

Chronological History of the Standards for Soil Erosion and Sediment Control in New Jersey to 1999 & The Early Years of the Soil Erosion and Sediment Control Program in New Jersey

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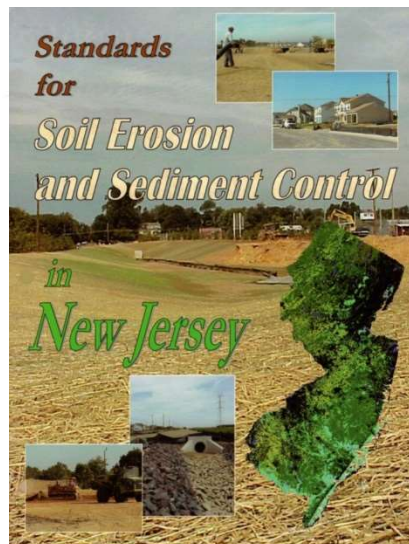
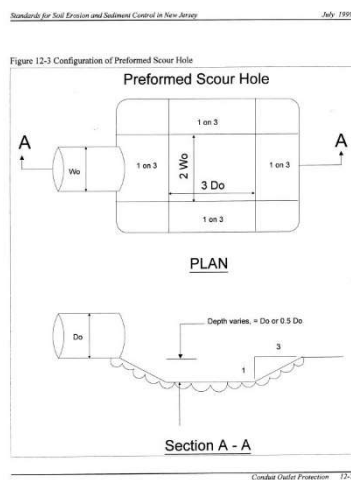
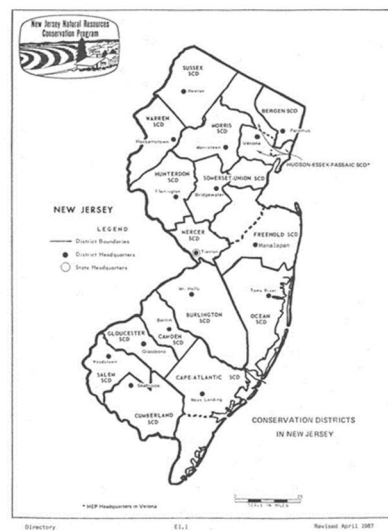
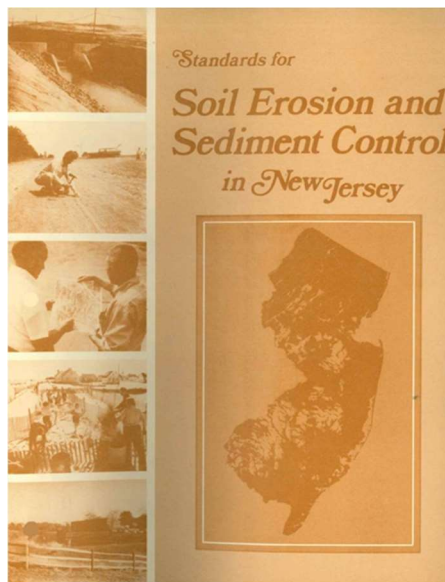


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Chronological History of the Standards for Soil Erosion and Sediment Control in New Jersey to 1999 and The Early Years of the Soil Erosion and Sediment Control Program in New Jersey

By

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Introduction

The New Jersey Department of Environmental Protection (NJDEP) was being formed at the time, but most of the functions to become NJDEP were still with other Departments. Art Vitale was hired by the New Jersey Department of Health (NJDOH) for a job which included plan review of proposed wastewater collection and treatment facilities.

NJDOH had a detailed list of criteria, referred to as "the book", for review of wastewater treatment plants, but occasionally a question would come up which was not answered by "the book". When Art had such a question during his 3 months with NJDOH, he was told to ask Mort Gibbons, whose desk was a few desks away from Art's, because "Mort wrote the book". Mort gave the answers, because he knew the background, history, and intent of the program. Mort was a very valuable resource.

The intent of this Chronological History is to assemble some of the background, history, and intent of the programs developed by the State, counties, municipalities, and private organizations. This assemblage of information is far from complete - maybe there is a Mort Gibbons of stormwater management out there somewhere.

In the 1970s, New Jersey led the nation in the control of soil erosion and sediment due to construction activity. In the early years, the program dramatically rose to address and manage the environmental concerns regarding nonpoint source pollution due to construction activity when it was most needed.

This Chronological History is mostly about the origin, evolution, and implementation of the Standards for Soil Erosion and Sediment Control in New Jersey issued, and from time to time revised, by the State Soil Conservation Committee (Committee) within the New Jersey Department of Agriculture (NJDA) to 1999. A substantial part of this Chronological History is thus concerned with the New Jersey Soil Erosion and Sediment Control Act (NJSA 4:24-39 et seq.) (Act), which since it took effect as Chapter 251, Laws of 1975 has governed the regulatory provisions of these Standards and their implementation. Under this Act, these regulatory provisions are mainly enforced by New Jersey's local Soil Conservation Districts (SCDs). A 1979 amendment to this Act required separate issuance and implementation of standards for NJ Department of Transportation (NJDOT) projects.

These Committee and NJDOT standards and this Act, which for many years have regulated almost all nonagricultural activities disturbing more than 5,000 square feet of land¹, are among New Jersey's most important environmental and infrastructure standards and legislation. They have not only prevented massive soil erosion and sediment discharges while regulated land clearing or construction activities were underway but have also increasingly prevented post construction stormwater discharges from causing or aggravating erosion offsite.

In the beginning (1970), the United States Department of Agriculture (USDA) Soil Conservation Service (SCS) influenced the State to develop and adopt Standards for soil erosion and sediment control. The program had the full support of, along with strong technical direction from, SCS. SCS would later relinquish the technical direction to New Jersey Department of Agriculture's licensed professional engineer.

The years 2022 and 2025 mark, respectively, the 50th anniversaries of the first of these Committee Standards (1972) and this Act, so now is a particularly good time to release this Chronological History. Priority is given to events before the year 2000 because fewer persons (especially among those who have not had long careers) are aware of them, and because it is steadily becoming harder to find persons willing and able to convey knowledge of many of these pre-2000 events. (By coincidence, moreover, in 1999 the Committee adopted its first major revisions after many years to its Standards for Soil Erosion and Sediment Control in New Jersey.)

This Chronological History addresses technical, institutional/legal/administrative, and general aspects of its subject. For example, on the technical side this Chronological History lists all Vegetative and Engineering Standards adopted or revised by the Committee and NJDOT between 1972 and 1999; makes remarks about practices and conditions specific to some of these Standards, such as acid soil, sod, erosion control mats, level spreaders, grassed waterways, sediment basins, conduit outlet protection, and off-site stability (including additional requirements implemented by some SCDs); and also discusses related hydrologic and engineering matters such as computation and map technology, curve numbers, TR-55, the Delmarva Unit Hydrograph, Karst geology, and general approaches concerning stormwater and runoff detention structures.

On the general and institutional/legal/administrative side, this Chronological History addresses such matters as growing acknowledgement in the 1960s and early 1970s of the erosion and sediment problem attendant to New Jersey's rapid urban expansion; early 1970s SCD actions, model municipal ordinances, and legislative proposals to address this problem before the Act's adoption; the decision to use the Committee and the SCDs to address this problem; the groups that developed the Committee Standards before and after 1975; the role of SCS (renamed the Natural Resources Conservation Service, NRCS, in 1994) before and after the Act's adoption; the initial

¹ The specific language in the Act's definition of "project" at NJSA 4:24-41.g is "disturbance of more than 5,000 square feet of the surface area of land." In the pertinent period covered by this Chronological History (1975-1979), the Act defined "disturbance" as "any activity involving the clearing, excavating, storing, grading, filling or transporting of **soil** or any other activity which causes **soil** to be exposed to the danger of erosion" (NJSA 4:24-41.d, emphasis added), and defined "soil" as "all unconsolidated mineral and organic material of any origin" (NJSA 4:24-41.i).

content of the Act and SCD attitudes toward the Act; early Committee rules to implement the Act; consultation among the Committee, SCDs, counties, and municipalities concerning implementation procedures; technical and other training of SCD personnel as well as the engineering and regulated community; major 1979 amendments to the Act and the Committee's enabling act; the Act's effect on funding SCD operations; the Committee's standard application form and other administrative policy and procedure documents; and some implementation statistics.

This Chronological History is not the product of professional or academic quality historical research, and must not be considered a complete treatment of the subject. For example, one basic document—the third edition of these Committee Standards—has still not been located.² Some available documents that would likely be quite informative, such as the full set of Committee minutes from 1970 through 1999, have not been requested and examined.³ This Chronological History's authors do not include any 20th century representatives of municipal officials, land developers or the construction industry, or non-SCD environmental organizations. A planned section on how the Act and its implementation related to the federal Clean Water Act and certain New Jersey water quality and stormwater statutes has not yet been written.

Notwithstanding these limitations, however, this Chronological History has considerable value. It was written by persons who each have extensive experience related to various aspects of its subject. These persons include Hunter Birkhead, P.E., the Committee's former State Erosion Control Engineer; John Showler, P.E., the Committee's current State Erosion Control Engineer; four current or former SCD officials—William Engisch (Hunterdon SCD Board of Supervisors member and former District Manager), Ernest Thurlow, PhD., CPESC (former Somerset-Union SCD District Manager), Angelo Caruso (Bergen SCD District Manager), and Victor DeVasto (former Gloucester SCD District Manager); David Lamm, P.E., former USDA NRCS State Conservation Engineer; Stacy Abrahamsen Brady, former Senior Resource Specialist, Freehold SCD; and William Minervini, former Supervising Environmental Specialist, NJDEP Division of Water Quality. Most of this Chronological History was written by Hunter Birkhead and William Minervini, separately or jointly depending on the passage in question.

As summarized above, moreover, this Chronological History addresses a very broad range of technical, institutional/legal/administrative, and general aspects of its subject. Among the tasks accomplished in writing this Chronological History was preparing a large electronic archive that includes (among other documents) the Committee's 1972, 1974, 1982, and 1987 Standards for

² Although the third edition has not been located, it seems clear that all Vegetative and Engineering Standards in the third edition were either in the 1974 second edition or the 1982 fourth edition (except possibly for the November 1980 correction to the Conduit Outlet Protection Standard). See the Chronology in Appendix C3 of the fourth edition.

