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STORMWATER RUNOFF CONTROL: A MODEL ORDINANCE FOR MEETING LOCAL WATER QUALITY MANAGEMENT NEEDS

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INTRODUCTION

Water pollution abatement programs in the United States have been directed almost entirely toward the elimination of point sources of water pollution—defined in the Federal Water Pollution Control Act¹ as “any discernible, confined and discrete conveyance . . . from which pollutants are or may be discharged.”² Yet officials of the Environmental Protection Agency estimate that fifty percent or more of the nation’s water pollution is waste picked up from the land by rainfall, which then reaches ground and surface waters through runoff and seepage and not through a pipe or other point source of pollution.³

The waters which drain urban streets, construction sites, agricultural areas and other sites of intensive human use are often heavily

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On April 23, 1980, as this article was being prepared for publication, Dean Frank E. Maloney suddenly died. His colleagues, friends, and former students join with his family in mourning his passing. The authors wish to acknowledge and honor the many professional accomplishments and personal services of Dean Maloney by dedicating this article to his memory.

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1. 33 U.S.C. § 1251-1376 (1976 & Supp. II 1978).

2. 33 U.S.C. § 1362(14) (Supp. II 1978).

3. See G. AMY, R. PITT, R. SINGH, W. BRADFORD & M. LAGRAFF, WATER QUALITY MANAGEMENT PLANNING FOR URBAN RUNOFF I (1974) [hereinafter cited as G. AMY].

polluted with nutrients, oxygen demanding materials, suspended solids, trace metals, pesticides, petroleum products, and other deleterious substances. These pollutants are eventually carried directly into our streams, rivers, lakes, and the seas.

Until quite recently,⁴ the parameters of non-point pollution problems were unknown and the data even now available are inadequate in many areas to support the application of certain specific control mechanisms. One complicating element of the problem is that stormwater runoff occurs naturally in the absence of human activities and is thus, in part, the natural state of things. The relatively recent effort to systematically identify and control non-point sources of pollution such as stormwater runoff has illuminated the legal difficulty of the task. Runoff arises from intermittent and unpredictable events. Its quality depends on factors that are difficult to quantify and which vary from one site to another.

Unlike pollutants from point sources which can be regulated by the application of effluent limitations, control of stormwater runoff requires an entirely different approach. Stormwater runoff control necessarily involves the regulation of the land uses which degrade its quality or increase its volume. Because the authority to promulgate land use regulations has traditionally been delegated to local governments, the responsibility for stormwater management rests most heavily upon counties and municipalities. The Model Stormwater Runoff Control Ordinance presented here was developed⁵ to provide local governments with an effective mechanism for meeting this important responsibility.

The discussion which follows is meant to facilitate a better understanding of the Model Ordinance and its usefulness. Part I will describe the physical aspects of the surface water pollution problem. In Part II, general control techniques that can effectively reduce the harmful impacts of stormwater runoff are examined. Part III looks at the common law applicable to diffused surface waters. Part IV discusses the federal law which has stimulated the current search for non-point source pollution control mechanisms. Some of the legal

4. One of the first studies in the United States on the pollution potential of stormwater runoff was conducted in Detroit, Michigan in 1949. Palmer, *The Pollutational Effects of Storm-Water Overflows From Combined Sewers*, 22 SEWAGE AND INDUSTRIAL WASTES 154 (Feb. 1950).

5. The Model Ordinance went through several drafts over the course of the project. After the completion of each draft, copies were sent to water resource agencies and local governments throughout the United States for review and comment. The feedback received via this process was of tremendous help in the refinement of the Model Ordinance. Of special help were the comments received from the academic community, especially Dr. Edwin Pyatt, Dr. Wayne Huber, and Dr. James Heaney of the Department of Environmental Engineering, University of Florida, Gainesville, Florida.

considerations that bear on the implementation of the Model Ordinance are examined in Part V. Finally, Part VI is the Model Stormwater Runoff Control Ordinance with commentary.

I. ENVIRONMENTAL IMPACTS OF STORMWATER RUNOFF

The Structure and Function of Natural Systems

In the absence of human development and use of land, stormwater runoff causes few problems. Indigenous biological systems are adapted to and dependent upon existing soils and hydrologic cycles. The quality and hydrodynamics of runoff are influenced in turn by the community of plants and animals. Natural systems tend to be dominated by mature, climax communities⁶ in which a diversity of well adapted plants and animals efficiently capture, use, and recycle a large percentage of the available nutrients.⁷ Vegetation obstructs the flow of runoff and protects the soil with a canopy of leaves, a covering of dead plant material, and an intricate network of roots.⁸ Organic material and small animal and insect burrows give the soil an open, spongelike structure, enabling it to quickly absorb and hold water.⁹ The period of runoff is thus extended, the rate is reduced and ground-water is recharged.

Because wetlands exist at the interface of terrestrial and aquatic systems and are the location of intensive biological activity, they have especially significant effects on runoff.¹⁰ Wetlands buffer rapid

6. A climax community results from a process of biological development known as community succession in which a group of species occupying an area modifies it to the extent that a succeeding group of species can become dominant. The process continues progressively until an equilibrium is reached. R. DARNELL, IMPACTS OF CONSTRUCTION ACTIVITIES IN WETLANDS OF THE UNITED STATES 50-51 (1976).

7. *Id.* at 52-55; Woodwell, *The Energy Cycle of the Biosphere*, in THE BIOSPHERE: A SCIENTIFIC AMERICAN BOOK (1970).

8. U.S. ENVIRONMENTAL PROTECTION AGENCY, PROCESSES, PROCEDURES AND METHODS TO CONTROL POLLUTION RESULTING FROM ALL CONSTRUCTION ACTIVITY 46-47 (1973) [hereinafter cited as PROCESSES]. No researcher has ever had the time or patience to count how many miles of roots support a single large tree. The work has been done on rye grass, however, with amazing results. "The report states that 14 billion [root] hairs, with an end-to-end length of 6 thousand miles, were crammed into one cubic inch of soil." R. PLATT, THE GREAT AMERICAN FOREST 81 (1971).

9. Jenny, *Soil as a Natural Resource*, in NATURAL RESOURCES 184, 198 (M. Huberty & W. Flock eds. 1959).

10. See generally R. DARNELL, *supra* note 6; C. WHARTON, H. ODUM, K. EWEL, M. DUEVER, A. LUGO, R. BOYT, J. BARTHOLOMEW, E. DE BELLEVUE, S. BROWN, M. BROWN & L. DUEVER, FORESTED WETLANDS OF FLORIDA, THEIR MANAGEMENT AND USE (1977) [hereinafter cited as FORESTED WETLANDS]; *Proposed Amendments to the Federal Water Pollution Control Act: Hearings on S. 2770, § 404 Before the Senate Committee on Public Works*, 94th Cong., 2d Sess. 390 (1976) [hereinafter cited as § 404 Hearings] (statements of Louis L. Clapper & Kenneth S. Kamlet); *id.* at 683-87 (statement of Orle L. Loucks).

hydrologic fluctuations by collecting runoff and then gradually releasing it. They can thus reduce flood peaks and slow the velocity of flood waters as well as diminish the duration and severity of droughts.¹¹ In some areas, wetlands are important sites of ground-water recharge.¹² Wetlands also help to maintain water quality by trapping nutrients, suspended solids, and other substances commonly contained in runoff.¹³

The ecological health of downstream areas depends in part on receiving runoff that has been reduced in quantity and enhanced in quality by the upriver vegetation and soils in their undisturbed state.¹⁴ Flood plain vegetation, for example, while needing to receive periodic overflows of water¹⁵ will die if flooded excessively.¹⁶ The timing of inundation, which depends on hydrologic characteristics of the watershed, is crucial.¹⁷ Estuaries similarly depend upon the input of freshwater to dilute seawater and create the brackish, nutrient-rich

11. § 404 Hearings, *supra* note 10, at 419, 685. A six inch rise in water over ten acres of wetlands places more than 1.5 million gallons in storage. *Id.* at 501. Researchers who studied the Nepuset River in Massachusetts concluded that destroying 10% of the wetlands would raise flood stages by 1.5 feet, and destroying 50% would raise floodwaters 3 feet. *Id.* at 685 n.1. The Army Corps of Engineers calculates that a 40% reduction in wetlands along the Charles River would elevate flood stages between 2 to 4 feet. *Id.* at 685. In addition, by slowing the velocity of flood waters, wetlands can help reduce the damages when flooding does occur. For example, after widespread flooding in Pennsylvania, bridges below a wetland that had been preserved were unharmed, while similar bridges elsewhere were destroyed. *Id.* at 501.

12. *Id.* at 419, 501.

13. FORESTED WETLANDS, *supra* note 10, at 51, 111-13. A study of Lake Minnetonka in Minnesota for the period from June 1969, to May 1970, revealed that although 77,000 pounds of phosphorus were released into the watershed, only 50,300 pounds reached the lake. Wetlands trapped 26,700 pounds. *Id.* at 509. The 512 acre Tincum marsh daily reduces about 7.7 tons of BOD, 4.9 tons of P-PO₄, 4.3 tons of N-NH₃, 138 pounds of N-NO₃ and produces 20 tons of O₂. *Id.* at 503. In the Alcovy River system, the water of one tributary which was heavily polluted by human sewage and chicken offal could be reclassified as clean after passing through 2.75 miles of river swamp and upgraded to excellent after 7 more miles. *Id.* In Wisconsin, researchers concluded that 300 acres of wetlands which had been destroyed would have trapped 200-300 kg/yr of the phosphorus generated by agricultural and urban development of uplands. *Id.* at 684 n.5. It has been estimated that a 1,000 acre marsh may be able to purify the nitrogenous wastes of 20,000 people. *Id.* at 421. In addition, wetlands help to prevent siltation of downstream areas by slowing the flow of water, thus decreasing its ability to erode stream banks and allowing a portion of the sediment load to settle out. *Id.* at 686 n.9.

14. See generally J. CLARK, COASTAL ECOSYSTEMS, ECOLOGICAL CONSIDERATIONS FOR MANAGEMENT OF THE COASTAL ZONE (1975); GEORGIA DEP'T OF NATURAL RESOURCES, INLAND LAND USE ACTIVITIES AND GEORGIA'S COASTAL WATERS (1979) [hereinafter cited as GEORGIA'S COASTAL WATERS]; FRESHWATER AND THE FLORIDA COAST (W. Seaman & R. McLean eds. 1977).

15. FORESTED WETLANDS, *supra* note 10, at 132-49.

16. R. DARNELL, *supra* note 6, at 204.

17. *Id.* at 209.

conditions that many marine organisms such as shrimp and oysters need.¹⁸ Again, flows must fluctuate cyclically to maintain optimal conditions.

Impacts of Land Development

Unwise land development alters the balance. When vegetation is removed or a wetland is filled, the functions they perform are lost. Since water flows faster over a smoother surface, the rate of runoff increases. If the soil is compacted or covered by an impervious surface, less water can infiltrate and the total quantity of runoff also increases. The cumulative impact of roofing, paving, filling, and compacting extensive areas can be enormous. More water runs off the land, and at a much faster rate. Streams experience more rapid and accentuated fluctuations in flow. Their banks erode as the channel changes its configuration to accommodate the increased velocity and volume.¹⁹ Flood peaks may be doubled,²⁰ yet because the recharge of groundwater has been blocked, streams may cease to flow during dry periods.²¹ Lowering water tables may stress overlying vegetation, and all of the downstream systems that depend on a flow of freshwater—wetlands, flood plains, and estuaries—may be severely disrupted.

Land development also accelerates erosion. The erosion of a construction site may be as great as 40,000 times that of undeveloped land.²² As water flows over the unprotected soils, it picks up particles and carries them in suspension.²³ Greater velocity and turbulence increases the water's ability to erode and transport sediment.²⁴ When the water slows, its capacity to hold solids in suspension decreases

18. *Id.* at 229-34. It has been estimated that "at least two-thirds of the animal populations in the oceans spend an essential portion of their life cycle in estuarine waters or are dependent upon species that do." U.S. COUNCIL ON ENVIRONMENTAL QUALITY, ENVIRONMENTAL QUALITY: FIRST ANNUAL REPORT 176 (1970).

19. ENVIRONMENTS FOR TOMORROW, INTER-RELATIONSHIPS OF LAND USE PLANNING AND CONTROL TO WATER QUALITY MANAGEMENT PLANNING, 49-50 (1973) [hereinafter cited as INTER-RELATIONSHIPS]; U.S. ENVIRONMENTAL PROTECTION AGENCY, PREVENTIVE APPROACHES TO STORMWATER MANAGEMENT 16-21 (1977) [hereinafter cited as PREVENTIVE APPROACHES].

20. R. DARNELL, *supra* note 6, at 131-32.

21. *Id.* During dry periods, many streams depend on base flow from groundwater to maintain a minimum flow. If groundwater is not recharged during wet periods, the stream may become intermittent. See INTER-RELATIONSHIPS, *supra* note 19, at 49.

22. J. Wildrick, K. Kuhn & W. Kerns, *Urban Water Runoff & Water Quality Control* 10 (Dec. 1976) (Report prepared for the Virginia Water Resources Research Center).

23. R. DARNELL, *supra* note 6, at 9.

24. *Id.*

and they settle.²⁵ The resulting sedimentation is one of the most insidious forms of biological destruction.²⁶

Sediment literally smothers insects, molluscs, crustaceans, and fish eggs.²⁷ It clogs the gills of fish, blocks the transmission of light, and increases water temperatures.²⁸ The filling of channels, lakes, and reservoirs by sediment decreases their usefulness.²⁹ Finally, sediment is a major transport mechanism for other pollutants, which attach themselves to the particles and are moved with them.³⁰

Lawns, streets, roofs, parking lots, and other surfaces of urban areas collect a variety of noxious pollutants. Air pollutants, including the lead from automobile exhaust, settle in large quantities.³¹ Another significant source of pollutants is litter.³² Many people commonly discard such materials as food, wash water, and cigarette butts on the sidewalk or street. They may dispose of rubbish or used crankcase oil by dumping it into a stormwater drain.³³ Dogs freely defecate.³⁴ In addition, road deicing salts,³⁵ herbicides, pesticides, fungicides, fertilizers, and other chemicals are widely dispersed in the urban environment.³⁶

25. *Id.* at 19.