³ Some Committee minutes were examined to obtain information related to certain specific events known from other sources. The Selected State Soil Conservation Committee Minutes Appendix provides the minutes of the September 12, 1983, November 21, 1983, and March 11, 1996 Committee meetings.

Soil Erosion and Sediment Control in New Jersey; Committee related excerpts from several NJDA Annual Reports; a 1973 South Branch Watershed Association Municipal Handbook and 1974 Camden County SCD Regulations for Control of Soil Erosion and Sedimentation; Appendices and Supplements concerning the Act's legislative history and acid soil; minutes of three Committee meetings; the December 1990 Interagency Agreement for Coordination of Stormwater Management and Soil Erosion Control between NJDEP and the Committee; and the Committee's March 1996 Interim Administrative Policy and Procedures Manual for implementing the Act. This archive is available at <https://www.njafm.org/archive.html>. The authors of this Chronological History thank the NJDA and NJDEP for providing, in paper or electronically, many of the documents in this archive; thank the Raritan Headwaters Association for granting permission to include in this archive the above mentioned Municipal Handbook; and thank the New Jersey Association for Floodplain Management (NJAFM) for hosting this archive on the NJAFM webpage.

In short, while this Chronological History is not the last word on its subject, it is a good start.

Summary Timeline

(based on documents cited in this Chronological History)

1965	<u>Water Control Guide for Suburban and Rural-Residential New Jersey</u> recommends control of serious soil erosion problem caused by urbanization
August 1967	Rutgers University report to the New Jersey Joint Committee on Drainage recommends control by counties, municipalities, and SCDs of soil erosion caused by land development
November 1967	SCS representative suggests that NJ adopt a sediment control program like that in Fairfax County, Virginia, where the county and municipalities submit development plans to local SCDs which, working with SCS, prepare plans for controlling sediment during site preparation and construction
1970-1971	In 1970, SCS publishes <u>Guidelines for the Control of Erosion and Sediment in Urban Areas of the Northeast and Controlling Erosion on Construction Sites (Information Bulletin 347)</u> The Committee's section of NJDA <u>Annual Report</u> for July 1970 to June 1971 notes that "erosion and sediment pollution" attendant to rapid NJ urban expansion was a

common problem addressed by SCD technical assistance; that a State Sediment Control task force was established “to develop State and local erosion and sediment controls”; and that “standards and specifications for erosion and sediment control for urbanizing areas and model ordinances for municipal implementation of controls” were developed

(A “Draft 9/3/71” of such a model ordinance is available)

June 14, 1972

The Committee issues its first Standards for Soil Erosion and Sediment Control in New Jersey, which include 7 Vegetative Standards, 7 Engineering Standards, general guidelines, and multiple appendices

June 26, 1972

NJ Senate Bill No. 1083 (S-1083) introduced

July 1972 to June 1973

The Committee’s section of NJDA Annual Report for July 1972 to June 1973 notes that 492 site plans and subdivision plats were reviewed by SCDs for erosion and sedimentation and other resource management problems (this number increased to 634 the following year); that the Camden County SCD “developed a proposed district ordinance to require district review of land development in an effort to control soil erosion, sedimentation and floodwater problems”; and that “... language was drafted for a statewide erosion control bill. Language will be used to modify S-1083 to be more comprehensive in nature”

February 11, 1974

NJ Senate Bill No. 806 (S-806) introduced (replaces and differs greatly from S-1083)

February 25, 1974

Camden County SCD adopts "Regulations for Control of Soil Erosion and Sedimentation in Camden County" under the NJ Soil Conservation Act of 1937

September 9, 1974

The Committee issues second edition of its Standards for Soil Erosion and Sediment Control in New Jersey; changes include 2 new Vegetative and 3 new Engineering Standards

November 12, 1975

S-806 adopted with major changes as the NJ Soil Erosion and Sediment Control Act (Chapter 251, Laws of 1975; NJSA 4:24-39 et seq.; the Act)

December 9 and 12, 1975	The Committee promulgates and amends “procedural rules and regulations” to implement the Act at new NJAC 2:90-1 (effective January 1, 1976; published January 8, 1976); NJAC 2:90-1.3 incorporates only the Vegetative and Engineering Standards in the Standards adopted September 9, 1974
January 1, 1976	All sections of the initial NJ Soil Erosion and Sediment Control Act now in effect; Committee rules at NJAC 2:90-1 in effect
January 5, 1978	Committee rules at NJAC 2:90-1 amended (mainly in regard to municipal soil erosion and sediment control ordinances)
February 27, 1980	Effective date of Chapter 459, Laws of 1979, which significantly changes parts of the Act, and also authorizes the Committee to approve, modify or reject any SCD decision
July 3, 1980	Effective date of incorporation in Committee rules at NJAC 2:90-1.3 of the Committee’s September 1979 changes to the 1974 Vegetative and Engineering Standards (including 6 new Engineering Standards) in the Committee’s <u>Standards for Soil Erosion and Sediment Control in New Jersey</u>
November 1982	The Committee issues fourth edition ⁴ of its <u>Standards for Soil Erosion and Sediment Control in New Jersey</u> (no post July 3, 1980 changes to the Vegetative and Engineering Standards except for a November 1980 correction to the Conduit Outlet Protection Standard)
June 30, 1983	In the first 7½ years of the Act’s administration, the total “Area of Projects in Acres” (i.e., disturbed area) was 133,840 acres (about 209 square miles); 15,046 applications were received; and 110,614 site inspections were performed
August 1983	The Committee issues draft <u>Administrative Policies and Procedures Manual for Implementing the Soil Erosion and Sediment Control Act</u>

⁴ Although the third edition has not been located, it seems clear that all Vegetative and Engineering Standards in the third edition were either in the 1974 second edition or the 1982 fourth edition (except possibly for the November 1980 correction to the Conduit Outlet Protection Standard). See the Chronology in Appendix C3 of the fourth edition.

December 1985	Version of the Committee's standard application form in the fifth edition (April 1987) of the Committee's <u>Standards for Soil Erosion and Sediment Control in New Jersey</u>
April 1987	The Committee issues fifth edition of its <u>Standards for Soil Erosion and Sediment Control in New Jersey</u> ; changes effective April 6, 1987 include 4 new "Structural" (renamed from "Engineering") Standards
July 18, 1988	Effective date of first <u>Soil Erosion and Sediment Control Standards</u> (NJAC 16:25A) that NJDOT promulgates under the Act (includes 11 Vegetative Standards and 29 Structural Standards)
December 27, 1990	<u>Interagency Agreement for Coordination of Stormwater Management and Soil Erosion Control</u> between NJDEP and the Committee signed
January 4, 1993	Effective date of amendments to Committee rules at NJAC 2:90-1; these amendments mainly codify requirements in the Committee's standard application form, and add requirements for submission of hydrologic and hydraulic data
November 2, 1994	Committee memorandum to SCD managers notes that "a special committee (Quality Improvement Team)" including representatives of 10 SCDs with input from Committee staff and others reviewed "the existing draft Ch. 251 Policy and Procedures Manual" and developed recommended changes; and solicits comment from all SCDs on this revised draft
March 1996	The Committee distributes its March 1996 <u>Interim Administrative Policy and Procedures Manual for Implementation of Chapter 251, P.L. 1975, as amended - The Soil Erosion and Sediment Control Act of New Jersey</u> to the SCDs; the Committee had "adopted this Administrative Policy and Procedures Manual on an interim basis" on September 11, 1995, and "anticipates final adoption of the Manual following some additional editorial and organizational review"
July 1999	The Committee issues sixth edition of its <u>Standards for Soil Erosion and Sediment Control in New Jersey</u> ; changes

effective July 6, 1999 (operative October 1, 1999) include 1 new Vegetative Standard, 5 new Engineering Standards, and 7 new Stormwater Runoff Treatment Standards⁵ (the name “Structural Standards” is changed back to “Engineering Standards”)

William Minervini
formerly NJDEP

⁵ These Stormwater Runoff Treatment Standards were deleted from the Committee rules at NJAC 2:90-1 in 2006.

Prolog: The New Jersey Soil Erosion and Sediment Control Program at 40+ Years

The Soil Erosion and Sediment Control Program in New Jersey is a product of the time when there was rapid development of suburban areas causing many areas to be faced with damages from unchecked soil erosion. Streams were muddy, lakes and rivers turned brown from sediment and wooded areas stripped of trees. At the same time, the environmental awareness of the citizens was increased with the first Earth Day in 1970. There was an increase in grassroots environmental groups, such as watershed associations to help fight some of the development and have municipality set zoning based on the natural resources and other areas which should be preserved. On the other side, the development and construction industries did not really consider erosion control to be a cost-effective practice and believed the damages such as muddy runoff or mud on the roads were a temporary condition which could be cleaned up if necessary. The common practice for stabilization was that you only planted grass when the project was done. Eventually as the control of point source pollution became regulated and controlled, the interest turned to nonpoint source pollution and soil erosion was identified as the main source in developing areas.

Soil erosion and sediment control was a little different than other sources of both point and nonpoint pollution because in the United States rural agricultural areas were voluntarily controlling soil erosion on farm fields to keep the productive soils on the farm and out of the waterway. This was happening through the US Department of Agriculture SCS working with the State Departments of Agriculture, State Land Grant Colleges and locally through the Soil Conservation Districts. It was a cooperative effort that developed the technical practices and tailored them to the local need. It seemed that when the need for regulation of development arose that there was already a technology and delivery system for agricultural soil erosion and sediment control that worked in place and which had experience.

In the beginning this was a new regulation forced on an industry with not much experience, but the selection of practices approach and the attempt not to make one size fit all led to an understanding that construction is not a precise business and there is a need for flexibility. While it was hard as first, many realized that there was a need and in some cases, it improved the construction process. After 40+ years, soil erosion and sediment control is part of the construction process just as the building codes. It would be hard to imagine what parts of New Jersey would look like today without the hard work of the Soil Erosion and Sediment Control Program. The development and construction process have changed and the old way of construction will not be tolerated by the public. Soil Erosion and Sediment Control has become part of the accepted construction process from planning to construction.