26. Over 4 billion tons of sediment are washed into our nation's waterbodies each year. 2 COMMITTEE ON PUBLIC WORKS, U.S. SENATE, 93rd CONG., 1st SESS., A LEGISLATIVE HISTORY OF THE WATER POLLUTION CONTROL ACT AMENDMENTS OF 1972, at 1457 (1973). The public tends not to recognize silt as a pollutant and to view turbidity as an unavoidable natural phenomenon. Most people never knew the original clarity of their local waterway and therefore expect it to be silty. Hines, *Agriculture: The Unseen Foe in the War on Pollution*, 55 CORNELL L. REV. 740, 754 (1970).

27. R. DARNELL, *supra* note 6, at 234-53.

28. *Id.*

29. "Annual sediment deposits in the nation's reservoirs amount to approximately 950,000 acre-feet, or nearly five times the total volume excavated in building the Panama Canal." U.S. ENVIRONMENTAL PROTECTION AGENCY, LEGAL AND INSTITUTIONAL APPROACHES TO WATER QUALITY MANAGEMENT PLANNING AND IMPLEMENTATION at VI, n.1 (1977) [hereinafter cited as APPROACHES]. This excellent work, prepared for the U.S. Environmental Protection Agency by the Environmental Law Institute, Washington, D.C., was a particularly helpful resource in the preparation of this article.

30. PROCESSES, *supra* note 8, at 92, 96.

31. Particulates settle on urban surfaces at an annual rate of from 170 to 320 metric tons per square kilometer. U.S. ENVIRONMENTAL PROTECTION AGENCY, URBAN STORMWATER MANAGEMENT AND TECHNOLOGY: AN ASSESSMENT 88 (1974) [hereinafter cited as ASSESSMENT].

32. Measurements of litter in urban areas have shown that it accumulates at rates of from .5 to 8 lb/day/100 feet of curb. G. AMY, *supra* note 3, at V, 6.

33. ASSESSMENT, *supra* note 31, at 136.

34. Beck, *The Impact of the Canine Clean-up Law*, 21 ENVIRONMENT 29 (October 1979).

35. G. AMY, *supra* note 3, at III, 1-3; ASSESSMENT, *supra* note 31, at 138. NaCl and CaCl are the principal salts used, together with additives such as cyanide and chromium. These materials are spread on roads at rates of 400 to 1200 lb/mile/application, and because of their solubility, almost all enter surface or groundwater. Concentrations as high as 2,730 mg/l of chlorides have been found in surface streams. *Id.*

36. ASSESSMENT, *supra* note 31, at 90.

Runoff flushes these pollutants into receiving waters. When natural filters such as soils, wetlands, or vegetated areas are bypassed or destroyed, the impacts are amplified. Numerous studies in recent years have depicted the magnitude of the problem.³⁷ The runoff from a typical American city during the first hour of a storm may carry many more pollutants than that same city's untreated sewage would carry during the same period.³⁸ The concentration of heavy metals in urban runoff may be 10 to 100 times that of sanitary sewage.³⁹ The Washington metropolitan area, covering only two percent of the Potomac River Basin, contributes 25 percent of its total sediment load.⁴⁰ A study of the streams in metropolitan Atlanta indicates that 45 percent of the biochemical oxygen demand and 95 percent of the suspended solids were derived from runoff.⁴¹ A comparison in the Roanoke river basin between the pollutant loads of urban and rural runoff showed that urban runoff contained 2.4 times more organic carbon, 19.2 times more phosphates, 3.8 times more free nitrogen, 2.7 times more nitrates, 5.5 times more sodium, and 6.1 times more calcium.⁴²

II. CONTROL MEASURES

It is apparent that declining water quality, increased flooding, the disruption of estuarine salinity gradients and related aspects of environmental degradation cannot be prevented or reversed unless the impacts of urban stormwater runoff are adequately addressed. Control measures have been developed and are continually being refined.⁴³ The selection of appropriate controls for a particular proposed land use depends upon specific characteristics of the site. Nevertheless, general techniques can be described.

One method of control is to collect runoff and treat it in large sewage treatment plants or similar facilities.⁴⁴ The enormous volume of stormwater runoff and the costs of treating it render this method impractical except for certain intensely urbanized areas, particularly where the pattern of existing development effectively forecloses other options. In many situations, however, structural improvements can

37. See G. AMY, *supra* note 3, at V, 1-12.

38. *Id.* at V, 4 & 8.

39. *Id.* at V, 11.

40. ASSESSMENT, *supra* note 31, at 140.

41. GEORGIA'S COASTAL WATERS, *supra* note 14, at 3-106 to 3-107.

42. *Id.* at 3-107.

43. See the stormwater management practices manuals set out in Appendix A *infra*.

44. G. AMY, *supra* note 3, at IV, 15-24. See generally ASSESSMENT, *supra* note 31, at 145-403.

be retrofitted into existing drainage systems. Government agencies can also physically collect pollutants through such activities as improved street sweeping⁴⁵ and catch basin cleaning.⁴⁶

Another approach to control is to regulate the dispersal of pollutants in the urban environment. Air pollution regulations, litter laws, restrictions on pesticide use, bans on the use of lead in gasoline, and animal control ordinances are examples of methods that can help to control the quality and quantity of substances that are deposited on urban surfaces and subsequently become a part of stormwater runoff.⁴⁷

The greatest opportunity for preventing further water quality degradation, however, is through proper location, design, construction, and maintenance of new urban development and its associated drainage systems.⁴⁸ The Model Stormwater Runoff Control Ordinance is designed to accomplish this objective. The full effectiveness of the ordinance cannot be realized, however, unless additional measures are used to protect water quality. Runoff controls should be integrated into a comprehensive planning, management, and regulatory process. Such vital components of the natural drainage system as wetlands, recharge areas, streams, and flood plains should be protected from development that is inconsistent with continued performance of their drainage control functions.⁴⁹ The urban drainage system should then be designed to modify the volume, rate, and quality of runoff in such a way that it can be released into the natural drainage system without causing adverse impacts.

Numerous techniques have been developed that can accomplish this objective. Erosion and sediment control practices should be implemented as an integral part of all construction projects. These prac-

45. Conventional street sweeping equipment is designed to remove litter and large particulate matter and thereby improve aesthetics. However, the remaining very fine particulate matter contains much of the pollutants. One study determined that, "Although this material accounted for only 5.9 percent, by weight, of the total solids . . . it contained approximately one-fourth of the total oxygen demand . . . perhaps one-third to one-half of the algal nutrients . . . , more than half of the heavy metals and nearly three-fourths of the total pesticides." G. AMY, *supra* note 3, at V, 9. Vacuum sweepers can be used to collect this source of pollutants. ASSESSMENT, *supra* note 31, at 136-37; M. WANIELISTA, STORMWATER MANAGEMENT, QUANTITY AND QUALITY 231-34 (1978) [hereinafter cited as M. WANIELISTA].

46. Organic materials and sediment accumulate and decompose in catch basins until they are flushed out by storm flows. Receiving waters may then receive a major influx of pollutants. ASSESSMENT, *supra* note 31, at 91-92.

47. G. AMY, *supra* note 3, at IV, 3-5, 12; APPROACHES, *supra* note 29, at VI, 10-11; PREVENTIVE APPROACHES, *supra* note 19, at 38-40, 46. See generally Beck, *supra* note 34.

48. APPROACHES, *supra* note 29, at VI, 8.

49. *Id.* at III.

tices generally involve minimizing the disturbance of soils, recovering and protecting disturbed soils, and trapping the sediment in runoff before it causes damage. Most importantly, runoff should be detained. Its flow from the site should be retarded rather than speeded, by routing the hydrologic path over a longer distance, across rougher surfaces, and through constricted openings. Detention basins are often constructed to receive and store the initial volume of stormwater runoff for subsequent release at a rate that approximates the flow that would have occurred prior to the development. Some of the runoff should also be retained so that the overall volume of water leaving the site is not increased. In particular, the first flush of runoff following a storm, which carries most of the pollutants, should be retained. The water that is retained can be disposed of by infiltration into the soils or by evaporation. Seepage pits, percolation ponds, irrigation systems, and detention areas can be used for retention.

III. THE COMMON LAW APPROACH TO DIFFUSED SURFACE WATER PROBLEMS

Drainage Rights

The rules developed at common law for adjudicating disputes over the drainage of surface water differ substantially according to how the water is classified. Theories of riparian rights⁵⁰ and prior appropriation⁵¹ generally apply to confined surface water contained in a "waterbody" or "watercourse." A different set of common law rules governs the drainage of diffused surface waters. Determining into which class the waters fall, then, is crucial.⁵²

A typical definition of a watercourse states that it is a stream of water usually flowing in a definite channel having a bed and sides, or banks, and discharging itself into some other stream or body of water. . . . In general the channels and banks formed by the flowing of the water must present to the eye on a casual glance, the unmistakable evidence of the frequent action of running water . . . ; but

50. See generally Dolson, *Diffused Surface Waters and Riparian Rights: Legal Doctrines in Conflict*, 1966 WISC. L. REV. 58; Hanks, *The Law of Water in New Jersey*, 22 RUTGERS L. REV. 621, 624-69 (1968).

51. *Oklahoma Water Res. Bd. v. Central Oklahoma Master Conservancy Dist.*, 464 P.2d 748 (Okla. 1968). See generally 5 WATERS AND WATER RIGHTS 1-446 (R. Clark ed. 1972).

52. The distinction may sometimes be difficult to perceive. See generally Davis, *The Law of Surface Water In Missouri* (pt. 1), 24 MO. L. REV. 137, 138-45 (1959); Maloney & Plager, *Diffused Surface Water: Scourge or Bounty*, 8 NAT. RES. J. 72, 73-75 (1968); Weston, *Gone With the Water-Drainage Rights and Stormwater Management in Pennsylvania*, 22 VILL. L. REV. 901, 903-05 (1977).

the water need not flow continually, and there are many water-courses which are sometimes dry.⁵³

Diffused surface waters, on the other hand, are waters that

occur on the surface of the earth in places other than definite streams or lakes or ponds; they may originate from any source and may be flowing vagrantly over broad lateral areas or, occasionally for brief periods, in natural depressions.⁵⁴

Until runoff reaches a watercourse or waterbody, then, it would be treated as diffused surface waters.

Three basic common law rules govern the drainage of diffused surface waters.⁵⁵ They are the civil law rule, the common enemy doctrine, and the reasonable use rule.

In its purest form, the civil law rule⁵⁶ prohibits interference with the natural flow of diffused surface waters.⁵⁷ The lower owner must accept the surface waters which naturally drain onto the land⁵⁸ and the upper owner can do nothing that increases the burden.⁵⁹ This rule is often expressed as an easement of natural drainage.⁶⁰ An underlying policy of the rule is a belief that enforcement of natural drainage patterns results in the least harm since all landowners should be adapted to them.⁶¹

Most jurisdictions that follow the civil law rule have modified it substantially, however, to avoid undesired constraints on land devel-

53. *Kislinski v. Gilboy*, 19 Pa. Super. Ct. 453, 454-55 (1902), quoted in *Kunkle v. Borough of Ford City*, 305 Pa. 416, 419-20, 158 A. 159, 160-61 (1931). See also *Tampa Waterworks Co. v. Cline*, 37 Fla. 586, 20 So. 780 (1896). A waterbody is treated the same as a watercourse when it has "a reasonably permanent existence." See *Dolson*, *supra* note 50, at 90-91. See also *Maloney & Plager, Florida's Lakes: Problems in a Water Paradise*, 13 U. FLA. L. REV. 1 (1960).

54. *Oklahoma Water Res. Bd. v. Central Oklahoma Master Conservancy Dist.*, 464 P.2d 748, 751 (Okla. 1968).

55. See generally Annot., *Modern Status of Rules Governing Interference with Drainage of Surface Waters*, 93 A.L.R. 3d 1193 (1979); *Davis*, *supra* note 52; *Kinyon & McClure, Interferences With Surface Waters*, 24 MINN. L. REV. 891 (1946); *Maloney & Plager*, *supra* note 52; *Snodgrass & Davis, The Law of Surface Water in Missouri* (pt. 2), 24 MO. L. REV. 281 (1959); *Weston*, *supra* note 52; Comment, *The Application of Surface Water Rules in Urban Areas*, 42 MO. L. REV. 76 (1977).

56. In support of the thesis that the rule was derived from the civil law, see 3 H. FARNHAM, *WATERS AND WATER RIGHTS*, § 889a (1904).

57. *Merritt v. Parker*, 1 N.J.L. 526 (1795); *Gough v. Goble*, 2 Ill.2d 577, 119 N.E.2d 252 (1954). See generally *Davis*, *supra* note 52, at 147-49; *Hanks, The Law of Water in New Jersey*, 22 RUTGERS L. REV. 621, 688-90 (1968); *Kinyon & McClure*, *supra* note 55, at 893-97; *Maloney & Plager*, *supra* note 52, at 76-77; *Weston*, *supra* note 52, at 906-08.

58. *Le Van v. Hedlund Plumbing & Heating*, 37 Mich. App. 271, 194 N.W.2d 725 (1971).

59. *New Homes of Pensacola, Inc. v. Mayne*, 169 So.2d 345, 347 (Fla. Dist. Ct. App. 1964).

60. See *Boynton v. Longley*, 19 Nev. 69, 6 P. 437, 438 (1885).

61. *Davis*, *supra* note 52, at 147-48; *Kinyon & McClure*, *supra* note 55, at 895.

opment.⁶² Upper landowners are thus often allowed to enhance natural drainage if the alterations are minor⁶³ or reasonable,⁶⁴ or there is no substantial and damaging increase in flow.⁶⁵ Some courts have simply abandoned the civil law rule for urban areas⁶⁶ while others have abandoned it for agricultural drainage.⁶⁷

The common enemy rule is opposite to the civil law rule.⁶⁸ Its basic premise is that diffused surface waters are an enemy and that every landowner has a right to fight this enemy without regard for the consequences to others.⁶⁹ Thus, under the pure common enemy rule an upper landowner may construct works that drain water onto lower lands and damage them without incurring any liability.⁷⁰ Similarly, the owner of lower lands may obstruct the drainage and back water onto upper lands or divert it onto adjacent lands with impunity.⁷¹

The philosophical justification for the common enemy rule is essentially the eighteenth century notion that landowners have absolute, inviolable rights to use and develop their land however they desire.⁷² It was believed that application of the rule would tend to encourage the use and development of land.⁷³ Whether it has this effect is highly questionable.⁷⁴ Certainly California, which follows the civil law rule, has suffered no lack of development.⁷⁵ Landowners who are subject to unrestricted flooding by their neighbors may in fact be discouraged from development by the common enemy rule.⁷⁶

The common enemy rule has also been substantially modified to ameliorate its unjust consequences. One common modification is to

62. See, e.g., *Keys v. Romley*, 64 Cal.2d 396, 50 Cal. Rptr. 273, 412 P.2d 529 (1966).

63. *Kinyon & McClure*, *supra* note 55 at 920; Comment, *supra* note 55, at 81.