Beginning

The Chapter 251 Soil Erosion and Sediment Control Program was a State initiative that grew out of the environment awareness of the middle 1960's. In 1970, the New Jersey Department of Environmental Protection (NJDEP) was formed primarily from the natural resource programs of the Department of Conservation and Economic Development, and the pollution control, solid waste, and potable water quality programs of the Department of Health. It was created to deal not only with traditional point source pollution but also more broadly to "formulate comprehensive policies for the conservation of the natural resources of the State, the promotion of the environmental protection and the prevention of pollution of the environment of the State" (NJSA 13:1D-9). Because the New Jersey Department of Agriculture (NJDA) through the State Soil Conservation Committee (Committee) programs was already involved with soil conservation and natural resource conservation on agricultural lands, the NJDA was assigned primary responsibility for the Chapter 251 Soil Erosion and Sediment Control Program and worked as a partner with the NJDEP⁶. The New Jersey Department of Agriculture was (and still is) a small Division of State Government with limited resources, implementing a regulatory program in non-agriculture settings. In the beginning it had the full support of USDA SCS, especially in implementing US Environmental Protection Agency programs. However, NJDEP as a primary New Jersey water pollution control agency administers as a partner with the NJDA certain regulatory and other programs directly related to soil erosion and sediment control. It was the USDA Soil Conservation Service (SCS) who urged the NJDA to develop New Jersey's first set of Soil Erosion and Sediment Control Standards in 1972.

Agriculture Background

The need to manage and control erosion and resultant sedimentation was recognized by the State of New Jersey with the passage of the NJ Soil Conservation Act in 1937. This Act established the State Soil Conservation Committee to provide a comprehensive natural resource management program and establish the local Soil Conservation Districts (SCDs) to provide the local link needed to work with the local agricultural community. The program worked closely with the USDA Soil SCS to provide the technical assistance to control soil erosion and keep the land productive. The SCS developed a diverse tool box of conservation practices that could be applied to deal with a wide range of problems as well as soils and management practices which could be applied to the land based on a conservation plan. The tools ranged from simple management strategies to engineering practices and vegetative recommendations. These conservation plans are tailored to all types of farming operations and to the soils and slopes of the land; and would reduce soil erosion and sedimentation impacts on the farm to maintain productivity, and off-site on waterways, lakes and neighboring properties.

⁶ Section 17 of Chapter 448, Laws of 1948 had transferred the Committee to the Division of Planning and Development in the Department of Conservation and Economic Development. Chapter 129, Laws of 1958 transferred the Committee to the NJDA. See NJSA 4:24-2.1.

This program which grew from the Dust Bowl days proved to be a successful means of delivering the technical assistance from the Federal level to the local agricultural community by partnering with State agencies and the local SCDs. The program has continued to provide technical assistance to the local agricultural community from Federal, State and local governments, and is recognized as one of the first nonpoint pollution control and natural resource management programs in the nation.

The Urban and Suburban Soil Erosion and Sediment Control Problem in New Jersey

In the 1960s and early 1970s, New Jersey was developing at a very rapid rate with subdivisions, residential development, and commercial and industrial projects in the rural/suburban areas, and areas of re-development in the urban areas. There was concern over the impact of these large land disturbances on both the surrounding lands and waterways. With increased environmental awareness by residents and government officials coupled with many examples of local problems from the land disturbance, there was a call for some type of control to prevent severe soil erosion and sedimentation problems. There was a need to control runoff pollution both from suburban and urban land disturbances and to protect our waterways from erosion due to increased stormwater flows.⁷

See, for example, the discussion and photographs of soil erosion and sedimentation problems that are part of the Water Control Guide for Suburban and Rural-Residential New Jersey (1965)⁸ written by five Rutgers University professors and staff, the SCS State Conservation Engineer, and the SCS State Soil Scientist. Following are excerpts from this discussion:

“When an area previously covered by woods and farms is developed for homes, industry, and commerce, the characteristics of the ground surface are modified with regard to infiltration capacity and runoff. This change often produces serious problems of flooding and soil erosion with resulting damage to private and public property ... Ideally, where land was properly managed in the past, the runoff from a new development should be minimized and should not exceed the previous quantity and rate. In practice, however, we can only try to approach this ideal. There is much that can be done to forestall drainage problems through proper planning by municipal officials and engineers concerned with the

⁷ For much earlier New Jersey judicial recognition that the rapid, concentrated discharge, from gutters of a municipality's recently paved street, of a large volume of stormwater onto private property could seriously (and, the courts decided, unlawfully) damage (in effect seize part of) such property by carving out a large channel where none previously existed, see Miller v. Morristown, 2 Dick. Ch. Rep. (1890); affirmed Mayor of Morristown v. Miller, 48 N.J. Eq. 645 (1891).

⁸ Kurt Nathan, Russell B. Alderfer, Stephen A. Decter, Robert M. Hanna, Mark E. Singley, Kenneth S. Werkman, and Kenneth P. Wilson. Circular 605. Rutgers University, College of Agriculture and Environmental Science, New Jersey Agricultural Experiment Station: New Brunswick, New Jersey.

layout and construction of developments. Every effort should be made to reduce the peak flow resulting from intense storms and to permit as much of the rain as possible to infiltrate the soil and replenish diminishing ground water resources ... " (page 4)

...

"The erodibility of the soil as well as its stability must be considered in designing all earth structures. Some control measures protect the soil from impact of raindrops or blasting by wind by providing a good cover. Other measures are designed to intercept the water or wind by barriers such as terraces or windbreaks. Still others lead the water away slowly to protected outlets. A good protective cover may consist of a tight vegetation, mulch for temporary protection, or paving. The latter of course increases rate and amount of runoff, whereas the other two measures reduce runoff." (page 10)

In August 1967, a Rutgers University report to the New Jersey Joint Committee on Drainage⁹ that recommended "regulation of a number of activities affecting the capacity of channels to facilitate water flows" included statements such as the following:

"... subdivision regulations only require that adequate drainage facilities be provided on lands shown on plats. There is no explicit authority to regulate the development of flood prone areas, indiscriminate landfills, and arbitrary grading of lands affecting water control. They do not control erosion from development sites blocking streams." (Part I, page 51)

"Land Use Practices. It is proposed that in conjunction with the review of subdivision plats and individual site developments, land use practices, such as grading of land and the control of soil erosion, be regulated according to prescribed standards by the reviewing agency [county, municipality, and, if and where created under future legislation, "watershed district board"] when such practices affect the control, protection, and conservation of the water resources within the jurisdiction of such agency." (Part II, page 182; see also Part II, page 201)

The report also noted that while supervisors of any soil conservation district are authorized to formulate regulations governing the use of lands within the district in order to conserve soil and soil resources and prevent and control soil erosion, this authority is lost if 20 per cent of the landowners within a district object (NJSA 4:24-23), and that "there is no evidence of this authority

⁹ Surface Water Control In New Jersey: Drainage, Flood Control and Related Policies in an Urban State by Stephen A. Decter (1967). Rutgers University, Bureau of Government Research: New Brunswick, New Jersey.

being enacted by district supervisors” (Part I, page 56)¹⁰. The report then stated: “Soil conservation districts' power to formulate and enforce land use regulations could be utilized to a greater extent than at present to control arbitrary grading and practices resulting in erosion and the blocking and siltation of channels. They should be accorded greater political support at the State level in such endeavors” (Part II, page 202).

At the follow-up November 2, 1967 Public Policy Forum on Surface Water Control in New Jersey¹¹, “a soil conservation service representative pointed out that there is a close relationship between sedimentation, flooding, and urbanization. He described a sedimentation control program which is working very well in the rapidly developing areas of Fairfax County, Virginia, where the county and municipalities submit industrial and housing development plans to the local soil conservation districts. The districts, working with the Soil Conservation Service technicians, prepare plans for controlling sediment during site preparation and building construction. He reported it has worked well and suggested it could be just as effective in New Jersey.” (page 54)

Since soil erosion and sediment control from development was not a regulated activity but was impacting the environment, there were two areas which needed to be developed. The first would be to develop regulations to require proper erosion controls during construction and related land disturbances and to end with a stable site. The second would be to develop Standards to be used as guidelines for developing and designing both temporary and permanent control on the site. Some of the first regulations were Soil Erosion and Sediment Control Ordinances on the municipal level. These ordinances were being developed by municipalities, watershed association and environmental groups and ranged from simple to complex. Many county and municipal officials asked the local soil conservation districts, SCS and the Committee for assistance and guidance. It was obvious that there was a strong need to base any regulation on a set of Standards, and that the SCS had many time-tested design standards for agriculture which could be adapted to the construction industry. The 1965 Water Control Guide for Suburban and Rural-Residential New Jersey said that water runoff control techniques developed by SCS and others for agricultural uses “seem appropriate” for much New Jersey land development. Moreover, in 1970 the SCS published Guidelines for the Control of Erosion and Sediment in Urban Areas of the Northeast and Controlling Erosion on Construction Sites (Information Bulletin 347).

The Committee’s section of the NJDA Annual Report for July 1, 1970 through June 30, 1971 noted that “erosion and sediment pollution” was one of the problems attendant to New Jersey’s rapid population growth and urban expansion; that “urban people are becoming more aware of the need for good land use and erosion and sediment control measures in urban developments”; and that one of the “most common” New Jersey problems being addressed by SCD

¹⁰ As noted below, the Camden County Soil Conservation District adopted regulations in 1974 under this authority, which originated in the NJ Soil Conservation Act of 1937.

¹¹ Proceedings of the Public Policy Forum on Surface Water Control in New Jersey edited by Harold M. Klein (1967). Rutgers University, Bureau of Government Research and University Extension Division: New Brunswick, New Jersey.

technical assistance was “bare and eroding land in subdivisions and shopping centers.” Among the “major program accomplishments” listed in this Committee section were “established a State Sediment Control task force to develop State and local erosion and sediment controls” and “developed standards and specifications for erosion and sediment control for urbanizing areas and model ordinances for municipal implementation of controls.” A December 9, 1971 Soil Conservation Seminar was developed in cooperation with the New Jersey Builders Association, who requested assistance with erosion and sedimentation control.

In 1972, at the urging of USDA SCS, the Committee issued the first Standards for Soil Erosion and Sediment Control in New Jersey. The Preface to these Standards explained their origin and intended use as follows:

The last several decades of rapid suburban development in the State of New Jersey has resulted in a number of undesirable effects. One of the most evident and harmful effects having very serious consequences is the erosion of soil by both wind and water. When soil is displaced unintentionally in this manner, problems are usually created in several areas: the area where the soil comes from; and the area(s) where it is deposited. If a waterway or drainage facility is involved, silting of the stream or drainage facility occurs. The cost of correcting the damage, pollution, and inconvenience this causes is much greater than the cost of preventing soil erosion in the beginning. Fortunately, the technology for preventing soil erosion is well established. Planners, engineers, developers and contractors must begin to utilize these tried and proven methods.

The New Jersey State Soil Conservation Committee under the chairmanship of Secretary of Agriculture Phillip Alampi, recognized a need for developing a comprehensive State wide plan to control these problems of erosion and sedimentation. A Sediment Control Committee was appointed and a copy of their report and recommendations has been published.

Among the recommendations of this group were the development of model ordinances for use by municipalities to regulate land disturbance activities to control erosion and sedimentation. Such model ordinances have been prepared by a committee of representatives from industry, government and concerned groups. Local governmental units should and will be encouraged to use them to establish the proper and necessary controls to reduce soil erosion.

Also recommended was the development of a single source of standards and recommendations to guide local governments, developers and technical personnel with erosion control techniques.

Secretary of Agriculture Alampi responded to this recommendation and appointed the committee of knowledgeable persons listed on page ii of this report to develop these standards.

The committee has worked diligently to produce these Standards which are a model of professional excellence. It is their earnest hope that concerned citizens, local governments and their technical advisors will act expeditiously to adopt the needed ordinances and stop the poor practices which have been laying our precious land to waste and ravaging the most valuable and beautiful features of the Garden State.

The multi-disciplined Committee for Development of Standards for Soil Erosion and Sediment Control in New Jersey included representatives of NRCS, NJDEP, NJDOT, College of Agriculture and Environmental Sciences at Rutgers, NJ Association of County Engineers, NJ Society of Municipal Engineers and the Committee. These Standards consisted of multiple elements including general guidelines, seven vegetative and seven engineering Standards on which a plan could be developed and reviewed, suggested items to include in or with erosion and sediment control plans, and (to implement the full 1972 Standards) a “Model Municipal Land Disturbance Ordinance to Control Soil Erosion and Sedimentation” and “Model Soil Erosion and Sediment Control Ordinance to Amend Municipal Subdivision and Zoning Ordinances.” The SCS provided much of the basic technical information. With the issuance of 1972 Standards, there was now a tool in place for both developing local ordinances and providing a uniform means to design erosion control plans. Both the designer and reviewers had a common platform to work from.

The two above mentioned model municipal ordinances expressly enabled, but did not require, municipalities to allow SCD participation in the development and review of individual erosion control plans. For example, Article III.A of the “Model Soil Erosion and Sediment Control Ordinance to Amend Municipal Subdivision and Zoning Ordinances” provided:

No site plan or preliminary plan submitted to the planning board pursuant to the subdivision or land use ordinance or [sic] _____ (municipality) shall be granted approval unless it includes a soil erosion and sediment control plan developed in accordance with the Standards for Soil Erosion and Sediment Control adopted by the New Jersey State Soil Conservation Committee and administered by the _____ Soil Conservation District. **The applicant may consult with the _____ soil conservation district in the development of the plan and the selection of appropriate erosion and sediment control measures.** The applicant shall bear the final responsibility for the installation and construction of all required soil erosion and sediment control measures according to the provisions of this ordinance except as exempted by ARTICLE V. (Emphasis added)

Article III.C of this model ordinance in turn provided:

Erosion and sediment control plans shall be reviewed by the planning board and approved when in conformance with the Standards for Erosion and Sediment Control. **The board may seek the assistance of the _____ soil conservation district in the review of such plans and may deem as approved those plans which have been reviewed and determined adequate by the soil conservation district.**
(Emphasis added)

(In contrast, what appears to be a September 3, 1971 draft of this model ordinance¹² included no provision for SCD review or consultation concerning such plans. Moreover, Article III.A of this draft required compliance not with standards for soil erosion and sediment control adopted by the Committee, but with “the standards and specifications for soil erosion and sediment control adopted by the _____ Soil Conservation District.”)

Article IV.A of this model ordinance set forth eight “General Design Principles,” the following two of which show that at least as early as 1972 the Committee advocated retaining natural vegetation whenever feasible, and retaining runoff onsite wherever possible:

2. Whenever feasible, natural vegetation shall be retained and protected.
- ...
6. Water runoff shall be minimized and retained on site wherever possible to facilitate ground water recharge.

Article V of this model ordinance exempted “minor subdivisions,” “site plans for development where the land will not be disturbed,” and “agricultural use of lands when operated in accordance with a farm conservation plan approved by the local soil conservation district or when it is determined by the local soil conservation district that such use will not cause excessive erosion and sedimentation.”

(The above quoted language in the 1972 Standards was left unchanged in the revised Standards for Soil Erosion and Sediment Control in New Jersey that the Committee adopted on September 9, 1974. It appears that from July 1976 onward, however, the Committee’s Standards for Soil Erosion and Sediment Control in New Jersey ceased to have any model municipal

¹² This version, referred to as the “New Jersey Model Ordinance - Model Ordinance to Amend Municipal Subdivision and Zoning Ordinances to Control Soil Erosion and Sedimentation,” and marked “Draft 9/3/71,” was reprinted in Local Environmental Planning Procedures: A Municipal Handbook For Flood Control, Land Use, and Environmental Protection by South Branch Watershed Association, Inc. (1973). South Branch Watershed Association, Inc.: Clinton, New Jersey.

ordinances, presumably due to the adoption in late 1975 of the New Jersey Soil Erosion and Sediment Control Act.¹³)

From 1972 to 1976, there was no Statewide implementation of the Soil Erosion and Sediment Control Program for construction sites. Prior to the 1976 mandatory implementation of the Chapter 251 Soil Erosion and Sediment Control Program, the Soil Conservation Districts had an option as to whether they wished to implement the Soil Erosion and Sediment Control (SESC) Program for construction sites under the NJ Soil Conservation Act of 1937, help their county administer the program, convince the local communities in their county to administer it (with District assistance where feasible), or take no action. As a result, in some counties a majority of their municipalities administer the SESC program but in the majority of New Jersey's counties the program is entirely administered by the Soil Conservation District.

In this regard, the Committee's section of the NJDA Annual Report for July 1, 1972 through June 30, 1973 noted that 492 site plans and subdivision plats were reviewed by SCDs for erosion and sedimentation and other resource management problems (this apparently referred to SCD reviews conducted to assist local government implementation of local government ordinances), and that the Camden County SCD "developed a proposed district ordinance to require district review of land development in an effort to control soil erosion, sedimentation and floodwater problems."

More progress along these lines was noted in the Committee's section of the NJDA Annual Report for July 1, 1973 through June 30, 1974, which stated:

... Six hundred and thirty-four site plans and subdivision plats were reviewed [by SCDs] for adequate erosion and sediment controls and for related soil resource management problems. This is a 30 percent increase over the previous year's record.

...

On February 25, 1974, the Camden County Soil Conservation District approved and formally adopted "Regulations for Control of Soil Erosion and Sedimentation in Camden County." This provision required that developers and others who engage in major land disturbance have a district-approved erosion control plan before municipal subdivision or site plan approval can be granted. This is the first such ordinance

¹³ See the "Chronology of Standards of Soil Erosion and Sediment Control in New Jersey" in Appendix C3 of the Standards for Soil Erosion and Sediment Control in New Jersey that the Committee published in November 1982. This Chronology identified the earliest item in these Standards' Appendix C (which included no model municipal ordinances) as "Soil Erosion and Sediment Control Act: Published July 1976." In the 1972 and 1974 Standards, the model municipal ordinances were in Appendix C.

enacted in New Jersey and one of the few enacted by a district in the nation.

In general, throughout the State, great emphasis was given to coordination with municipalities and counties to integrate erosion controls in regular development procedures.

...

In 1974, Sixty municipalities now have ordinances requiring erosion and sediment control prior to development or site approval with 40 more in process.

The above quoted statements demonstrate that even before the New Jersey Soil Erosion and Sediment Control Act was adopted in 1975, SCDs reviewed many site plans and subdivision plats for adequate erosion and sediment controls, and that the number of municipal soil erosion and sediment control ordinances was substantial and increasing in these two years. The Camden County SCD regulations, adopted under the NJ Soil Conservation Act of 1937, applied to local government approval of "a development plan or application for a building permit involving more than one acre of land," required the affected applicant or landowner to conform to the Committee's full "Standards for Soil Erosion and Sediment Control in New Jersey" (not just some provisions in those Standards), and allowed the SCD to delegate administration and enforcement to local government.

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NJ Soil Erosion and Sediment Control Act (NJSA 4:24-39 et seq.)

Background and Overviews

It soon became apparent that there was a need for a Statewide Soil Erosion and Sediment Control Act which would provide the development community and construction industry a uniform approach to controlling soil erosion and sediment control. It was clear that soil erosion control ranged from non-existent to over regulation across the State. There was a need to clearly define a project or land disturbance, provide more comprehensive design standards based on science and sound engineering practice, more uniform review and inspection, and a clear path for enforcement and penalties. With years of experience in promoting a voluntary program to the agricultural community, the Committee along with the local SCDs worked to be inclusive of all involved and have a program which was developed with input from the government agencies and the regulated public. There was support among the regulated community that soil erosion and

sediment control should be more uniform in design, review, and enforcement. However, the State of New Jersey was not uniform geologically, hydrologically nor in land use.