64. *Keys v. Romley*, 64 Cal.2d 396, 50 Cal. Rptr. 273, 412 P.2d 529 (1966); Comment, *supra* note 55, at 80-81.

65. *DeWitt v. DeWitt*, 259 Iowa 1037, 147 N.W.2d 32, 33 (1966).

66. *Dekle v. Vann*, 279 Ala. 153, 182 So.2d 885 (1966); *Drummond v. Franck*, 252 Ala. 474, 41 So.2d 268, 272 (1949); *Lunsford v. Stewart*, 95 Ohio App. 383, 120 N.E.2d 136 (1953). *But see*, *Calvaresi v. Brannan Sand & Gravel Co.*, 35 Colo. App. 271, 534 P.2d 652 (1975); *Kinyon & McClure*, *supra* note 55, at 933-34.

67. See, e.g., *Garbarino v. Van Cleave*, 214 Or. 554, 330 P.2d 28 (1958).

68. See generally *Davis*, *supra* note 52, at 149-51; *Kinyon & McClure*, *supra* note 55, at 898-904; *Maloney & Plager*, *supra* note 52, at 78-79; *Weston*, *supra* note 52, at 908-10.

69. The term "common enemy" appears to have been adopted from an English case that referred to the sea. *Davis*, *supra* note 52, at 150.

70. *Greeley v. Maine Cent. R.R.*, 53 Me. 200 (1865).

71. See, e.g., *Cloverleaf Farms, Inc. v. Surratt*, 349 N.E.2d 731 (Ind. Ct. App. 1976); *Johnson v. Whitten*, 384 A.2d 698 (Me. 1978).

72. *Pennsylvania Coal Co. v. Sanderson*, 113 Pa. 126, 6 A. 453 (1886).

73. *Barkley v. Wilcox*, 86 N.Y. 140 (1881).

74. *Weston*, *supra* note 52, at 909-10.

75. *Id.* at 909.

76. *Id.* at 910; *Hanks*, *supra* note 57, at 691.

prohibit the collection by artificial means of diffused surface waters and the discharge of them in a concentrated flow onto adjacent land.⁷⁷ Discharge into a natural drainage way may be required if one is available.⁷⁸ In addition, many courts now insist that, although landowners may alter the natural flow of surface water, they must use reasonable care to avoid causing unnecessary harm.⁷⁹ In other words, damage to the property of others by altering drainage will only be tolerated when it is reasonably unavoidable in order to use one's own property. In many instances a court will escape application of the common enemy rule by determining that a watercourse has been obstructed rather than that the waters are diffused surface waters.⁸⁰

The reasonable use rule is a third major common law approach to the drainage of diffused surface water.⁸¹ Unlike the civil law and common enemy rules, it is grounded in theories of tort liability rather than property law.⁸² The basic principle is that although drainage alterations should be allowed, they must meet a test of "reasonableness."⁸³ Reasonableness is a factual determination that must be made with reference to the particular circumstances of each case.⁸⁴ Significant factors include "the nature and importance of the improvements sought to be made, the extent of the interference with the water, . . . the amount of injury done to the other land owners as compared with the value of such improvements, and . . . whether such injury could or could not have been reasonably foreseen."⁸⁵

Many commentators believe the reasonable use rule represents a desirable trend.⁸⁶ Because of the rule's flexibility, it is not necessary to stretch the application of an exception to achieve just results. Although the result might be the same as under the modified civil law

77. Kinyon & McClure, *supra* note 52, at 916-19; Weston, *supra* note 52, at 926-28.

78. *Leaders v. Sarpy County*, 134 Neb. 817, 279 N.W. 809 (1938).

79. *Brasko v. Prislovsky*, 207 Ark. 1034, 183 S.W.2d 925 (1944); *Pfeiffer v. Brown*, 165 Pa. 267, 30A 844 (1895); *Seventeen, Inc. v. Pilot Life Ins. Co.*, 215 Va. 74, 205 S.E.2d 648, 651-52 (1974); Kinyon & McClure, *supra* note 55, at 928-31.

80. *Paasch v. Brown*, 190 Neb. 421, 208 N.W.2d 695 (1973); Weston, *supra* note 52, at 923-24. In general, a landowner may drain into a watercourse so long as "unreasonable" harm is not caused to other riparians, water is not diverted into the watercourse from another watershed and the capacity of the watercourse is not exceeded. *Maloney & Plager, supra* note 52, at 92.

81. See generally *Davis, supra* note 52, at 151-52; Kinyon & McClure, *supra* note 55, at 904-13.

82. *Maloney & Plager, supra* note 52, at 79-80.

83. *Pendergrast v. Aiken*, 293 N.C. 201, 236 S.E.2d 787 (1977); *Butler v. Bruno*, 115 R.I. 264, 341 A.2d 735 (1975); *State v. Deetz*, 66 Wis.2d 1, 224 N.W.2d 407 (1974).

84. See RESTATEMENT (SECOND) OF TORTS § 825 (1979).

85. *Swett v. Cutts*, 50 N.H. 439, 446 (1870).

86. Kinyon & McClure, *supra* note 55, at 935-39; Weston, *supra* note 52, at 910-11; *Comment, supra* note 55, at 96-99.

or common enemy rules, it can be more readily understood by reference to the factors that determine reasonableness.

Common Law Liability for Water Pollution

Common law rights regarding the quality of diffused surface waters are generally either subsumed under the riparian rights applicable to contained surface waters or protected by nuisance law.⁸⁷ The first application of riparian rights to water quality was through the natural flow doctrine which prohibited any alteration of the natural condition of the water.⁸⁸ As in the case of drainage law, this strict approach was soon modified into a rule of reasonable use under which the lower riparian has only a right to have the water kept free of pollution that is both harmful and unreasonable.⁸⁹ The approach to water quality control through riparian water law has thus become virtually indistinguishable in its application from the general law of nuisance.⁹⁰

The term nuisance encompasses two discrete theories of action, private nuisance and public nuisance. A private nuisance is an unreasonable interference with the use of private property.⁹¹ A public nuisance, on the other hand, is an unreasonable interference with rights held by the public in general.⁹² Although a water polluting activity may constitute both a public and private nuisance, the distinction is important because only public officials may prosecute a public nuisance, unless a private individual can show "special damages."⁹³

The gravamen, then, of common law restrictions on water pollution is unreasonable harm. Pollutants can be discharged into waters

87. Liability may also be based on theories of trespass, negligence, or strict liability. These concepts are far less successfully applicable to stormwater runoff control, however. See generally Juergensmeyer, *Common Law Remedies and Protection of the Environment*, 6 U.B.C. L. REV. 215, 220-25 (1971); Maloney, *Judicial Protection of the Environment: A New Role for Common-Law Remedies*, 25 VAND. L. REV. 145, 149-51 (1972).

88. Hanks, *supra* note 50, at 628-29; Maloney, *supra* note 87, at 151; Comment, *Private Remedies for Water Pollution*, 70 COLUM. L. REV. 734, 736 (1970).

89. Hanks, *supra* note 50, at 630-32; Maloney, *supra* note 87, at 151.

90. Hines, *Nor Any Drop to Drink: Public Regulation of Water Quality, Part I: State Pollution Control Programs*, 52 IOWA L. REV. 186, 196-97 (1966); Maloney, *supra* note 87, at 152; Comment, *supra* note 88, at 738-44.

91. W. PROSSER, *HANDBOOK OF THE LAW OF TORTS* § 89 (4th Ed. 1971).

92. *RESTATEMENT (SECOND) OF TORTS* § 821B (1979).

93. *Bouquet v. Hackensack Water Co.*, 90 N.J.L. 203, 101 A. 379 (1917). Special damages are damages that are different in kind from those suffered by the public at large. For example, if the pollution of a navigable watercourse caused fish to be killed, a non-riparian would usually not be able to bring a private action since his injury would not be different than that of the general public. For special damages to exist, the plaintiff would have to show, for example, that his commercial fishing business was ruined or that his cow had been killed by the pollution. Hines, *supra* note 90, at 197-98.

so long as they do not unreasonably interfere with the exercise of public or private property rights. To determine reasonableness a court balances the social utility of the competing uses.

Inability of the Common Law to Successfully Regulate Stormwater Runoff

The common law appears to be groping, with some success, toward acceptable analytical tools for use in adjudicating clearcut disputes between limited numbers of parties over alterations in the drainage or quality of surface waters. It is fundamentally unable, however, to adequately control the serious, adverse environmental and physical impacts of improperly managed stormwater runoff.⁹⁴ The usefulness of the common law is necessarily restricted to situations in which one party has clearly and directly caused enough injury to another party that the latter is willing to risk the large expense that is necessary to prove and prosecute a private action. If one landowner channels the runoff from a parking lot and directs it onto the residential lot of another landowner, flooding a home, the common law may be able to resolve the dispute.⁹⁵ But the problems resulting from improper management of stormwater runoff and the necessary solutions are much more complex. They are usually manifested as the cumulative impact of numerous actions that, by themselves, are relatively insignificant. For example, the accelerated eutrophication of a lake may be caused by an excessive inflow of nutrients from an intricate network of poorly designed drainage ditches that serves thousands of individual homeowners, businesses, roads, and public institutions. Who should be liable? Who should have standing to bring the suit? How could a court enforce an order? What if there are other sources of nutrients also? The deficiencies of the common law are evident in such a case.

To begin with, there is the difficulty of proving a causal connection between the defendant's activities and the resulting harm to the plaintiff.⁹⁶ This is a particularly heavy burden when there are no major, specific, easily identified sources of pollution. The numerosity of parties to such litigation is a major obstacle to judicial resolution of the problems.⁹⁷ In addition, the basic common law concepts

94. See generally F. MALONEY, S. PLAGER & F. BALDWIN, *WATER LAW AND ADMINISTRATION: THE FLORIDA EXPERIENCE* § 112.4 (1968); Hines, *supra* note 90, at 196-201; Juergensmeyer, *supra* note 87, at 233-36.

95. See, *Lawrence v. Eastern Air Lines*, 81 So.2d 632 (Fla. 1955); Comment, *Torts: Defense of Coming to a Nuisance*, 9 U. FLA. L. REV. 228 (1956).

96. Hines, *supra* note 90, at 198.

97. *Id.* at 198-99.

upon which liability must rest depend upon an application of terms such as "reasonableness" that are essentially vague and ambiguous. The determination of reasonableness involves a balancing of many factors. It is therefore subject to a wide range of varying interpretations by different judges and juries.⁹⁸ Private remedies may also be blocked by prescription,⁹⁹ laches, a balancing of the equities,¹⁰⁰ legalization by the government,¹⁰¹ or the necessity of proving special damages.¹⁰²

More fundamental limitations arise from the nature of the adversary process and the judicial system.¹⁰³ The development, revision, and enforcement of a comprehensive stormwater pollution control program requires planning and a constant, systematic application of technical expertise that is beyond the capability of any court. Courts depend upon adversaries to bring a dispute before them. There are no effective mechanisms to ensure that all polluters are brought into court and that litigation is prosecuted to protect the public interest rather than the interests of the person prosecuting the action. Because decisions are made on a case by case basis, the system has difficulty in handling interrelated and cumulative effects. In addition, because judges are trained in law, not science, they may not be qualified to make the necessary decisions. Finally, the judicial process is often too expensive in terms of time and money. For these reasons, society has been turning toward administrative agencies to plan and implement stormwater runoff controls.

IV. THE FEDERAL STIMULUS TOWARD BETTER STORMWATER RUNOFF CONTROL

The Federal Water Pollution Control Act

The federal role in combating water pollution has been steadily growing.¹⁰⁴ For many years Congress chose to leave the responsibility almost entirely to state and local governments.¹⁰⁵ Steadily declining water quality led eventually, however, to enactment of the Fed-

98. See Hines, *supra* note 90, at 198; Maloney, *supra* note 87, at 151; Comment, *supra* note 88, at 737-38.

99. Hines, *supra* note 90, at 198.

100. Maloney, *supra* note 87, at 151; Comment, *supra* note 88, at 748.

101. Maloney, *supra* note 87, at 147-48.

102. *Id.* at 147; Comment, *supra* note 88, at 741.

103. Hines, *supra* note 90, at 200-01.

104. For a description of the history of federal involvement in water pollution control, see Hines, *Nor Any Drop To Drink: Public Regulation of Water Quality, Part III: The Federal Effort*, 52 IOWA L. REV. 799 (1957).

105. See, e.g., the Water Quality Act of 1965, § 1(b), 5(a) Pub. L. No. 89-234, 79 Stat. 903.

eral Water Pollution Control Act Amendments of 1972 (FWPCA),¹⁰⁶ in which the federal government took a leading financial and regulatory role in water pollution control.¹⁰⁷ Although the statute was substantially amended in 1977 and is now known as the Clean Water Act,¹⁰⁸ the original structure and content is largely intact.¹⁰⁹

The FWPCA created a comprehensive program designed to "restore and maintain the chemical, physical and biological integrity of the Nation's waters."¹¹⁰ This goal is to be accomplished by: (1) eliminating the discharge of pollutants into navigable waters by 1985; (2) attaining a degree of water quality conducive to recreation and the protection of fish and wildlife by July 1, 1983; (3) forbidding the discharge of toxic pollutants; (4) constructing publicly owned treatment works through federal financial assistance; (5) implementing areawide waste treatment management plans; and (6) initiating research to develop the necessary technology.¹¹¹

There are three primary means for implementing the act. A construction grants program provides money for building waste treatment plants.¹¹² A permitting process, the National Pollutant Discharge Elimination System (NPDES), regulates the discharge of pollutants from "point sources."¹¹³ An areawide waste treatment management planning process is designed to integrate all planning, funding, and regulatory efforts in order to meet water quality goals.¹¹⁴

Section 208: Areawide Waste Treatment Management Planning

The NPDES permit system is an elaborate process¹¹⁵ for directly

106. Pub. L. 92-500, 86 Stat. 816.

107. See generally Donley & Hall, *Section 208 and Section 303 Water Quality Planning and Management: Where is it Now?*, 6 ENV'T'L L. RPTR. 50115 (1976); Federman, *The 1972 Water Pollution Control Act: Unforeseen Implications for Land Use Planning*, 8 URB. LAW. 140 (1976); Jungman, *Areawide Planning Under the Federal Water Pollution Control Act Amendments of 1972: Intergovernmental and Land Use Implications*, 54 TEX. L. REV. 1047 (1976); Phillips, *Developments in Water Quality and Land Use Planning: Problems in the Application of the Federal Water Pollution Control Act Amendments of 1972*, 10 URB. L. ANN. 43 (1975).