Each SCD was an existing organization with local offices and staff to review and certify the soil erosion control and sediment control plans, inspect the projects, and issue reports of compliance when complete. A good number of local SCDs coordinated the process with the municipalities and the regulated community to meet and resolve issues on the local level which is unique for most State regulations. It is interesting to note that the Act was generally supported by both the State and local government officials and the regulated community. With the Committee and the 15 SCDs throughout the State funded by user-based fees, the ability to implement the program was there, with the advantage of local contact for review and inspection.

Overview

The path to a Statewide Soil Erosion and Sediment Control Act was not short or direct. For example, the Committee issued comprehensive Standards for Soil Erosion and Sediment Control in New Jersey in 1972 three years **before** this Act ensuring Statewide implementation of the Committee's standards was adopted, and this Act (or something similar) was not the only approach considered. The following paragraphs (and the Appendix cited therein) outline major steps on this path up to and including the 1974 introduction of the bill (Senate Bill No. 806) that with certain changes became this Act.

As discussed above, starting in the mid-1960s there was a growing call for some type of control to prevent severe soil erosion and sedimentation problems attendant to New Jersey's rapid population growth and urban expansion, accompanied by belief that such control should include (i) a role for the SCDs; and (ii) integration with municipal approval of land development proposals. There were, however, multiple options and issues to be addressed in establishing such control. For example, at a general level there was the option of using *existing statutes alone* (if only for an interim period pending new legislation), and the alternative of enacting *new legislation*. There were also issues such as regulatory thresholds and application processing deadlines and content; regulation by municipal ordinance versus, or in combination with, direct SCD regulation of land disturbance (under the NJ Soil Conservation Act of 1937 or new legislation); the specific role of SCDs and particular municipal officials in municipal ordinances; the Committee and/or NJDEP role if any; and possible regulation of agricultural soil erosion. These options and issues were illustrated by various model municipal ordinances, Camden County SCD regulations, and legislative bills recommended, adopted, or drafted in the early 1970s before the New Jersey Soil Erosion and Sediment Control Act was adopted on November 12, 1975. Several of these model ordinances, regulations, and bills are briefly discussed below. For more discussion of how they relate to these options and issues, see the Chapter 251 Legislative History Appendix.

Examples of the existing statutes alone option

- The two model ordinances in the Committee’s 1972 and 1974 Standards for Soil Erosion and Sediment Control in New Jersey: the “Model Soil Erosion and Sediment Control Ordinance to Amend Municipal Subdivision and Zoning Ordinances” and the “Model Municipal Land Disturbance Ordinance to Control Soil Erosion and Sedimentation.” These model ordinances did not identify existing authorizing statutes, but probably relied on statutes such as the then existing “Municipal Planning Act” (former NJSA 40:55-1 through 1.29), “Zoning Act” (former NJSA 40:55-30 through -51), and a general municipal Home Rule Act provision (NJSA 40:48-2).
- The "Regulations for Control of Soil Erosion and Sedimentation in Camden County" adopted by the Camden County SCD on February 25, 1974. These regulations stated expressly that were established pursuant to the NJ Soil Conservation Act of 1937¹⁴ (1937 Act), which expressly authorizes (but does not require) SCD supervisors “to formulate regulations governing the use of lands within the district in the interest of conserving soil and soil resources and preventing and controlling soil erosion” (see NJSA 4:24-23 through -34).

The new legislation option:

NJ Senate Bills No. 1083 (S-1083) and No. 806 (S-806)

The earlier of these two bills, S-1083 (introduced June 26, 1972 by State Senators Parker and Hughes), was very brief. Its most important provision by far was section 2: “No subdivision of land shall be approved or a building permit issued until the soil conservation district within which the land is situate certifies that plans for soil erosion and sediment for the land to be subdivided or upon which construction is proposed, conform to regulations of the district promulgated by the supervisors thereof under R. S. 4:24-23” (part of the 1937 Act).

This bill included no direct references to the Committee or to Statewide soil erosion and sediment control standards, and did not expand the narrow enforcement authority in the 1937 Act. Nor did this bill (or the 1937 Act) expressly authorize the SCD to collect fees from applicants; or specify a deadline for SCD review of applications; or expressly exempt any subdivision or building permit; or expressly allow qualifying municipalities to administer the program.

It is perhaps such omissions that prompted the NJDA to declare, in its Annual Report for July 1, 1972 to June 30, 1973, that “... language was drafted for a statewide erosion control bill. Language will be used to modify S-1083 to be more comprehensive in nature.” S-1083 was so different from the New Jersey Soil Erosion and Sediment Control Act adopted in 1975 that S-1083 should not even be considered an early draft of the adopted 1975 Act. Nevertheless, S-1083 was still significant. First, S-1083 demonstrated two State legislators’ early 1970s interest in soil erosion and sediment control at land development projects Statewide. Second, S-1083 set forth the basic principle, later incorporated with modifications in the adopted 1975 Act, that on a

¹⁴ Including post-1937 amendments thereto.

Statewide basis, projects that need a building permit require soil erosion and sediment control plans certified by the SCD.

The second and much lengthier bill, S-806 (introduced February 11, 1974 by State Senators Martindell, Merlino, Parker, Hughes, and Zane), introduced the name "Soil Erosion and Sediment Control Act," and unlike S-1083 was identical in many ways to the adopted 1975 Act. Some of the major differences between S-806 (as first introduced) and S-1083 are briefly noted in the Chapter 251 Legislative History Appendix. The discussion below under "The Adopted Statute" notes major changes made to S-806 before its November 12, 1975 adoption.

It is evident that the authors of S-806 were particularly interested in (i) establishing a Statewide erosion and sediment control program, based on standards in Committee regulations, for most but not all development projects requiring municipal approval; (ii) requiring SCD certification of the soil erosion and sediment control plans prepared in this program, unless the municipality adopted and enforced the Committee standards; (iii) funding SCD plan review and inspections with fees from applicants, who in return are guaranteed an SCD decision to grant or deny certification within 30 days of a complete application¹⁵ (with absence of that decision constituting certification); (iv) specifying that several kinds of municipal development approvals shall be "conditioned upon" such SCD certification (whether or not a municipal planning board participates in the approval); (v) prohibiting municipalities from issuing certificates of occupancy unless there has been compliance with the certified plan; and (vi) authorizing stop-construction orders and other enforcement actions for noncompliance.

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The Adopted Statute

The New Jersey Soil Erosion and Sediment Control Act was approved as Chapter 251, Laws of 1975 (adopted November 12, 1975). The Act, sometimes called "Chapter 251," includes the following legislative findings and declarations in section two (NJSA 4:24-40):

2. The Legislature finds that sediment is a source of pollution and that soil erosion continues to be a serious problem throughout the State, and that rapid shifts in land use from agricultural and rural to nonagricultural and urbanizing uses, construction of housing, industrial and commercial developments, and other land disturbing activities have accelerated the process of soil erosion and sediment deposition resulting in pollution of the waters of the State and damage to domestic, agricultural, industrial, recreational, fish and wildlife, and other resource uses. It

¹⁵ Unless extended 30 days by mutual agreement in writing between the SCD and the applicant..

is, therefore, declared to be the policy of the State to strengthen and extend the present erosion and sediment control activities and programs of this State for both rural and urban lands, and to establish and implement, through the State Soil Conservation Committee and the Soil Conservation Districts, in cooperation with the counties, the municipalities and the Department of Environmental Protection, a Statewide comprehensive and coordinated erosion and sediment control program to reduce the danger from storm water runoff, to retard nonpoint pollution from sediment and to conserve and protect the land, water, air, and other environmental resources of the State.

These findings and declarations focus heavily on water pollution control and natural resource conservation. The Act addressed the obvious overlap between these objectives and the statutory responsibilities of NJDEP by calling in section two for cooperation between the Committee, SCDs, and NJDEP, and more directly by the reference to NJDEP in section four (NJSA 4:24-42).

Section 4 (as adopted in 1975) authorized the Committee, subject to the approval of the NJDA Secretary and the NJDEP Commissioner, to establish regulatory “standards for the control of soil erosion and sedimentation” which “shall be based upon relevant physical and developmental information concerning the watersheds and topography of the State, including, but not limited to, data relating to land use, soils, slope, hydrology, geology, size of land area being disturbed, proximate water bodies and their characteristics.” (Making these standards subject to the approval of the NJDA Secretary and the NJDEP Commissioner was one of the amendments made after S-806 was introduced. As introduced, S-806 required the Committee to “consult with” the NJDEP prior to promulgating such standards.)

Although some of the findings and declarations in section two, as well as Committee authority to adopt Standards under section 4, did or might apply to agricultural as well as nonagricultural and urbanizing uses¹⁶, the Act’s primary emphasis was erosion and sediment control at “projects,” which the section 3.g of the Act (NJSA 4:24-41.g) as adopted in 1975 defined as:

the disturbance of more than 5,000 square feet of the surface area of land for the accommodation of construction for which the Standard Building Code of the State of New Jersey would require a building permit, except that the construction of a

¹⁶ This broad scope of parts of the Act makes it unclear whether the phrase “to retard nonpoint pollution from sediment” in section two is a legislative determination that that all erosion related pollution from nonagricultural and urbanizing uses is legally “nonpoint pollution.” The “point source”/“nonpoint source” terminology has caused confusion ever since it was introduced by the Federal Water Pollution Control Act Amendments of 1972 (renamed the “Clean Water Act” by 1977 amendments).

single-family dwelling unit shall not be deemed a "project" under this act unless such unit is part of a proposed subdivision, site plan, special exception, zoning variance, planned unit development or building permit application involving two or more such single-family dwelling units. (emphasis added)

(In contrast, S-806 as introduced specified a 1,000 square feet threshold in the definition of "project," and also provided that "the local building inspector is authorized to exempt any single-family dwelling from the provisions of this act.")