108. Pub. L. No. 95-217, 91 Stat. 1566 (codified at 33 U.S.C. § § 1251-1376 (Supp. II 1978)).

109. See generally Hall, *The Clean Water Act of 1977*, 11 NAT. RESOURCES LAW. 343 (1978); Comment, *The Clean Water Act of 1977: Great Expectations Unrealized*, 47 U. CIN. L. REV. 259 (1978).

110. 33 U.S.C. § 1251(a) (1976).

111. *Id.*

112. *Id.* § § 1281-1288 (Supp. II 1978).

113. *Id.* § 1342 (Supp. II 1978).

114. *Id.* § 1288 (Supp. II 1978).

115. A permit is required for the discharge of pollutants into waters of the United States. *Id.* § § 1311(a), 1342 (1976 & Supp. II 1978).

regulating the discharge¹¹⁶ of pollutants¹¹⁷ from point sources¹¹⁸ into waters of the United States.¹¹⁹ A point source is defined as "any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged."¹²⁰ Until stormwater runoff has been channelized, it cannot be regulated as a point source. However, unless such non-point sources of pollution are controlled, it will not be possible to meet water quality goals. A process for developing non-point source controls is therefore contained in section 208 of the act, the areawide waste treatment management planning process.¹²¹

The act required the governor of each state to designate appropriate agencies to perform intensive areawide planning for geographic areas of the state "which, as a result of urban-industrial concentrations or other factors, [have] substantial water quality control problems."¹²² It also required the state to undertake planning for all non-designated areas,¹²³ a requirement that was ignored until the case of *Natural Resources Defense Council, Inc. v. Train*¹²⁴ was decided. At that time more than half the states contained non-designated areas.¹²⁵ The decision required states to prepare 208 plans for the non-designated areas and was thus a great stimulus to water quality control.

The content of section 208 plans is specified in the act¹²⁶ and implementing regulations.¹²⁷ One major component is that the plans must identify non-point sources of pollution and develop alternative solutions for management of them.¹²⁸ Urban stormwater must specifically be addressed by the identification of best management prac-

116. *Id.* § 1362(12) (1976) (defining "discharge of a pollutant").

117. *Id.* § 1362(6) (1976) (defining "pollutant").

118. *Id.* § 1362(14) (Supp. II 1978) (defining "point source").

119. *Id.* § 1362(7) (1976) (defining "navigable waters").

120. *Id.* § 1362(14) (Supp. II 1978).

121. *Id.* § 1288 (Supp. II 1978).

122. *Id.* § 1288(a)(2) (1976).

123. *Id.* § 1288(a)(6) (1976).

124. 396 F. Supp. 1386 (D.D.C. 1975), *aff'd*, 564 F.2d 573 (D.C. Cir. 1977).

125. *Id.* at 1390. Ninety-five percent of the nation's waterways were thus non-designated. *Id.*

126. 33 U.S.C. § 1288(b) (1976 & Supp. II 1978). *See also* 40 C.F.R. §§ 35.1513-5, .1521-3, -4, (1979).

127. 40 C.F.R. § 35.1500-1550 (1979).

128. 33 U.S.C. § 1288(b)(1)(A) (Supp. II 1978) requires the plan to "be applicable to all wastes generated within the area" and to be "consistent with section 2181." 33 U.S.C. § 1281(c) (1976) states, "[t]o the extent practicable, waste treatment management shall . . . provide control or treatment of all point and nonpoint sources of pollution. . . ."

tices to achieve water quality goals.¹²⁹ Best management practices are "those methods, measures, or practices to prevent or reduce water pollution and include but are not limited to structural and non-structural controls, and operation and maintenance procedures."¹³⁰ Although nonregulatory measures, such as the construction of treatment facilities, may be developed, "[a]ppropriate regulatory programs to control the location, modification, and construction of facilities for municipal stormwater management must be identified."¹³¹ "Nonregulatory programs will be approved only where the plan provides a sound basis for determining that they will result in the achievement of water quality goals. If, after a period of implementation, a nonregulatory program is determined by EPA or the State not to be effective, the WQM [Water Quality Management] agency shall develop a regulatory program."¹³²

Significant sanctions may be imposed by the Environmental Protection Agency for failing to develop and implement an approved plan.¹³³ Permitting authority that had been delegated to the state may be withdrawn¹³⁴ and funds that are available under the act may be withheld.¹³⁵

V. LEGAL CONSIDERATIONS

It is not possible to treat in depth the many legal issues that may arise in the adoption and enforcement of the proposed Model Ordinance. Nevertheless, an attempt has been made to discuss in general terms some of the arguments that commonly are used to challenge the legality of local land use control legislation and the manner in which the Model Ordinance is designed to meet the challenge. The commentary that appears within the Model Ordinance addresses these issues in the context of specific provisions of the ordinance.

The Model Ordinance was modeled in large part on laws currently in force in cities and counties throughout the United States. One could say that, because of its origins, it has already in large part with-

129. 40 C.F.R. § 35.1521-4(e) (1979).

130. *Id.* § 35.1521-4(c)(1).

131. *Id.* § 35.1521-4(e). An "appropriate" regulatory program is apparently one that is the "most practicable method (considering economic, technical, social and environmental factors) of assuring that an effective nonpoint source control program is implemented." *Id.* § 35.1521-4(c)(2). See also 44 Fed. Reg. 30,021 (1979).

132. 40 C.F.R. § 35.1521-4(c)(2) (1979).

133. See 44 Fed. Reg. 30,023 (1979) for an explanation of EPA's policy. For the view that sanctions are weak, see Goldfarb, *Water Quality Management Planning: The Fate of 208*, 8 U. TOL. L. REV. 105, 120-131 (1976).

134. 40 C.F.R. § 35.1509-3 (1979).

135. *Id.* § 35.1509-3, .1533-3.

stood the test of actual use. Needless to say, before any local government adopts a version of the Model Ordinance, its legal staff should review the ordinance to insure it does not conflict with any local or state law.

Before discussing some of the common legal challenges, it is important first to note that local ordinances enjoy a strong presumption of constitutional validity.¹³⁶ Courts generally proceed on the premise that local governmental authorities have knowledge of local conditions and that sound discretion was exercised in enacting any local regulation.¹³⁷ This presumption requires that the burden lie upon the party attacking the ordinance to show its unreasonableness—a difficult burden to overcome.

Power to Regulate

A presumption underlying the Model Stormwater Runoff Control Ordinance is that adequate authority exists at the county and municipal government level to adopt and administer such a non-point source regulatory program. In many states, including Florida, where the authors reside, local governments have the necessary authority to implement this kind of regulation, based on constitutional or statutory enabling provisions.¹³⁸ In some states, however, the necessary authority is unclear. The determination of which of the fifty states have sufficient enabling legislation and which do not is beyond the scope of this article. Nevertheless, it is probably fair to say that even in those states where the authority to exercise non-point source pollution control has not been explicitly given to local governments, the authority has been implicitly granted through the enactment of general legislation covering such subjects as flood plain protection, wetland protection, coastal zone management, zoning, and subdivision control.¹³⁹

Delegation of Legislative Authority

Once it is determined that a local government possesses the requisite power to adopt a local non-point source regulatory program,

136. *Nebbia v. New York*, 291 U.S. 502 (1934); *New Orleans Pub. Service, Inc. v. City of New Orleans*, 281 U.S. 682 (1930); *Goriet v. Fox*, 274 U.S. 603 (1926); *Village of Euclid v. Ambler Realty Co.*, 272 U.S. 365 (1926).

137. *See Gant v. Oklahoma City*, 289 U.S. 98 (1933); *Atlantic & Pacific Tel. Co. v. Philadelphia*, 190 U.S. 160 (1902).

138. *See Strauss & Kusler, Statutory Land Use Control Enabling Authority in the Fifty States* (1976) (report of the Federal Insurance Administration, U.S. Dep't of Housing and Urban Development, Washington, D.C.).

139. *See APPROACHES, supra* note 29.

there remains the corollary question of whether the exercise of this power is lawful. One primary constraint is that legislative powers may not be delegated to administrative agencies. The separation of powers doctrine would otherwise be violated.¹⁴⁰

Because policy-making is a legislative function and cannot be delegated, the policies upon which the decision to approve or deny a permit is based must be formulated by a legislative body.¹⁴¹ In many communities the review of local permits is the function of the city or county commission itself. Under such circumstances, the delegation issue would not arise. However, when an ordinance provides that the permit review function is to be delegated to a non-legislative board or official, specific review standards must be established that incorporate the legislative policies and prevent policy-making by non-legislators.¹⁴²

In the Model Ordinance a water management plan must be submitted and approved before land can be platted or subdivided and before development can begin.¹⁴³ The review power was placed in a "local agency" which was contemplated to be a body of officials other than the local commissioners.¹⁴⁴ This is not to suggest that commissioners should not perform this function, only that in many communities they do not. Sufficient standards are contained in the Model Ordinance to provide for the lawful delegation of the review function to an executive board if that arrangement is preferred.

The objectives listed in section three of the Model Ordinance clearly outline the legislative policies to be applied to each applicant.¹⁴⁵ In addition, the section eight performance standards and section nine design standards constitute a codification of legislative policy in themselves. In reviewing the water management plan, the objectives, performance standards, and design standards significantly confine the discretion of the reviewing agency to a non-policy role.

140. See U.S. CONST. art. 1, § 1; *Youngstown Sheet & Tube Co. v. Sawyer*, 343 U.S. 579 (1952). It is well-settled that the delegation of legislative police power to a local government for exercise within its boundaries is constitutional. See *Standard Oil Co. v. City of Marysville*, 279 U.S. 582 (1929); *Sprout v. City of South Bend*, 277 U.S. 163 (1928); *Zucht v. King*, 260 U.S. 174 (1922); *Jacobson v. Massachusetts*, 197 U.S. 11 (1905).

141. See Mandelker, *Delegation of Power and Function in Zoning Administration*, 1963 WASH. UNIV. L.Q. 60, 84-85.

142. See generally cases cited in Annot., 58 A.L.R.2d 1083 (1958).

143. Model Stormwater Runoff Control Ordinance [hereinafter cited as Model Ordinance], *infra*, Section Five.

144. See *id.* at Section Six.

145. In *J. M. Mills, Inc. v. Murphy*, 116 R.I. 54, 352 A.2d 661 (1976), where the sufficiency of standards for the issuance of permits for activities in wetlands was at issue, the Rhode Island Supreme Court held that the statute's stated purposes which listed the role of wetlands and the need for their protection was sufficient to define the "public interest" criterion in the statute. *Id.*, A.2d at 666.

In addition, the elected officials must approve the engineering manual that is used to evaluate plans.¹⁴⁶ Usually much less is required to overcome an allegation of unlawful delegation of legislative authority.¹⁴⁷

Reasonable Police Power Regulation

The regulatory program must also constitute a reasonable exercise of the police power.¹⁴⁸ The police power is the sovereign right of the state to enact laws for the protection of the health, safety, morals, and welfare of its citizens.¹⁴⁹ The police power is exceptionally broad in scope of application¹⁵⁰ but is not unlimited. The presumption of validity enjoyed by a police power regulation may be rebutted by showing it to be unconstitutional on its face or in its application. The key to the validity of police power enactments and the satisfaction of the constitutional guarantee of substantive due process is found in the notion of "reasonableness."¹⁵¹ In considering the reasonableness of an ordinance, the test is not whether the court thinks it a wise measure or the best means of approaching an objective, but whether the objective is a valid one and whether the ordinance is reasonably designed to achieve the objective.¹⁵²

Pollution control legislation is perhaps the classic example of a legitimate exercise of the police power.¹⁵³ It is beyond question that the protection of public health through pollution control is a proper objective of local government. In fact, it has been said that protection of public health "is not only a right but a manifest duty of a city."¹⁵⁴ It is also well established that public health can be protected through the control of permissible land uses.¹⁵⁵

146. Model Ordinance, *infra*, Section Eleven, subsection (e).

147. *See, e.g.*, Turnpike Realty Co., Inc. v. Town of Dedham, 362 Mass. 221, 284 N.E.2d 891 (1972); *cert. denied*, 409 U.S. 1108 (1973); MacGibbon v. Bd. of Appeals of Duxbury, 356 Mass. 635, 255 N.E.2d 347 (1970).

148. Nectow v. City of Cambridge, 277 U.S. 183 (1928).

149. Queenside Hills Realty Co. v. Saxl, 328 U.S. 80 (1946); Sinclair Refining Co. v. City of Chicago, 178 F.2d 214 (7th Cir. 1949).

150. *See, e.g.*, Berman v. Parker, 348 U.S. 26, 32-33 (1954).

151. "[T]he guaranty of due process . . . demands only that the law shall not be unreasonable, arbitrary or capricious, and that the means selected shall have a real and substantial relation to the object sought to be attained." *Nebbia v. New York*, 291 U.S. 502, 525 (1934).

152. *E.g.*, *Oriental Boulevard Co. v. Heller*, 58 Misc.2d 920, 297 N.Y.S.2d 431 (Sup. Ct. 1969), *aff'd*, 34 A.D.2d 811, 311 N.Y.S.2d 635 (App. Div.), *aff'd*, 27 N.Y.2d 212, 265 N.E.2d 72, 316 N.Y.S.2d 226 (Ct. App. 1970), *appeal dismissed*, 401 U.S. 986 (1971).

153. *See, e.g.*, *Beer Co. v. Massachusetts*, 97 U.S. 25 (1877); *The Slaughter-House Cases*, 83 U.S. (16 Wall.) 36 (1872).

154. *Nourse v. City of Russellville*, 257 Ky. 525, 78 S.W.2d 761, 764 (1935).

155. *Village of Euclid v. Ambler Realty Co.*, 272 U.S. 365 (1926).

Section two and section three of the Model Ordinance, outlining its findings of fact and objectives, describe the problems perceived by the legislators and the objectives which underlie the ordinance's substantive provisions. The references cited in Appendix A generously document the pollution problems attributable to stormwater runoff. As a mechanism for abating the adverse impacts of uncontrolled runoff, the Model Ordinance is directed to the achievement of a legitimate public purpose—the health of the local community.¹⁵⁶

The references in Appendix A also support the reasonableness of the regulatory approach of the Model Ordinance devised to attain its objectives. The use of a pre-development plan, performance and design standards, and best management practices as a framework for abating the adverse impacts of stormwater runoff is not arbitrary but, quite the contrary, can actually be shown to be the current "state of the art" in the field of non-point source pollution control.¹⁵⁷ The rational relationship between the control measures and the legitimate objectives of the Model Ordinance is thus strongly supported.

An ordinance must also afford procedural due process. The two elements deemed essential to this requirement are notice and an opportunity to be heard.¹⁵⁸ These must be provided before property rights may be limited. In section seven of the Model Ordinance, the local agency that reviews water management plans is required to notify the applicant within 30 days after a plan's submission whether it has been approved or rejected. If the plan is rejected, the local agency must also explain why.¹⁵⁹ If the applicant applies for a waiver from the requirement to submit a water management plan, he must be notified within ten working days of the local agency's decision.¹⁶⁰ An applicant has the right to appeal the decision of the local agency if he is not satisfied.¹⁶¹

Section thirteen of the Model Ordinance sets forth the enforcement powers which may be exercised in the case of a violation of any ordinance requirement. It is also designed to afford procedural due process to the alleged violator. Subsection (d) provides that a notice of violation will be issued which includes a statement specifying the

156. "The drainage of a city in the interest of the public health and welfare is one of the most important purposes for which the police power can be exercised." *New Orleans Gas Light Co. v. Drainage Commission*, 197 U.S. 453, 460 (1905).

157. See generally APPROACHES, *supra* note 29; D. Athayde & A. Waldo, *The Urban Stormwater Runoff Presentation* (Spring 1977) (presentation at U.S. Environmental Protection Agency 208 Seminar, Washington, D.C.).

158. *In re Oliver*, 333 U.S. 257 (1948).

159. Model Ordinance, *infra*, Section Seven, subsection (d).

160. *Id.* at subsection (b).

161. *Id.* at subsection (g).

nature of the violation, a description of such remedial actions as are necessary to abate the violation, and a statement of the penalties that may be assessed against the violator. Furthermore, the written notice informs the alleged violator of his right to appeal the agency action. Thus, where the Model Ordinance provides that a permit may be denied or penalties assessed against an alleged violator, notice and an opportunity to be heard are adequately provided, to ensure due process of law.

Equal Protection

Ordinances enacted under the police power authority of local government must comply with the Fourteenth Amendment's constitutional guarantee of equal protection of the law.¹⁶² Almost all environmental control ordinances involve some form of discrimination in the delineation of those activities which are restricted or prohibited because of their perceived danger to the environment and the public welfare. However, as explained by the supreme court of Vermont:¹⁶³

The equal protection clause of the Fourteenth Amendment . . . does not prohibit legislative classification, and the imposition of statutory restraints on one class which are not imposed on another. . . . "A particular classification is not invalidated by the Fourteenth Amendment merely because inequality actually results. Every classification of persons or things for regulation by law produces inequality in some degree; but the law is not thereby rendered invalid . . . unless the inequality produced be actually and palpably unreasonable and arbitrary."¹⁶⁴

An unconstitutional infringement of equal protection arises where the provisions of an ordinance, either textually or in their application, create classes of persons subject to different requirements where the classes are not reasonably related to the objectives of the ordinance.¹⁶⁵ Thus, the regulatory classification is subject to the same test of rationality that was applied to the due process issues already discussed.

The Model Stormwater Runoff Control Ordinance is applicable only to prospective land development. Persons applying for local permits to develop land are required as a condition of the permit to show how they will minimize the environmental impacts of the pro-

162. U.S. CONST. amend. XIV, § 1.

163. Anchor Hocking Glass Corp. v. Barber, 118 Vt. 206, 105 A.2d 271 (1954).

164. *Id.*, 105 A.2d at 275, quoting State v. Auclair, 110 Vt. 147, 160-614, A.2d 107, 113 (1939). See also Missouri Pac. Ry. Co. v. City of Omaha, 235 U.S. 121 (1914).

165. New York Rapid Transit Corp. v. City of New York, 303 U.S. 573 (1938).

posed development.¹⁶⁶ They are essentially required to develop the land in a manner which will avoid the pollution problems attributable to stormwater runoff.

Distinguishing between existing and prospective land uses is a common approach of regulatory programs and is not, of itself, sufficient to manifest an arbitrary classification.¹⁶⁷ In fact, in accordance with common principles of judicial construction of governmental enactments, ordinances are often presumed to have only a prospective operation in the absence of clear indications to the contrary.¹⁶⁸

The Model Ordinance recognizes that certain development projects may create no significant threat of adverse impact to community waters. These projects may be exempted from the requirements of the Model Ordinance under the guidelines listed in section five. Once again, however, this approach is universal and allows the local government to utilize its resources where they will be most effective in accomplishing a regulatory objective. The equal protection guarantee is not violated by the exemption of activities which are of little or no consequence to the objectives of an ordinance.¹⁶⁹

The application of the ordinance to one landowner may have a more restrictive effect than when applied to another landowner. However, dissimilarities in slope, elevation, soils, presence of water, vegetation, and other characteristics of the site interact with rainfall to produce a wide range of stormwater runoff characteristics. These dissimilarities are thus important criteria and provide a reasonable basis for treating development sites differently when they are not similarly situated.¹⁷⁰

The Taking Issue

The taking issue arises out of language in the Fifth Amendment of the U.S. Constitution¹⁷¹ made applicable to the states through the

166. Model Ordinance, *infra*, Section Six.

167. *Zahn v. Bd. of Public Works*, 195 Cal. 497, 234 P. 388 (1925), *aff'd*, 274 U.S. 325 (1927). *See generally* Annot., 136 A.L.R. 207 (1942).

168. *Krekeler v. St. Louis County Bd. of Zoning Adjustment*, 422 S.W.2d 265 (Mo. 1967).

169. *See, e.g., Kozesnik v. Township of Montgomery*, 24 N.J. 154, 131 A.2d 1 (1957). *See also Oriental Boulevard Co. v. Heller*, 58 Misc.2d 920, 297 N.Y.S.2d 431 (Sup. Ct. 1969), *aff'd*, 34 A.D.2d 811, 311 N.Y.S.2d 635 (App. Div.), *aff'd*, 27 N.Y.S.2d 212, 265 N.E.2d 72, 316 N.Y.S.2d 226 (Ct. App. 1970), *appeal dismissed*, 401 U.S. 986 (1971).

170. *See Penn Central Transp. Co. v. New York City*, 438 U.S. 104, 124 (1978).

171. "No person shall . . . be deprived of life, liberty, or property, without due process of law; nor shall private property be taken for public use, without just compensation." U.S. CONST. amend. V.

Fourteenth Amendment.¹⁷² It has been justifiably referred to as "the most stubborn of all property issues."¹⁷³ While the taking issue can involve the actual destruction of property as by flooding,¹⁷⁴ most often the issue arises when a property owner claims that government regulation has had the practical effect of appropriating his property for a public use. In essence, the owner asserts that there has been an exercise of eminent domain but without the payment to him of just compensation. While the exercise of the police power is undeniably limited by the constitutional prohibition against taking private property for public benefit without just compensation, it is equally clear that a substantial restriction in the allowable uses of private property may be required by government regulation designed to protect the public health, safety, and welfare without constituting an unconstitutional taking.¹⁷⁵

Various judicial approaches have been used to distinguish between a lawful regulation and an unlawful taking. Courts have generally applied either the "diminution in value"¹⁷⁶ test or the "residual beneficial use" test.¹⁷⁷ To a large extent, the difference between the two approaches is a matter of judicial perception; one court might view the glass as being half-empty, another, half-full.

Ever since Justice Holmes wrote in *Pennsylvania Coal Co. v. Mahon* that "if regulation goes too far it will be recognized as a taking,"¹⁷⁸ courts have been trying to find a standard to determine the extent of diminution in land value brought about by regulation that "goes too far." No clear standard has yet been established. Regulations have been upheld, however, that severely reduce the economic value of private lands in the interest of public health and welfare.¹⁷⁹

172. U.S. CONST. amend. XIV, § 1; *Chicago, Burlington & Quincy R.R. Co. v. Chicago*, 166 U.S. 226 (1897).

173. Costonis, *A Reply . . .*, in J. COSTONIS, C. BERGER & S. SCOTT, *REGULATION v. COMPENSATION IN LAND USE CONTROL* 67, 67 (1977).

174. *Pumpelly v. Green Bay Co.*, 80 U.S. (13 Wall.) 166 (1871).

175. See generally F. BOSSELMAN, D. COLLIES & J. BANTA, *THE TAKING ISSUE* (1973); Sax, *Takings, Private Property and Public Rights*, 81 *YALE L.J.* 149 (1971).

176. The diminution test originated in *Pennsylvania Coal Co. v. Mahon*, 260 U.S. 393 (1922).

177. *Arverne Bay Constr. Co. v. Thatcher*, 278 N.Y. 222, 15 N.E.2d 587 (1938), is generally regarded as the classic articulation of the residual use test.

178. 260 U.S. 393, 415 (1922).

179. *E.g.*, *Goldblatt v. Town of Hempstead*, 369 U.S. 590 (1962); *Candlestick Properties, Inc. v. San Francisco Bay Conservation & Dev. Comm'n*, 11 Cal. App. 3d 557, 89 Cal. Rptr. 897 (1970). See also F. BOSSELMAN, D. COLLIES & J. BANTA, *supra* note 176, at 208.

The Model Stormwater Runoff Control Ordinance establishes performance and design standards and incorporates a manual of stormwater runoff control techniques as a regulatory framework.¹⁸⁰ This approach provides a wide range of alternative methods for accomplishing its objectives. The flexibility provided by the performance and design standards allows the developer to design his own regulation, in a sense, since he may choose preferred techniques for controlling stormwater on his property so long as they meet the prescribed performance and design standards. The approach is not likely to cause such a diminution in the land's development value as to be held a public appropriation requiring just compensation.¹⁸¹ In fact, the use of best management practices on the site of development may in some instances enhance the value of the property by, for example, improving its aesthetic quality. It is also possible that compliance with the requirements of the Model Ordinance would prevent substantial economic loss to the landowner arising from stormwater related damages.

The residual beneficial use test attempts to identify those benefits that remain to be enjoyed by the owner in lands that are restricted by regulation. Regulations are held to be takings when they act to deny all practical or reasonable use of the land.¹⁸²

The concept behind the Model Ordinance is that land can be used in a manner that minimizes or avoids adverse environmental impacts. The Model Ordinance encourages land uses that harmonize with the needs of the natural environment; it does not attempt to prevent any particular kind of land use. The concern is thus with *how* land is used and not with *whether* it is to be used at all. Consequently, the Model Ordinance is designed to preserve for the developer a reasonable and beneficial use of his land consistent with the public health and welfare.

180. See Model Ordinance, *infra*, Sections Eight, Nine & Eleven.

181. "The power which the States have of prohibiting such use by individuals of their property as will be prejudicial to the health, the morals, or the safety of the public, is not—and, consistently with the existence and safety of organized society, cannot be—burdened with the condition that the State must compensate such individual owners for pecuniary losses they may sustain, by reason of their not being permitted, by a noxious use of their property, to inflict injury upon the community." *Goldblatt v. Town of Hempstead*, 369 U.S. 590, 594 (1962), quoting *Mugler v. Kansas*, 123 U.S. 623, 669 (1887).

182. "To sustain an attack upon the validity of the ordinance, an aggrieved property owner must show that if the ordinance is enforced the consequent restrictions upon his property preclude its use for any purpose to which it is reasonably adapted." *Walker v. Bd. of County Comm'rs of Talbot County*, 208 Md. 72, 116 A.2d 393, 405, *cert. denied*, 350 U.S. 902 (1955), quoting *City of Baltimore v. Cohn*, 204 Md. 523, 105 A.2d 482, 486 (1954). See also *Spiegle v. Borough of Beach Haven*, 46 N.J. 479, 218 A.2d 129, *cert. denied*, 395 U.S. 831 (1966); *Ocean Villa Apts., Inc. v. City of Fort Lauderdale*, 70 So.2d 901 (Fla. 1954).

A prohibition simply upon the use of property for purposes that are declared, by valid legislation, to be injurious to the health, morals, or safety of the community, cannot, in any just sense, be deemed a taking or an appropriation of property for the public benefit. Such legislation does not disturb the owner in the control or use of his property for lawful purposes, nor restrict his right to dispose of it, but is only a declaration by the State that its use by any one, for certain forbidden purposes, is prejudicial to the public interests. . . .¹⁸³

In cases involving the taking issue a distinction is often made between government action designed to secure a public benefit and action designed to protect the public from actual or potential harm. When the intent is to secure for the public a benefit it does not presently enjoy, then the courts are more likely to hold that the adversely affected landowner must be compensated for the value of his property which has been destroyed.¹⁸⁴ On the other hand, government action intended to protect the general public from an injury resulting from the use of private land will rarely constitute an unconstitutional taking though the private owner's economic interest is thereby diminished.¹⁸⁵

As the Model Ordinance sets out in section two and as generously detailed in the literature listed in Appendix A, stormwater runoff can be a significant pollution problem in urbanized areas. The indiscriminate alteration of land for development has been identified as a major factor in urban runoff pollution. In its attempt to control stormwater runoff as a nuisance and danger to the public health and welfare it seems clear that a local government may regulate private land in such a way as to restrict its permissible uses and cause some diminution in the owner's potential economic return on its development without violating the Fifth Amendment.¹⁸⁶

The most recent of the few United States Supreme Court cases to address the taking issue in the context of land use regulation is *Penn Central Transportation Co. v. New York City*.¹⁸⁷ There, the Court considered whether New York City could, as part of a comprehensive program to preserve landmarks, place restrictions on the development of individual landmarks without effecting a taking requiring the payment of compensation. In holding that the application of the Landmarks Law to the Grand Central Terminal property did not consti-

183. *Goldblatt v. Town of Hempstead*, 369 U.S. 590, 593 (1962), quoting *Mugler v. Kansas*, 123 U.S. 623, 668-69 (1887).