Section 5 (NJSA 4:24-43) stipulated in 1975 that "approval of an **application for development** for any **project** by a **municipal officer or agency** shall be conditioned upon **certification** by the local district of a plan for soil erosion and sediment control" (emphasis added). As in S-806 as introduced, Section 3.a broadly defined "application for development" as "a proposed subdivision of land, site plan, special exception, zoning variance, planned unit development or building permit."

Section 6 (NJSA 4:24-44) provided that the SCD "shall **certify such plan** if it meets the standards promulgated by the committee pursuant to this act ..." (emphasis added). These sections might indicate that plan "certification" was limited to projects subject to approval by a "municipal officer or agency." (As noted below, however, Committee rules adopted December 9, 1975 may have required plan "certification" for additional projects.) Section 7 (NJSA 4:24-45) established deadlines for SCD certification decisions; section 8 (NJSA 4:24-46) directed the SCDs to adopt a fee schedule and collect reasonable fees from applicants for plan certification and on-site inspection of certified plans; and section 9 (NJSA 4:24-47) authorized the SCD or the municipality "to issue a stop-construction order if a project is not being executed in accordance with a certified plan."

Section 10 (NJSA 4:24-48), however, provides that any municipality, which adopts an ordinance that conforms to the Standards within 12 months of their promulgation and obtains Committee approval thereto, shall be **exempt from sections 5 through 9**, until the SCD determines that the municipality is not enforcing said ordinance. (Some "exempt municipalities" still operate under this provision.) Section 11 (NJSA 4:24-49) provided in 1975 that "no certificate of occupancy for a project shall be issued **by a municipality** unless there has been compliance with the provisions of a certified plan for **permanent** measures to control soil erosion and sedimentation" (emphasis added). Section 12 (NJSA 4:24-50) provides that in those counties where the SCD does not maintain its central office, the board of freeholders may direct the county planning board to administer the SCDs powers under the Act. (This section has never been invoked.)

Section 15 (NJSA 4:24-53) provides that if any person violates the Act or any standard promulgated under the Act, or fails to comply with the certified plan, the municipality or the district may institute a civil action in the Superior Court to prohibit and prevent such violation, and such

person shall be liable to a penalty of not less than \$25 nor more than \$3,000. (In S-806 as introduced, the per offense penalty was “not more than” \$500.)

To sum up, the 1975 Act required all land disturbance which met a “building permit” focused “project” definition to have soil erosion and sediment control in accordance with Standards that are adopted by the Committee (with NJDA secretary and NJDEP commissioner approval), and that are applied via either (i) an SCD certified soil erosion and sediment control plan; or (ii) a promptly adopted, Committee approved municipal ordinance with SCD oversight of municipal enforcement. Municipal approval of development applications must be conditioned upon SCD certification of the soil erosion and sediment control plan where applicable. Moreover, a municipality shall not issue a certificate of occupancy for a project unless there has been compliance with provisions of a certified plan for permanent control of soil erosion and sedimentation. There are enforcement and penalty provisions including stop-construction orders and fines. The Standards would be administered primarily by the Committee and local SCDs funded through user-based fees developed by those SCDs.

(As discussed below under “Administrative,” within a month after the Act’s adoption, the NJDA adopted “procedural rules and regulations” of the Committee at new NJAC 2:90-1 that, among other things, adopted the vegetative and engineering standards in the September 9, 1974 Standards; required applicants to submit application forms prescribed by the Committee; authorized the Committee to review and change any SCD decision; required Committee approval before the SCD adopts a fee schedule; asserted (for SCD certified plans) a primary SCD role in conducting site inspections and determining whether the certified plan is being followed; and required SCDs to submit quarterly reports to the Committee.)

The 1977 amendment to the Act (L.1977, c. 264) was limited to certain NJSA 4:24-41 definitions (mainly, to make them conform to those used in the "Municipal Land Use Law" and the "State Uniform Construction Code Act"). For example, the 1977 amendment substituted "conditional use" for "special exception" and substituted "construction permit" for "building permit" in the definitions of “application for development” and “project”; and substituted "State Uniform Construction Code" for "Standard Building Code of the State of New Jersey" in the definition of “project.”

The 1979 amendments to the Act (part of Chapter 459, Laws of 1979) significantly changed parts of the Act by:

1. Substantially expanding the NJSA 4:24-41.g definition of "project" (for land disturbance of more than 5,000 square feet) to also include structure demolition; construction of a parking lot or "public facility" (the 1979 amendments also added the NJSA 4:24-41.l definition of "public facility"); mining or quarrying; and clearing or grading land for non-agricultural, non-horticultural purposes.
2. Adding NJSA 4:24-42.c to require the Standards to also include "standards of administrative procedure" for implementing the Act. (Among other things, this addition

enhanced statutory support for the “procedural rules and regulations” of the Committee already in NJAC 2:90-1.)

3. In NJSA 4:24-43 and 49, substantially expanding SCD certification (and the certificate of occupancy provision) to also include projects **not** requiring municipal approval. For NJ Department of Transportation (NJDOT) projects, requiring NJDOT certification pursuant to soil erosion and sediment control standards developed jointly by NJDOT, NJDEP, and the Committee, and promulgated by NJDOT (and amending the NJSA 4:24-41.b definition of "certification" accordingly).

(NJDOT promulgated its first Soil Erosion and Sediment Control Standards under the Act in 1988 at NJAC 16:25A. See the proposal and adoption notices published in the New Jersey Register at 19 NJR 2126(a) and 20 NJR 1728(a), respectively.)

In addition, section 9 of Chapter 459, Laws of 1979 enacted the following provision at NJSA 4:24-6.1: "The committee may, on its own motion or at the request of any person aggrieved by any decision by a local district, review and approve, modify or reject any such decision as it deems appropriate." This provision was copied in part from the first sentence of NJAC 2:90-1.6(a) that NJDA adopted on December 9, 1975, but applies to any SCD decision, not just any SCD decision under the NJ Soil Erosion and Sediment Control Act.

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Financial

In the 1970s, the SCDs had to obtain, or develop, their own financial resources to implement the program. In the beginning, grants to the SCDs from the Committee and other sources were received and many SCDs held annual seedling sale to help fund their operations. Prior to the 1975 passage of the NJ Soil Erosion and Sediment Control Act, the SCDs financial income was quite meager and was not constant. There were a few SCDs, such as the Freehold SCD, that received annual income from dredging of farm ponds. The employees of the SCDs were usually secretaries, with few SCDs having District Managers. This all changed in 1976 with the implementation of the Soil Erosion and Sediment Control Act and the ability to charge fees for services. The SCD could now develop a professional staff to handle the responsibilities of the soil erosion and sediment control program.

Administrative

There were (and still are) no Statewide institutional criteria for hiring Soil Conservation District employees. However, there are a few District employees that were tied to their county's

governmental system. Although they are part of the pension system, they are not part of the State Civil Service System.

In general, there is little to no requirement for any personnel in the SCD to take a Civil Service Exam. The hiring criteria for each District employee rests with each individual agricultural Soil Conservation District Board of Supervisors, which are (in many cases) composed of mostly individuals involved with agricultural interests. The Soil Conservation District Board, however, might be considered State employees but the employees of the SCD are not considered State employees. In many of the Soil Conservation Districts, the District Manager has considerable influence as to who will be on the Board. This eventually results in who is appointed to the State Soil Conservation Committee, which is the governing body of the program.

The Soil Conservation District is an agriculture entity influencing urban hydrology through the implementation of the Soil Erosion and Sediment Control Program. The integrity and technical competency of the SCD was (and is) a function of the District Manager's background and perspective. In the beginning, the USDA SCS ran the technical aspects of the program until the mid 1980s.

With the implementation of the new Act in 1976, the Committee and the SCDs were faced with administration of a State law in a non-agricultural environment. The Committee and the SCDs began to develop policy and procedures enabling the local SCDs to begin the program. The Committee sought guidance about legal responsibilities and definition. At the same time on the local level, most of the SCDs worked with the counties and local municipalities to set up lines of communications and procedures to integrate the new regulation into the municipal approval process. There were also information and training sessions to make the engineering and regulated community aware of their responsibilities in both developing and implementing soil erosion and sediment control plans. The Committee met monthly with all the District Managers. Procedures, problems and successes were discussed to try to keep everyone on the same page. Committees were established to develop everything from application procedures, to ways of resolving problems with the Standards, to addressing new technologies.

It is interesting to note that each SCD developed its own procedures to implement the program. An official State procedures and policies manual was not established until sometime after implementation of the program in 1976.

In addition, however, on December 9 and 12, 1975, respectively, the NJDA promulgated "procedural rules and regulations" of the Committee at new NJAC 2:90-1, and then amended those rules by adding a section temporarily approving all municipal soil erosion and sedimentation control ordinances adopted before January 1, 1976. These new rules and amendments for implementing the Act were published in the January 8, 1976 New Jersey Register at 8 NJR 3(a) and 5(a), respectively, and set forth several important policies not then expressly stated in the Act (or elsewhere in NJSA 4:24, Soil Conservation) including:

- Adopting, for purposes of enforcing the Act, **only** the vegetative and engineering standards in the Standards adopted September 9, 1974. See NJAC 2:90-1.3 (1-8-76).
- Requiring applicants to submit, on application forms prescribed by the Committee, “the information required to make a decision on certification of plans.” See NJAC 2:90-1.4 (1-8-76).
- Requiring SCD certification for “projects” (if any?) **not** requiring municipal approval. See NJAC 2:90-1.5(b) (1-8-76), which did not mention municipal approval. (Concerning the Act’s definition of “project,” in the 1970s did the “Standard Building Code of the State of New Jersey” or the “State Uniform Construction Code” require a “building permit” or “construction permit” for any construction that did **not** otherwise require municipal approval?)
- Authorizing the Committee to review and change any SCD decision and requiring Committee approval before the SCD adopts a fee schedule. See NJAC 2:90-1.6 and 1.8 (1-8-76).
- Specifying, for SCD certified plans, that the SCD (not the municipality independently) shall conduct site inspections and determine whether the certified plan is being followed. See NJAC 2:90-1.9 (1-8-76).
- Requiring SCDs to submit quarterly reports to the Committee giving number of applications, number of certifications, denials and number of reviews. See NJAC 2:90-1.11 (1-8-76).