184. See Dunham, *A Legal and Economic Basis for City Planning*, 58 COLUM. L. REV. 650 (1958).

185. See, e.g., *Miller v. Schoene*, 276 U.S. 272 (1928).

186. See *Village of Euclid v. Ambler Realty Co.*, 272 U.S. 365 (1926).

187. 438 U.S. 104 (1978).

tute a taking, Mr. Justice Brennan, writing for the 6-3 majority, outlined the current law regarding the taking issue:

(1) In a wide variety of contexts, the government may execute laws that adversely affect economic values without constituting a taking; where health, safety, and welfare is involved, government may enact regulations that have serious adverse affects on property interests.¹⁸⁸

(2) Validity of government regulation depends in part upon both the character of the action and on the nature and extent of the interference with rights in the property as a whole. Government may deny the ability to exploit a property interest previously thought to be available for development without effecting a taking.¹⁸⁹

(3) Diminution of property values alone is not enough to find a compensable taking.¹⁹⁰

(4) The fact that some owners may be affected more than others is not sufficient to constitute a taking.¹⁹¹

(5) Prohibitions on the use of one feature of property while allowing gainful use of others do not comprise a taking.¹⁹²

(6) No taking exists where the plaintiff may still realize a reasonable return on his investment.¹⁹³

Despite some unanswered questions, the precedential value of the *Penn Central* case is undeniable. It clearly developed the historical context of the decision, outlined the elements of the taking issue, and declared the validity of an ordinance that, as applied to the particular facts of the case, was quite restrictive.

It would appear to be a fair statement that there is a trend of more favorable judicial reception to the reasonable necessity of most land use restrictions imposed to protect environmental quality. Greater general awareness of the valuable functions of natural systems has helped to spotlight the link between their protection and the public

188. *Id.* at 126-27.

189. *Id.* at 130-31.

190. *Id.* at 124.

191. *Id.* at 125-26.

192. *Id.* at 130-31.

193. *Id.* at 133-34. The particular factual circumstances of this case appear to control the Court's application of a basic test of economic impact, i.e., did the regulation interfere with "primary economic expectations" and was there a "reasonable return on investment." The owner's ability to continue the present use of the terminal despite the regulation, as well as potential uses contemplated for the future, influenced the Court to find no taking. The opportunity to transfer development rights to other properties seems significant as well. The Court noted specifically that although transferrable development rights may not be just compensation where a taking has occurred, they are valuable, and should be taken into account as mitigating financial burdens when considering impacts of regulation. *Id.* 136-38.

health and welfare. As stated by the Wisconsin Supreme Court in the now well-known decision in *Just v. Marinette County*,¹⁹⁴

What makes this case different from most condemnation or police power zoning cases is the interrelationship of the wetlands, the swamps and the natural environment of shorelands to the purity of the water and to such natural resources as navigation, fishing, and scenic beauty. . . .

. . . An owner of land has no absolute and unlimited right to change the essential natural character of his land so as to use it for a purpose for which it was unsuited in its natural state and which injures the rights of others.¹⁹⁵

It is becoming more obvious to courts and legislators alike that the use of land has ramifications beyond the boundaries expressed in the deed. As Professor Sax has noted, "[f]requently, use of any given parcel of property is at the same time effectively a use of, or a demand upon, property beyond the border of the user."¹⁹⁶ The Model Stormwater Runoff Control Ordinance is simply a device which requires landowners to use their land in a manner that will not harm themselves and others.

MODEL STORMWATER RUNOFF CONTROL ORDINANCE

Concept Behind The Model Ordinance

The presumption underlying the Model Stormwater Runoff Control Ordinance is that land development can be accommodated on almost any site without resulting in irreparable damage to local water resources and the biological community. Land can and should be used in a manner that minimizes or avoids adverse environmental impacts. The choice is not between development or no development; it is between wise development or destructive development. The Model Stormwater Runoff Control Ordinance was developed to encourage a more harmonious relationship between land alteration for human use and the needs of the natural environment.

The Model Ordinance is intended to require the implementation of stormwater runoff management practices that accomplish two basic objectives:

1. Protect the absorptive, purifying and retentive functions of natural systems that exist on the site of a proposed development; and

194. 56 Wis.2d 7, 201 N.W.2d 761 (1972).

195. *Id.*, 201 N.W.2d at 768.

196. Sax, *supra* note 176, at 152.

2. Provide for post-development stormwater runoff characteristics that resemble the conditions that existed before the site's alteration.

The Model Ordinance, however, could not possibly be drafted to fit perfectly into all of the innumerable varieties of regulatory programs that exist at the local government level. There are instances, for example, in which a specialized department handles all regulatory matters except the final decision to issue or deny a permit which is specifically left to the governing board of the county or municipality. In other localities, an environmental agency has full authority to take final action on permit applications. There are still other programs where this responsibility is shared by the governing body and a specialized department. The diversity of such regulatory "styles" made the task of developing a model program quite difficult.

The Model Stormwater Runoff Control Ordinance is designed to be adapted to the unique characteristics of each local government organization. It is presumed that some provisions of the Model Ordinance will be modified or possibly even rejected altogether. Other provisions may have to be added. Nevertheless, the regulatory approach and the means that were formulated to accomplish stormwater runoff control in the Model Ordinance should greatly facilitate the creation of effective controls in areas where no controls presently exist and to meet the section 208 water quality management planning requirements of the Federal Water Pollution Control Act.

SECTION ONE: SHORT TITLE

This ordinance shall be known as the "Stormwater Runoff Control Ordinance."

Commentary

Use of the term "stormwater runoff" does not imply that problems result only from the way runoff is handled following extraordinary rainfall. In fact, problems result from the manner in which all surface water is managed.

SECTION TWO: FINDINGS OF FACTS

The _____ of _____ finds
(governing authority) (local unit)
 that uncontrolled drainage and development of land has a significant adverse impact upon the health, safety and welfare of the community. More specifically,

- (a) Stormwater runoff can carry pollutants into receiving water bodies, degrading water quality;
- (b) The increase in nutrients such as phosphorus and nitrogen accelerates eutrophication of receiving waters, adversely affecting flora and fauna;
- (c) Improperly channeling water increases the velocity of runoff, thereby increasing erosion and sedimentation;
- (d) Construction requiring the alteration of natural topography and removal of vegetation tends to increase erosion;
- (e) Siltation of water bodies resulting from increased erosion decreases their capacity to hold and transport water, interferes with navigation, and harms flora and fauna;
- (f) Impervious surfaces increase the volume and rate of stormwater runoff and allow less water to percolate into the soil, thereby decreasing groundwater recharge;
- (g) Improperly managed stormwater runoff can increase the incidence of flooding and the level of floods which occur, endangering property and human life;
- (h) Improperly managed stormwater runoff can interfere with the maintenance of optimum salinity in estuarine areas, thereby disrupting biological productivity;
- (i) Substantial economic losses result from these adverse impacts on community waters;
- (j) Many future problems can be avoided if land is developed in accordance with sound stormwater runoff management practices.

Commentary

Regulation under the police power must be reasonably related to protection of the public health, safety or welfare. Findings of fact identify the problems which the ordinance is intended to remedy. A reviewing court or an affected citizen should be able to read the findings of fact and understand the reasons for imposition of the ordinance's requirements. Appendix A contains a listing of studies which have identified or described the adverse impacts of improperly managed stormwater runoff on water quality and other environmental values.

SECTION THREE: OBJECTIVES

In order to protect, maintain, and enhance both the immediate and the long term health, safety and general welfare of the citizens of _____, this ordinance has the following objectives:
(local unit)

- (a) To encourage productive and enjoyable harmony between humanity and nature;
- (b) To protect, restore, and maintain the chemical, physical and biological integrity of community waters;
- (c) To prevent individuals, business organizations and governments from causing harm to the community by activities which adversely affect water resources;
- (d) To encourage the construction of drainage systems which aesthetically and functionally approximate natural systems;
- (e) To encourage the protection of natural systems and the use of them in ways which do not impair their beneficial functioning;
- (f) To encourage the use of drainage systems which minimize the consumption of electrical energy or petroleum fuels to move water, remove pollutants, or maintain the systems;
- (g) To minimize the transport of pollutants to community waters;
- (h) To maintain or restore groundwater levels;
- (i) To protect, maintain or restore natural salinity levels in estuarine areas;
- (j) To minimize erosion and sedimentation;
- (k) To prevent damage to wetlands;
- (l) To prevent damage from flooding, while recognizing that natural fluctuations in water levels are beneficial;
- (m) To protect, restore, and maintain the habitat of fish and wildlife; and
- (n) To ensure the attainment of these objectives by requiring the approval and implementation of water management plans for all activities which may have an adverse impact upon community waters.

Commentary

A listing of objectives serves a number of purposes. The public's understanding of the ordinance and its control program is facilitated. Judicial understanding is promoted as well. Objectives help to outline the direction and scope of the runoff control program. They can also serve as a checklist against which the ordinance can later be evaluated. T. DEBO, SURVEY AND ANALYSIS OF URBAN DRAINAGE ORDINANCES AND A RECOMMENDED MODEL ORDINANCE 51 (1975).

SECTION FOUR: DEFINITIONS

Unless specifically defined below, words or phrases shall be interpreted so as to give them the meaning they have in common usage and to give this ordinance its most effective application. Words used

in the singular shall include the plural and the plural the singular; words used in the present tense shall include the future tense. The word "shall" connotes mandatory and not discretionary; the word "may" is permissive.

(a) "Adverse Impacts" are any modifications, alterations or effects on a feature or characteristic of community waters or wetlands, including their quality, quantity, hydrodynamics, surface area, species composition, living resources, aesthetics or usefulness for human or natural uses which are or may potentially be harmful or injurious to human health, welfare, safety or property, to biological productivity, diversity, or stability or which unreasonably interfere with the enjoyment of life or property, including outdoor recreation. The term includes secondary and cumulative as well as direct impacts.

(b) "Clearing" means the removal of trees and brush from the land but shall not include the ordinary mowing of grass.

(c) "Detention" refers to the collection and storage of surface water for subsequent gradual discharge.

(d) "Developer" means any person who engages in development either as the owner or as the agent of an owner of property.

(e) "Development" or "Development Activity" means:

(1) the construction, installation, alteration, demolition or removal of a structure, impervious surface, or drainage facility; or

(2) clearing, scraping, grubbing, or otherwise removing or killing the vegetation of a site;

(3) adding, removing, exposing, excavating, leveling, grading, digging, burrowing, dumping, piling, dredging, or otherwise significantly disturbing the soil, mud, sand or rock of a site.

(f) "Drainage Facility" means any component of the drainage system.

(g) "Drainage System" is the system through which water flows from the land. It includes all watercourses, waterbodies and wetlands.

(h) "Erosion" is the wearing or washing away of soil by the action of wind or water.

(i) "Flood" is a temporary rise in the level of any waterbody, watercourse or wetland which results in the inundation of areas not ordinarily covered by water.

(j) "Impervious Surface" means a surface which has been compacted or covered with a layer of material so that it is highly resistant to infiltration by water. It includes semi-impervious surfaces such as compacted clay, as well as most conventionally surfaced streets, roofs, sidewalks, parking lots and other similar structures.

(k) "Natural Systems" means systems which predominantly consist of or use those communities of plants, animals, bacteria and other

flora and fauna which occur indigenously on the land, in the soil or in the water.

(l) "Owner" is the person in whom is vested the fee ownership, dominion, or title of property, i.e., the proprietor. This term may also include a tenant, if chargeable under his lease for the maintenance of the property, and any agent of the owner or tenant including a developer.

(m) "Person" means any and all persons, natural or artificial and includes any individual, firm, corporation, government agency, business trust, estate, trust, partnership, association, two or more persons having a joint or common interest, or any other legal entity.

(n) "Predevelopment Conditions" are those conditions which existed before alteration, resulting from human activity, of the natural topography, vegetation and rate, volume or direction of surface or ground water flow, as indicated by the best available historical data.

(o) "Receiving Bodies of Water" shall mean any waterbodies, watercourses or wetlands into which surface waters flow either naturally, in manmade ditches, or in a closed conduit system.

(p) "Retention" refers to the collection and storage of runoff without subsequent discharge to surface waters.

(q) "Sediment" is fine particulate material, whether mineral or organic, that is in suspension or has settled in a waterbody.

(r) "Sedimentation Facility" means any structure or area which is designed to hold runoff water until suspended sediments have settled.

(s) "Site" means any tract, lot or parcel of land or combination of tracts, lots, or parcels of land which are in one ownership, or are contiguous and in diverse ownership where development is to be performed as part of a unit, subdivision, or project.

(t) "Structure" means that which is built or constructed, an edifice or building of any kind, or any piece of work artificially built up or composed of parts joined together in some definite manner but shall not include fences or signs.

(u) "Subdivide" means to divide the ownership of a parcel of land, whether improved or unimproved, into three or more contiguous lots or parcels of land, whether by reference to a plat, by metes and bounds or otherwise, or, if the establishment of a new street is involved, any division of a parcel of land. Subdivision includes a resubdivision and, when appropriate to the context, relates to the process of subdividing or to the land subdivided.

(v) "Vegetation" means all plant growth, especially trees, shrubs, vines, ferns, mosses and grasses.

(w) "Waters" or "Community of Waters" means any and all water

on or beneath the surface of the ground. It includes the water in any watercourse, waterbody or drainage system. It also includes diffused surface water and water percolating, standing or flowing beneath the surface of the ground, as well as coastal waters.

(x) "Water Management Plan" refers to the detailed analysis required by Section Six for each activity described in Section Five of this ordinance.

(y) "Watercourse" means any natural or artificial stream, river, creek, channel, ditch canal, conduit, culvert, drain, waterway, gully, ravine, street, roadway, swale, or wash in which water flows in a definite direction, either continuously or intermittently, and which has a definite channel, bed or banks.

(z) "Waterbody" means any natural or artificial pond, lake, reservoir or other area which ordinarily or intermittently contains water and which has a discernible shoreline.

(aa) "Watershed" means a drainage area or drainage basin contributing to the flow of water in a receiving body of water.

(bb) "Wetlands" means those areas where

(1) the soil is ordinarily saturated with water; or

(2) the dominant plant community is one or more of those species designated by the _____ as identifying
(local agency)

wetlands or the transitional zone of wetlands.

Commentary

Sources of the definitions include: Environmental Policy Standards, DEKALB COUNTY, GA, CODE Ch. 6-A (1974); Snohomish County, Wash., Drainage Ordinance, Title XXIV (1979); Volusia County, Fla., Ordinance No. 78-32 (1978); Knox County, Tenn., Grading, Soil Erosion and Sedimentation Control Regulations; METROPOLITAN COUNCIL OF THE TWIN CITIES AREA (St. Paul, Minn.), MODEL ORDINANCES FOR USE BY LOCAL GOVERNMENTS (1977) [hereinafter cited as MODEL ORDINANCES]; The Florida Coastal Management Program (Oct. 1978) (threshold draft prepared by the Florida Dep't of Environmental Regulation); F. Maloney & D. Fernandez, Development of County and Local Ordinances Designed to Protect the Public Interest in Florida's Coastal Beaches (July 1977) (technical paper prepared for the Florida Sea Grant Program). For alternative definitions of wetlands see Environmental Law Institute, Strengthening State Wetlands Regulation (prepared for the U.S. Fish and Wildlife Service, Office of Biological Services). Communities might also consider specifically mapping wetland areas in advance.

SECTION FIVE: APPLICABILITY

(a) Unless exempted pursuant to subsection (b) or waived pursuant to subsection (c), a Water Management Plan must be submitted and approved before:

- (1) a plat is recorded or land is subdivided; or
- (2) an existing drainage system is altered, rerouted, deepened, widened, enlarged or obstructed; or
- (3) development is commenced.

(b) *Exemptions.* The following development activities are exempt from the Water Management Plan Requirement:

- (1) the development of less than five single family or duplex residential dwelling units and their accessory structures (such as fences, storage sheds and septic tanks) in an existing subdivision;
- (2) the development of one single family or duplex residential structure not in an existing subdivision;
- (3) agricultural activity not involving the artificial drainage of land;
- (4) any maintenance, alteration, use or improvement to an existing structure not changing or affecting quality, rate, volume or location of surface water discharge.

(c) *Waivers.*

- (1) A waiver of the Water Management Plan requirement may be obtained by submitting an application on forms supplied by _____ . The application shall
(local agency)

contain:

- (i) the name, address and telephone number of the developer and owner; and
- (ii) a description and a drawing of the proposed development; and
- (iii) the location of the development; and
- (iv) any other information requested by _____
(local agency)

that is reasonably necessary to evaluate the proposed development.

- (2) The _____ may grant a waiver if the applica-
(local agency)
 - tion demonstrates the development is not likely to:
 - (i) [significantly] increase or decrease the rate or volume or surface water runoff;
 - (ii) have a [significant] adverse impact on a wetland, watercourse or waterbody;

(iii) [significantly] contribute to the degradation of water quality.

(3) The following types of development shall not be eligible to receive a waiver:

(i) shopping centers;

(ii) industrial or commercial facilities;

(iii) subdivisions;

(iv) roads;

(v) impervious surfaces greater than 10,000 square feet.

(d) *Variances.*

The _____ may grant a written variance from any
(local agency)

requirement of this ordinance using the following criteria:

(1) there are special circumstances applicable to the subject property or its intended use; and,

(2) the granting of the variance will not:

(i) [significantly] increase or decrease the rate or volume of surface water runoff;

(ii) have a [significant] adverse impact on a wetland, watercourse or waterbody;

(iii) [significantly] contribute to the degradation of water quality;

(iv) otherwise [significantly] impair attainment of the objectives of this ordinance.

Commentary

When a plat is submitted for approval and recordation by the local government, potential impacts on the environment and especially on water quality should be among the considerations examined by the commissioners. The manner in which land is subdivided can have a significant effect upon the ultimate impact of development. If there are wetlands in an area detaining and purifying runoff and recharging groundwater, the land should be subdivided in a way that preserves these important functions. No lot should be created that contains too little dry upland to be useful. A landowner should not have to resort to drainage of all or part of a wetland to create additional dry land for a homesite. Similarly, consideration must be given to the reservation of sufficient land for such things as drainage system components, roads and rights-of-way, utilities and other services. In order to make advance consideration possible, approval of a water management plan is required before a plat is recorded or the land is subdivided. Changes in existing drainage systems should be made only

after careful evaluation and, therefore, prior approval of a water management plan is required before such changes are made.

The ordinance is applicable to a broad range of development activities that have the potential to cause adverse impacts on water resources. It is not possible or desirable, however, to regulate all development activity. Therefore provision is made for a system of exemptions and waivers. The difference between the two is that exemptions are granted in the ordinance, whereas waivers are granted by the local agency under the authority of the ordinance. There is no requirement for the submission of any information regarding exempted activities. Exemptions should include only those activities that would clearly not have adverse impacts. Waivers may be used to relieve other types of development from the necessity of submitting a water management plan for the proposed development. Unlike exemptions, however, waivers require that some preliminary information regarding the proposed activity be available to the agency for use in deciding whether a waiver is appropriate. Because certain types of development have such a high potential for causing significant adverse impacts, the local agency should have no discretion to waive the requirement of submitting a water management plan with regard to them.

The specific listings in this section are only illustrative of the types of development that might be exempted or made ineligible to receive a waiver. The problems, needs and regulatory capabilities of each local government vary greatly. This structure may be adapted to fit many diverse situations and to incorporate the experience of the local government.

The words "significant" and "significantly" included in earlier drafts, now appear in brackets. Such terms arguably can be used to create loopholes in the ordinance that would weaken it substantially. On the other hand, without such qualifying language the waiver and variance provisions would be almost beyond practical use. A compromise was to put the words in brackets so as to flag this important question for the potential users of the Model Ordinance. The crucial consideration, of course, is not whether to use or not use a term such as "significant" but, rather, to insure that decisions of the reviewing body are consistent with the objectives of the ordinance as opposed to undermining them.

Some examples of exception and waiver provisions were found in Snohomish County, Wash., Drainage Ordinance, Title XXIV (1979) and Volusia County, Fla., Ordinance No. 78-32 (1978). An excellent review and commentary from the Florida Department of Environmental Regulation was of considerable help in developing this section.

SECTION SIX: CONTENTS OF THE WATER MANAGEMENT PLAN

(a) It is the responsibility of an applicant to include in the Water Management Plan sufficient information for the _____ to
(local agency)

evaluate the environmental characteristics of the affected areas, the potential and predicted impacts of the proposed activity on community waters, and the effectiveness and acceptability of those measures proposed by the applicant for reducing adverse impacts. The Water Management Plan shall contain maps, charts, graphs, tables, photographs, narrative descriptions and explanations and citations to supporting references, as appropriate to communicate the information required by this section.

(b) The Water Management Plan shall contain the name, address and telephone number of the owner and the developer. In addition, the legal description of the property shall be provided, and its location with reference to such landmarks as major waterbodies, adjoining roads, railroads, subdivisions, or towns shall be clearly identified by a map.

(c) The existing environmental and hydrologic conditions of the site and of receiving waters and wetlands shall be described in detail, including the following:

- (1) the direction, flow rate, and volume of stormwater runoff under existing conditions and, to the extent practicable, predevelopment conditions;
- (2) the location of areas on the site where stormwater collects or percolates into the ground;
- (3) a description of all watercourses, waterbodies and wetlands on or adjacent to the site or into which stormwater flows. Information regarding their water quality and the current water quality classification, if any, given them by the [State Water Quality Management Agency] shall be included;
- (4) groundwater levels, including seasonal fluctuations;
- (5) location of flood plains;
- (6) vegetation;
- (7) topography;
- (8) soils.

(d) Proposed alterations of the site shall be described in detail, including:

- (1) changes in topography;
- (2) areas where vegetation will be cleared or otherwise killed;
- (3) areas that will be covered with an impervious surface and a description of the surfacing material;

- (4) the size and location of any buildings or other structures.
- (e) Predicted impacts of the proposed development on existing conditions shall be described in detail, including:
 - (1) changes in water quality;
 - (2) changes in groundwater levels;
 - (3) changes in the incidence and duration of flooding on the site and upstream and downstream from it;
 - (4) impacts on wetlands; and
 - (5) impacts on vegetation.
- (f) All components of the drainage system and any measures for the detention, retention, or infiltration of water or for the protection of water quality shall be described in detail, including:
 - (1) the channel, direction, flow rate, volume and quality of stormwater that will be conveyed from the site, with a comparison to existing conditions and, to the extent practicable, predevelopment conditions;
 - (2) detention and retention areas, including plans for the discharge of contained waters, maintenance plans, and predictions of water quality in those areas;
 - (3) areas of the site to be used or reserved for percolation including a prediction of the impact on groundwater quality;
 - (4) a plan for the control of erosion and sedimentation which describes in detail the type and location of control measures, the stage of development at which they will be put into place or used, and provisions for their maintenance;
 - (5) any other information which the developer or the _____
(local agency) believes is reasonably necessary for an evaluation of the development.

Commentary

This section specifies the information that must be provided to the local agency. The complexity and depth of information that is necessary for proper evaluation will depend on the nature of the site and the extent to which it will be altered. The Manual of Surface Water Management Practices discussed in Section Eleven should describe specific techniques for obtaining and calculating the data required in the Water Management Plan. See the commentary following Section Eleven for more information regarding the use of a practices manual.

The Manual should tell an applicant what conditions must be accounted for—drought, the 10 year storm, the 25 year storm, etc. The Water Management Plan is similar to an environmental impact assessment. The Water Management Plan contents were adapted in part

from the MODEL ORDINANCES, *supra*. Examples of hydrologic and hydraulic studies required in the drainage ordinances of several communities are contained in T. DEBO, *supra*, at 90-100.

SECTION SEVEN: PROCEDURES AND FEES

(a) Any person planning a development as defined in this ordinance, unless exempted, shall submit a Water Management Plan or an application for waiver to the _____ .
(local agency)

(b) Within ten (10) working days after submission of the completed waiver application, the _____ shall notify the applicant that the waiver has been approved or denied and whether a Water Management Plan must be submitted by the applicant.
(local agency)

(c) A permit fee will be collected at the time the Water Management Plan or application for waiver are submitted and will reflect the cost of administration and management of the permitting process. The _____ shall establish, by resolution, a prorated fee schedule based upon the relative complexity of the project. The fee schedule may be amended from time to time by the _____ by resolution. Notice of such resolution shall be published no less than fifteen (15) days prior to adoption.
(governing authority)
(governing authority)

(d) Within thirty (30) days after submission of the completed Water Management Plan, the _____ shall approve, with or without specified conditions or modifications, or reject the Plan and shall notify the applicant accordingly. If the _____ has not rendered a decision within thirty (30) days after Plan submission, it shall inform the applicant of the status of the review process and the anticipated completion date. If the Plan is rejected or modified, the _____ shall state its reasons. However, it is not the responsibility of the _____ to design an acceptable project.
(local agency)
(local agency)

(e) The Water Management Plan shall not be approved unless it clearly indicates that the proposed development will meet the Performance Standards described in Section Eight and the Design Standards described in Section Nine, except where a variance has been granted pursuant to Section Five, Subsection (d), or where off-site management is approved pursuant to Section Ten.

(f) *Inspections.* No Water Management Plan may be approved without adequate provision for inspection of the property before development activity commences. The applicant shall arrange with the _____ for scheduling the following inspections:

(local agency)

- (1) Initial Inspection: prior to approval of the Water Management Plan;
- (2) Bury Inspection: prior to burial of any underground drainage structure;
- (3) Erosion Control Inspection: as necessary to ensure effective control of erosion and sedimentation;
- (4) Finish Inspection: when all work including installation of all drainage facilities has been completed.

The _____ shall inspect the work and shall either
(local agency)

approve it or notify the applicant in writing in what respects there has been a failure to comply with the requirements of the approved Water Management Plan. Any portion of the work which does not comply shall be promptly corrected by the applicant or the applicant will be subject to the penalty provisions of Section Thirteen.

(g) *Appeals.* Any person aggrieved by the action of any official charged with the enforcement of this Ordinance, as the result of the disapproval of a properly filed application for a permit, issuance of a written notice of violation, or an alleged failure to properly enforce the Ordinance in regard to a specific application, shall have the right to appeal the action to the _____ . The
(special hearing examiner)

appeal shall be filed in writing within twenty (20) days of the date of official transmittal of the final decision or determination to the applicant, shall state clearly the grounds on which the appeal is based, and shall be processed in the manner prescribed for hearing administrative appeals under _____ .

(local or state code provision)

Commentary

The procedures involved in the Model Ordinance are straightforward. A proposed development is either exempted from the requirements of the Ordinance, is granted a waiver from its requirements after a review of a written request for waiver, or requires the submission of a Water Management Plan. The fee structure will provide funds to pay the cost of administration, including costs of review and inspection.

If the Plan is not approved, the applicant will be told why and will know what he can do to meet the requirements of the Ordinance.

Even if the Plan is otherwise in good order, an initial site inspection will be necessary to determine whether the predevelopment conditions are actually as they have been described in the Plan and whether any considerations have been omitted. After approval of the Plan and commencement of the development, it will be important to inspect the progress and completion of the project to make certain that the approved Water Management Plan is followed.

The appeals procedure may require modification or inclusion of more detail in a specific jurisdiction because this area is one where differences are most pronounced. It is contemplated that the procedure for hearing appeals will usually be drafted to conform to an existing procedure for hearing appeals from building permit denials. Some counties have a hearing examiner for these purposes and this type of appellate process seems to be a good one.