(As noted above under “The Adopted Statute,” issues raised by some of these policies were addressed by 1979 legislation that substantially expanded the “project” definition and the express scope of SCD certification; and expressly addressed New Jersey Department of Transportation projects, “standards of administrative procedure,” and Committee review of SCD decisions.)

On January 5, 1978, the NJDA adopted some changes to the rules of the Committee at NJAC 2:90-1, including an amendment to NJAC 2:90-1.7(a) which provided that adoption by a municipality (at its discretion) of soil erosion and sediment control ordinances conforming to the Standards must be completed by May 31, 1978, in order to qualify for an exemption from sections 5 through 9 of the Act. See the proposal and adoption notices published in the New Jersey Register at 9 NJR 554(a) and 10 NJR 54(a), respectively.

As also noted above under “The Adopted Statute,” in 1979 the Act was amended to require the Committee’s promulgated standards to include standards of administrative procedure. Such procedural standards were already set forth in NJAC 2:90-1 as promulgated in December 1975 and subsequently amended¹⁷. The following paragraphs in a 1992 Committee rule proposal (24

¹⁷ In 1990, the Committee said in this regard at 22 NJR 1299(a): “The State Soil Conservation Committee is empowered and required [by the Act] to promulgate technical and administrative standards for such controls. This has been previously accomplished through the promulgation of N.J.A.C. 2:90-1. The Committee proposes to readopt N.J.A.C. 2:90-1, which includes these standards and procedural rules to provide for orderly continuation of the implementation of the Act by the Committee and the local districts. This will enable persons proposing to engage in

NJR 3587; adoption at 25 NJR 65(a)) illustrate how some post-1979 NJAC 2:90-1 provisions codified requirements already in the Committee's standard application form:

A standard application form approved by the State Soil Conservation Committee (Committee) had been created in this program since its inception. However, some SCDs created their own application form. The Committee has determined that the requirements currently contained in that form and the proposed additional requirements for submission of hydrologic and hydraulic data should be adopted as a rule. These submission requirements are described in N.J.A.C. 2:90-1.4, Application, as amended.

In addition, the Committee has previously established that district certification of a soil erosion and sediment control plan for any project shall be valid only for the duration of the initial project approval granted by the municipality or other land use approval agency not to exceed three and one half years. Municipal or other public agency renewals of the project must also be conditioned upon recertification of the plan by the district. Such limitation has been a condition of the standard application form and the certification issued by the district. The Committee has determined that this limitation should be adopted as a rule at N.J.A.C. 2:90-1.5(i).

See, for example, the required applicant's certifications in NJAC 2:90-1.4(c)¹⁸ and on the front page of the Committee's standard application form (dated 12/85) provided on page A2.3 in Appendix A-2 of the Standards the Committee adopted in 1987, such as the applicant's agreement to "allow district agents to go upon project lands for inspection." (See also the application content required by NJAC 2:90-1.4(b) and the list of items "needed by the local Soil Conservation District" on page A2.1 in Part I of this Appendix.)

The earliest direct ancestor of this standard application form was the suggested "Request for Approval Form" in Appendix A2 ("Suggested Requirements for Erosion and Sediment Control Plans") of the Committee's 1972 Standards. The rest of this Appendix was a list of "items [that] should be included in or with a sediment and erosion control plan."

In the Committee's 1974 Standards, this Form was unchanged in Appendix A2. This Appendix, however, was renamed "Suggested Requirements, Guidelines and Procedures for Preparing and Implementing 'Standards for Soil Erosion and Sediment Control in New Jersey,'" and was also changed in other respects. For example, this Appendix was revised to state that the

development activities to meet statutory mandates, and obtain erosion control plan approval upon which municipal land development and construction approvals are conditional. This subchapter also prescribes rules concerning municipal ordinances, fees and enforcement procedures."

¹⁸ As promulgated at 25 NJR 65(a). The version of NJAC 2:90-1.4 printed in Appendix C2 of the 1999 Committee Standards was erroneous, as it did not include the major amendments that took effect in 1993.

“reviewing agency” is “usually the local soil conservation district,” and the list of items “needed by the reviewing agency” was substantially revised. In addition, this Appendix was expanded to list 11 items in a suggested reviewing agency “Review Procedure,” and three items under “Follow up by reviewing agency.”

Appendix A2 was revised in 1976¹⁹, but a copy of this 1976 version has not been located. In the Committee’s 1982 Standards, Appendix A-2 included an “Application for Soil Erosion and Sediment Control Plan Certification” form (dated “12/81”) much different than the “Request for Approval Form” in the Committee’s 1974 Standards. The word “Suggested” was deleted from the Appendix A-2 title, and the list of items “needed by the local Soil Conservation District” (not the “reviewing agency”) was substantially revised from the 1974 list. The “Review Procedure” was unchanged from 1974, but another item was added under “Follow up by reviewing agency”: “Enforce implementation of Soil Erosion and Sediment Control Plan on construction site, if necessary.”

In Appendix A-2 of the Committee’s 1987 Standards, the “Application for Soil Erosion and Sediment Control Plan Certification” form differed in appearance from, but had the same substance as, the 1982 version. The 1987 and 1982 lists of items “needed by the local Soil Conservation District” were essentially the same except for changes in the scale and number of copies of the soil erosion and sediment control plan required. The 1987 and 1982 “Review Procedure” and “Follow up by reviewing agency” sections were the same.

In Appendix A2 of the Committee’s 1999 Standards, the “Application for Soil Erosion and Sediment Control Plan Certification” form added language to the 1987 version. The 1999 list of items required in the application added some information such as wetlands delineation pursuant to NJSA 13:9B, and “all hydraulic and hydrologic data, describing existing and proposed watershed conditions and HEC1, HEC2, WSP2 and TR20 and other electronic input files, if used, of existing and proposed conditions and a completed copy of the Hydraulic and Hydrologic Data Base Summary Form, SSCC [State Soil Conservation Committee] 251 HDF1.” The 1999 and 1987 (and 1982) “Review Procedure” and “Follow up by reviewing agency” sections were the same.

Appendix A2 (or A-2) was an official element of the Committee’s Standards, but unlike the vegetative and engineering standards element of the Committee’s Standards, Appendix A2 (or A-2) was not directly incorporated in NJAC 2:90-1, and thus had no direct regulatory force. For the “Application for Soil Erosion and Sediment Control Plan Certification” form and the list of items required in the application, this absence of direct regulatory force became essentially irrelevant when the major amendment of NJAC 2:90-1.4 took effect in 1993. The same cannot be said, however, about the Appendix A2 (or A-2) “Review Procedure” and “Follow up by reviewing agency” sections.

¹⁹ See the Chronology in Appendix C3 of the 1982 Committee Standards.

Following are glimpses of other Committee efforts to establish more uniform interpretation and implementation of the Act throughout the State.²⁰ The first glimpse concerns the Committee's August 1983 **draft** Administrative Policies and Procedures Manual for Implementing the Soil Erosion and Sediment Control Act, which was discussed in the following excerpt from the "Soil Erosion and Sediment Control Act" portion of the minutes of the September 12, 1983 Committee meeting²¹:

f. Draft Outputs- Chapter 251 Study Project²² - Mr. Race [Committee Secretary Samuel R. Race] indicated that draft copies of a policy and procedures manual have been completed and forwarded to DEP as final outputs for this project funded in part by a grant from EPA. Messrs. Baumley and Shinder [ofNJDA] reviewed the content of these documents briefly with members of the Committee. Additional copies of the document will be prepared and distributed to districts for comment.

Following considerable discussion, it was agreed that a special committee of district personnel be established to assist with detailed review of these outputs and to help develop final modifications for Committee consideration. Mr. Race explained that this work has been in progress for quite some time and will provide the basis for more uniform interpretation and implementation of Chapter 251 throughout the State. Assistance in this work was volunteered from the Ocean, Cape-Atlantic, and Warren Districts representatives of whom were present at this meeting. It was agreed that this matter should be given high priority.

g. District Requests for Interpretative Guidelines - Mr. Race indicated that numerous requests have been received from districts seeking interpretations, clarifications and other guidance needed for uniform implementation of the Act.

Some questions being asked may require actual amendments to the Act or promulgation of rules and standards of administrative procedure which is authorized under the Act.

Mr. Race indicated that at a meeting of district managers scheduled for later in the month the problem issues will be

²⁰ **Disclaimer**

Many of the following administrative efforts were undertaken with or without any serious intent for them to be finalized. However, some of the administrative moves did provide some guidance and corrections needed to implement the program.

²¹ The minutes of the September 12, 1983, November 21, 1983, and March 11, 1996 Committee meetings referenced in this section are provided in the Selected State Soil Conservation Committee Minutes Appendix.

²² Identified as the "Chapter 251 Financial and Institutional Modification Project" in a July 20, 1983 letter from Mr. Race to NJDEP.

identified and that districts will be asked to propose workable solutions to the problems suitable for state committee adoption.

It was agreed the special committee which will assist with the policy manual also be utilized to help generate appropriate outputs.

Note the decision to form a special committee of district personnel, and the recognized possible need for rules and standards of administrative procedure. Soon thereafter such matters were further discussed in the following excerpt from the "Soil Erosion and Sediment Control Act" portion of the minutes of the November 21, 1983 Committee meeting:

d. Progress on Guidelines, Rules and Procedures - Mr. Race reviewed progress on the development of guidelines, rules and procedures. A summary of results of the special committee of district personnel which met on November 14 was distributed and a copy is attached to these minutes. Various districts were assigned the tasks of developing language which would serve as definitions, guidelines or rules suitable for adoption by the State Committee and promulgation for statewide use. It became apparent at this meeting that conflicting procedures are utilized by the districts and that a consensus could not initially be achieved on several of the issues.

This "summary of results" stated among other things that "It was agreed that ultimate resolution of most of the issues should be accomplished through promulgation of rules through the Administrative Procedures process. A policy and procedure manual will also be developed to facilitate district implementation." Following is this summary's list of seven diverse issues assigned to districts for a proposed December 6, 1983 special committee meeting (which would also review six other issues not covered at the November 14, 1983 meeting):

Issue # 1 Subdivisions-(Where no land disturbance is proposed)
assignment Ocean SCD - develop language suitable for administrative rule.