Some of the language in this section was adopted from Drainage Ordinance, Title XXIV, Snohomish County, Washington (1979); and Ordinance No. 78-32, Volusia County, Florida (1978).

SECTION EIGHT: PERFORMANCE STANDARDS

Water Management Plans must demonstrate the proposed development or activity has been planned and designed and will be constructed and maintained to meet each of the following standards:

(a) Ensure that after development, runoff from the site approximates the rate of flow, volume and timing of runoff that would have occurred following the same rainfall under existing conditions and, to the extent practicable, predevelopment conditions, unless runoff is discharged into an Off-site Drainage Facility as provided in Section Ten;

(b) Maintain the natural hydrodynamic characteristics of the watershed;

(c) Protect or restore the quality of ground and surface waters;

(d) Ensure that erosion during and after development is minimized;

(e) Protect groundwater levels;

(f) Protect the beneficial functioning of wetlands as areas for the natural storage of surface waters and the chemical reduction and assimilation of pollutants;

(g) Prevent increased flooding and damage that results from improper location, construction and design of structures in areas which are presently subject to an unacceptable danger of flooding;

(h) Prevent or reverse salt water intrusion;

(i) Protect the natural fluctuating levels of salinity in estuarine areas;

- (j) Minimize injury to flora and fauna and adverse impacts to fish and wildlife habitat;
- (k) Otherwise further the objectives of this Ordinance.

Commentary

The basic objective of the Ordinance is to prevent development from causing unnecessary harm to valuable functions of the natural environment. The primary basis for evaluating a developer's proposal is to ascertain whether it is likely to meet that objective. A set of performance standards has been developed which incorporates the environmental processes that should be maintained. The local policy-making body needs to determine what will be an acceptable risk of flooding for different types of uses. For example, it might be acceptable to build roads in areas that are likely to flood every five years, but not hospitals.

Performance standards have the advantage of allowing a great deal of flexibility in the use of control techniques. Each site and proposed development will involve unique characteristics that rigid engineering rules cannot easily account for. In addition, performance standards allow for the use of new and innovative engineering technology, whether structural or non-structural.

SECTION NINE: DESIGN STANDARDS

To ensure attainment of the objectives of this Ordinance and to ensure that performance standards will be met, the design, construction and maintenance of drainage systems shall be consistent with the following standards:

(a) Channeling runoff directly into waterbodies shall be prohibited. Instead, runoff shall be routed through swales and other systems designed to increase time of concentration, decrease velocity, increase infiltration, allow suspended solids to settle, and remove pollutants;

(b) Natural watercourses shall not be dredged, cleared of vegetation, deepened, widened, straightened, stabilized or otherwise altered. Water shall be retained or detained before it enters any natural watercourse in order to preserve the natural hydrodynamics of the watercourse and to prevent siltation or other pollution;

(c) The area of land disturbed by development shall be as small as practicable. Those areas which are not to be disturbed shall be protected by an adequate barrier from construction activity. Whenever possible, natural vegetation shall be retained and protected;

(d) No grading, cutting or filling shall be commenced until erosion

and sedimentation control devices have been installed between the disturbed area and waterbodies, watercourses and wetlands;

(e) Land which has been cleared for development and upon which construction has not commenced shall be protected from erosion by appropriate techniques designed to revegetate the area;

(f) Sediment shall be retained on the site of the development;

(g) Wetlands and other waterbodies shall not be used as sediment traps during development;

(h) Erosion and sedimentation facilities shall receive regular maintenance to insure that they continue to function properly;

(i) Artificial watercourses shall be designed, considering soil type, so that the velocity of flow is low enough to prevent erosion;

(j) Vegetated buffer strips shall be created or, where practicable, retained in their natural state along the banks of all watercourses, waterbodies or wetlands. The width of the buffer shall be sufficient to prevent erosion, trap the sediment in overland runoff, provide access to the waterbody and allow for periodic flooding without damage to structures;

(k) Intermittent watercourses, such as swales, should be vegetated;

(l) Retention and detention ponds shall be used to retain and detain the increased and accelerated runoff which the development generates. Water shall be released from detention ponds into watercourses or wetlands at a rate and in a manner approximating the natural flow which would have occurred before development;

(m) Although the use of wetlands for storing and purifying water is encouraged, care must be taken not to overload their capacity, thereby harming the wetlands and transitional vegetation. Wetlands should not be damaged by the construction of detention ponds;

(n) The first one inch of runoff from impervious surfaces shall be retained on the site of the development;

(o) Runoff from parking lots shall be treated to remove oil and sediment before it enters receiving waters;

(p) Detention and retention areas shall be designed so that shorelines are sinuous rather than straight and so that the length of shoreline is maximized, thus offering more space for the growth of littoral vegetation;

(q) The banks of detention and retention areas shall slope at a gentle grade into the water as a safeguard against drowning, personal injury or other accidents, to encourage the growth of vegetation and to allow the alternate flooding and exposure of areas along the shore as water levels periodically rise and fall;

(r) The use of drainage facilities and vegetated buffer zones as open space, recreation and conservation areas shall be encouraged.

Commentary

Design Standards create limitations on the specific methods that can be utilized to achieve the Performance Standards of Section Eight. For example, the performance standard that requires runoff after development to approximate the rate, quantity and timing of runoff under natural, predevelopment conditions could be met by constructing a deep, rectangular pit to trap runoff which could then be pumped out on a schedule that approximates the natural, predevelopment hydroperiod. Obviously, that solution would not be desirable because the pit would be dangerous and unsightly and the water in it would probably be of low quality. Design Standards constrain such undesirable solutions. The list of Design Standards included in the Ordinance should be augmented and modified as appropriate to meet the needs of a particular community.

The Design Standards are drawn in strict terms to ensure the achievement of the objectives of the Ordinance. However, it is possible that a proposed development may deviate from the strict wording of a particular Design Standard and yet still be shown to provide sound stormwater management consistent with the objectives. In such an instance, the Section Five, Subsection (d) variance provisions provides a procedure for making this showing to the reviewing agency.

A common infirmity of local regulatory programs, and one which prompts lawsuits, is the lack of clear guidelines to assist the regulatory board in its decision-making. The performance and Design Standards in the Model Ordinance create clear objective guidelines to direct decision-making. Some Design Standards were adapted or modified in part from MODEL ORDINANCES, *supra*, and Environmental Policy Standards, DEKALB COUNTY, GA., CODE Ch. 6-A (1974).

SECTION TEN: OFF-SITE DRAINAGE FACILITIES

(a) The _____
(local agency) may allow stormwater runoff that is otherwise of unacceptable quality or which would be discharged in volumes or at rates in excess of those otherwise allowed by this Ordinance, to be discharged into drainage facilities off the site of development if each of the following conditions is met:

- (1) It is not practicable to completely manage runoff on the site in a manner that meets the Performance Standards and Design Standards;
- (2) The off-site drainage facilities and channels leading to them are designed, constructed and maintained in accordance with the requirements of this ordinance;

- (3) Adequate provision is made for the sharing of construction and operating costs of the facilities. The developer may be required to pay a portion of the cost of constructing the facilities as a condition to receiving approval of the drainage plan;
- (4) Adverse environmental impacts on the site of development will be minimized.

(b) A request to use off-site drainage facilities and all information related to the proposed off-site facilities should be made a part of the developer's Water Management Plan. Guidelines for the consideration of off-site facility use will be defined in the Manual of Surface Water Management Practices.

Commentary

The Model Ordinance was initially designed to regulate the land activities that affect runoff by requiring on-site management in every instance. However, it was later recognized that not only are there cases where on-site management is impracticable but it is often much less cost-effective for the developer and the local government with respect to costs of drainage facilities and their subsequent maintenance. Therefore, Section Ten was drafted to provide a mechanism for providing off-site management as an alternative where it can be demonstrated to otherwise meet the objectives of the Model Ordinance. The establishment of regional facilities is provided for in the Model Stormwater Management Ordinance included in the *Snohomish County/King County 208 Areawide Waste Management Planning Study* (1977).

SECTION ELEVEN: MANUAL OF STORMWATER MANAGEMENT PRACTICES

- (a) The _____ shall compile a manual of Stormwater Management Practices for the guidance of persons preparing Water Management Plans, and designing or operating drainage systems. The Manual shall be updated periodically to reflect the most current and effective practices and shall be made available to the public;
(local agency)
- (b) The Manual shall include guidance and specifications for the preparation of Water Management Plans. Acceptable techniques for obtaining, calculating and presenting the information required in the Water Management Plans shall be described;
- (c) The Manual shall include guidance in the selection of environ-

mentally sound practices for the management of stormwater and the control of erosion and sediment. Specific techniques and practices shall be described in detail. The development and use of techniques which emphasize the use of natural systems shall be encouraged;

(d) The Manual shall also establish minimum specifications for the construction of drainage facilities. Construction Specifications shall be established in accordance with current good engineering practices;

(e) The _____ shall submit the Manual and subsequent revisions of it to the _____ for review and approval.
(local agency) (local authority)

Commentary

There are numerous effective techniques that have been developed for managing stormwater runoff in an environmentally acceptable manner. Many local developers will be unfamiliar with these techniques, however. The local agency, therefore, should compile a manual to guide persons in the selection of appropriate techniques.

The manual should not be a limiting document forcing the engineer to use standard designs and procedures. Several design examples should be given . . . with latitude for the design engineer to use his imagination and engineering judgment. The manual should have the connotation of a document that suggests and informs rather than limiting or prescribing. In addition, the manual would give more complete definitions of some of the concepts included in the ordinance. . . .

T. DEBO, *supra*, at 38-39. The use of innovative techniques should be encouraged, subject always to the review of the local agency as to whether they will be effective.

A list of helpful reference materials including existing manuals of stormwater management practices are compiled and included as Appendix A. These manuals could be adopted in whole or in part by local governments in the development of their own manual or management practices.

SECTION TWELVE: MAINTENANCE

(a) Drainage facilities shall be dedicated to the _____ where they are determined to be appropriately a part of the _____ maintained regional system or are unlikely to be adequately maintained by the developer or owner of the property;
(governing authority) (local unit)

(b) The systems maintained by the owner shall have adequate easements to permit the _____ to inspect and, if necessary, to take corrective action should the owner fail to properly maintain the system. Before taking corrective action, the _____ (local agency) shall give the owner written notice of the nature of the existing defects. If the owner fails within thirty (30) days from the date of notice to commence corrective action or to appeal the matter to the _____ (special hearing examiner), the _____ (local agency) may take necessary corrective action, the cost of which shall become a lien on the real property until paid.

Commentary

A frequent comment that was received in response to requests for comment on early drafts of the Model Ordinance was that maintenance problems can be a significant headache for local governments. Section Twelve provides alternatives for allocating the maintenance responsibility between the private and public sectors. No cost sharing is provided for maintenance here as it is in Section Ten for off-site facilities. There may be particular situations, however, where a cost contribution would be justified and easily administered by the local government that assumed maintenance responsibility. Articulating those situations, however, is extremely difficult. This section was adapted from Volusia County, Fla., Ordinance No. 78-32 (1978).

SECTION THIRTEEN: ENFORCEMENT

(a) *Nuisance.* Any development activity that is commenced without prior approval of a Water Management Plan or is conducted contrary to an approved Water Management Plan as required by this Ordinance, shall be deemed a public nuisance and may be restrained by injunction or otherwise abated in a manner provided by law.

(b) *Civil and Criminal Penalties.* In addition to or as an alternative to any penalty provided herein or by law, any person who violates the provisions of this Ordinance shall be punished by a fine of not less than One Hundred Dollars (\$100) nor more than One Thousand Dollars (\$1,000) or by imprisonment in the county jail for a period not to exceed sixty (60) days, or by both such fine and imprisonment. Such person shall be guilty of a separate offense for each day during which the violation occurs or continues.

(c) Any violator may be required to restore land to its undisturbed condition. In the event that restoration is not undertaken within a

reasonable time after notice, the _____ may take necessary corrective action, the cost of which shall become a lien upon the property until paid.

(d) *Notice of Violation.* When the _____ determines that development activity is not being carried out in accordance with the requirements of this Ordinance, it shall issue a written notice of violation to the owner of the property. The notice of violation shall contain:

- (1) the name and address of the owner or applicant;
- (2) the street address when available or a description of the building, structure, or land upon which the violation is occurring;
- (3) a statement specifying the nature of the violation;
- (4) a description of the remedial actions necessary to bring the development activity into compliance with this Ordinance and a time schedule for completion of such remedial action;
- (5) a statement of the penalty or penalties that shall or may be assessed against the person to whom the notice of violation is directed;
- (6) a statement that the _____ determination of violation may be appealed to the _____ by filing a written notice of appeal within fifteen (15) days of service of notice of violation.

The notice of violation shall be served upon the person(s) to whom it is directed either personally, in the manner provided for personal service of notices by the court of local jurisdiction or by mailing a copy of the notice of violation by certified mail, postage prepaid, return receipt requested to such person at his or her last known address.

A notice of violation issued pursuant to this section constitutes a determination from which an administrative appeal may be taken to the _____.

(special hearing examiner)

Commentary

The local government is provided with a substantial arsenal for enforcing the provisions of the Model Ordinance. A violator is provided with detailed notice of the nature of his alleged violation and related matters. This section was drawn in part from Drainage Ordinance,

Title XXIV, Snohomish County, Washington (1979) and Ordinance No. 78-32, Volusia County, Fla. (1978).

SECTION FOURTEEN: SEVERABILITY

Each separate provision of this Ordinance is deemed independent of all other provisions herein so that if any provision or provisions of this ordinance be declared invalid, all other provisions thereof shall remain valid and enforceable.

SECTION FIFTEEN: EFFECTIVE DATE

This Ordinance shall become effective on _____ .

APPENDIX A

REFERENCES FOR STORMWATER RUNOFF IMPACTS AND CONTROL MEASURES

- Amy, Pitt, Singh, Bradford & Lagruff, WATER QUALITY MANAGEMENT PLANNING FOR URBAN RUNOFF, EPA-440/9-75-004 (NTIS PB 241-689/AS) (1974).
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- Darnell, IMPACTS OF CONSTRUCTION ACTIVITIES IN WETLANDS OF THE UNITED STATES, EPA-600/3-76-045 (1976).
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