Issue # 2 Projects with approvals granted prior to 1976
assignment Ocean SCD, - develop language suitable for administrative rule.

Issue # 3 Reports of Compliance
assignment Somerset - Union SCD - develop draft Model Report of compliance, identify what the district needs for DCA cooperative agreement.

Issue # 4 Incomplete Application - agreement not reached -
assignment Burlington SCD - develop draft language to clarify when application is complete. State Committee staff to obtain comment from representatives of the State Builders Association and Engineer associations.

Issue # 5 - Exempt Activities - Agriculture/Horticulture assignment - Somerset-Union SCD - further refine language to address forestry.

Issue # 6 Landfills assignment - Burlington SCD - develop draft language for cooperative agreement with DEP to describe when, how, who, does what.

Issue # 13 Demolitions assignment - HEP [Hudson, Essex and Passaic] SCD - further refinement of language.

The second glimpse is the Committee's March 1996 Interim Administrative Policy and Procedures Manual for Implementation of Chapter 251, P.L. 1975, as amended - The Soil Erosion and Sediment Control Act of New Jersey. (Distribution to the SCDs of this Interim Manual was announced in the March 11, 1996 Committee minutes.) Background about the purpose and development of this Interim Manual was provided in the following paragraphs in the November 2, 1994 memorandum to SCD managers from Committee Secretary Samuel R. Race about the "Revised Draft Policy and Procedures Manual":

As you know, the State Soil Conservation Committee established a special committee (Quality Improvement Team) to review the existing draft Ch. 251 Policy and Procedures Manual and to develop recommended changes for consideration by the State Committee for adoption. The group, consisting of representatives of 10 districts with input from our staff and others, has met monthly and has developed the enclosed draft for further review and comment. Summaries of each of the monthly meetings were forwarded to all district offices for information and to solicit inputs.

The manual is intended and is essential to provide for reasonably uniform implementation of the Soil Erosion and Sediment Control Act. There have been variations in implementation among the 16 districts which have led to comments by the regulated public such as "they don't require this in the XYZ district, why do you". A uniform procedure will help avoid this and also provide a consistent basis for training new personnel. We are soliciting comment from all districts on this revised draft. There will also be concurrent SSCC [State Soil Conservation Committee] staff and legal review prior to final action by the State Committee.

The language in the revised draft manual was developed by group consensus. Additional clarification, additions or changes may be required following further review. The State Committee and the Department of Agriculture express sincere appreciation to the group members for their contributions and for their enthusiasm and dedication to the completion of the Manual.

To maintain momentum in the process we urge you to submit further comments by the end of November. The Draft will also be reviewed by the State Committee at its November 21 meeting and copies are being forwarded to Committee members.

This Interim Manual's Preface noted that the Committee "adopted this Administrative Policy and Procedures Manual on an interim basis" on September 11, 1995; that use by program personnel of this Interim Manual, which "contains guidance and uniform administrative procedures," "will help maintain program credibility and high quality performance"; and that the Committee "anticipates final adoption of the Manual following some additional editorial and organizational review." The Preface listed the following SCD "staff members and others who assisted in the development of the interim Manual":

Ernest Thurlow, Somerset-Union SCD	Don Yarus, Burlington SCD
Robert Dobbs, Camden SCD	Victor De Vasto, Gloucester SCD
Ines Grimm, Freehold SCD	Glen Van Olden, HEP SCD
Angelo Caruso, Bergen SCD	William Engisch, Hunterdon SCD
Mark Symancek, Hunterdon SCD	Frank Burns, Cape-Atlantic SCD
Andrew Hrynczyszyn, Mercer SCD	

Jim Sadley, State Soil Conservation Committee, Project Leader
John Showler, State Soil Conservation Committee

The following list of this Interim Manual's chapters (subchapter headings omitted) indicates part of this Manual's extensive scope:

- Preface
- Table of Contents
- Chapter 1 - How to Submit a Plan
- Chapter 2 - Application & Plan Submission Processes
- Chapter 3 - Plan Review and Certification Procedure
- Chapter 4 - Inspection Process
- Chapter 5 - Violations; Injunctions; Penalties & Enforcement Process
- Chapter 6 - Interdistrict Coordination of Multi-District Projects
- Chapter 7 - Appeal Process
- Chapter 8 - Projects Involving Other Agencies
- Chapter 9 - Project Completion & Issuance of Reports of Compliance
- Chapter 10 - Exempt Municipalities
- Chapter 11 - Fiscal Management and Adoption of Fee Schedule
- Chapter 12 - Record and Filing System
- Chapter 13 - Progress Reporting
- Chapter 14 - Municipal Construction Officials
- Chapter 15 - Dealing with the Press

Chapter 16 - State Soil Conservation Committee Policy for District Recertification of Soil Erosion and Sediment Control Plans That Will Expire Appendices

Because NJAC 2:90-1 has not incorporated any Administrative Policy and Procedures Manual by reference, such a Manual has not had direct regulatory force. (Such a Manual may, however, cite documents such as rules that do have such force.)

The September 12, 1983 Committee minutes also included a “Cumulative Summary Report” concerning SCD review of Chapter 251 soil erosion and sediment control plans from January 1, 1976 (when most of the Act took effect) to June 30, 1983. Following are some highlights from this Summary of the first 7½ years of Chapter 251 administration:

- The total “Area of Projects in Acres” (i.e., disturbed area) was 133,840 acres, or about 209 square miles (for comparison, the land area of Passaic County is about 190 square miles). The three SCDs with the largest area of projects were Freehold (27,437 acres), Somerset-Union (13,050 acres), and Morris (12,806 acres). The three SCDs with the smallest area of projects were Cumberland (3,418 acres), Sussex (3,130 acres), and Salem (1,135 acres).
- A total of 15,046 applications were received. The three SCDs receiving the most applications were Freehold (2,546), Bergen (1,947), and Somerset-Union (1,408). The three SCDs receiving the fewest applications were Cumberland (309), Sussex (306), and Salem (78).
- A total of 110,614 site inspections were performed.

An Interagency Agreement for Coordination of Stormwater Management and Soil Erosion Control Between the New Jersey Department of Environmental Protection and the New Jersey Department of Agriculture State Soil Conservation Committee was executed on December 27, 1990, and included the following introductory paragraphs:

Purpose

This Agreement provides a framework for stormwater management and soil erosion control project review and approval that reflects express goals of: (1) minimizing development impacts to natural resources to the maximum extent practicable; (2) addressing water quality management as close to the source as practicable; (3) controlling potential offsite erosion from stormwater drainage; (4) expediting project approvals and (5) avoiding potentially conflicting and/or duplicating requirements or regulations.

Applicability

The State Soil Conservation Committee of the Department of Agriculture, and the 16 Soil Conservation Districts which operate under State Committee guidance, are charged under State law with

the implementation of soil erosion and sediment controls and related stormwater management controls on virtually all land disturbance activities in the state. The Department of Environmental Protection through its land use, water quality, stormwater and resource management programs is charged with pursuit and/or maintenance of fishable, swimmable waters, protection of wetlands and stream corridor ecosystem integrity and ensuring that flood hazards are mitigated to the maximum extent practicable. Both agencies have a common mission of protecting the public safety and welfare while also implementing responsible government through consistent and coordinated standards and expedited procedures. The following points of agreement address potential operational conflicts and establish a common understanding regarding stormwater management and soil erosion and sediment control.

The Department of Environmental Protection and State Soil Conservation Committee of the Department Of Agriculture agree .to the principles, procedures and responsibilities that follow; recognize the statutory authorities and limitations of both agencies; and do not intend this Memorandum of Agreement to expand or limit respective statutory powers in any way.

This Memorandum of Agreement then discussed the following 14 “Points of Agreement”:

- Stormwater Runoff Impact on Erosion Control
- Stormwater Management System Design
- Consideration for Soil Erosion and Sediment Controls in Wetland Areas
- Utilization of Natural Drainage Techniques
- Criteria for Demonstrating Off-Site Stability for Stormwater Discharges
 - A. Condition Where There Is No Well Defined Waterway Below the Point of Discharge
 - B. Condition Where There Is A Direct Discharge to Wetlands
 - C. Condition Where There Is A Direct Discharge to a Well Defined Waterway
- Infiltration Devices
- Maintenance of Stormwater Facilities
- Implementation By Respective Approval Agencies
- Resolution of Conflicts – Interagency Contacts
- Exchange of Directories – Respective Agency Personnel
- Project Approvals Conditioned upon SCD Certification
- Acid Soil Mitigation – Monitoring by SCD
- Distribution of Documents
- Effective Date/Modifications

Technical Training and Implementation

In the 1970s, the SCD personnel had to learn hydrology, hydraulics, soils, and vegetation. They had to hire people who could learn the aforementioned areas of knowledge and apply those concepts to a soil erosion and sediment control plan. In the 1970s and 1980s, there was a greater respect for Professional Engineering. There were a few SCDs who continued to rely on USDA SCS personnel to implement the program rather than learn the program for themselves. There were some that had serious ethical issues.

In the 1970s, the USDA SCS personnel provided training and, in some cases, implemented the SESC program for the Soil Conservation Districts. In general, there were joint reviews and inspections by the USDA SCS and the SCDs. The SCS held the USDA short course on hydraulics for district and SCS personnel and seminars on TR-55. This was done extensively in the beginning, and certain aspects continued on a regular basis to keep the staff trained by the USDA SCS and the Committee.

Ongoing training by the USDA SCS was appropriate in light of that agency's major role in developing the Standards. For example, the Standards the Committee adopted in 1987 extended special acknowledgement to SCS officials "who have provided the primary basis for each of the Standards and guidelines incorporated herein. Developed through research and practical application, these technical devices, systems and practices have withstood the tests of trial and time and have been utilized throughout the nation for many years."

A second component was the Committee and SCDs providing training to the planners and engineers on soil erosion and sediment control as well as training on the various practices in the Standards for Soil Erosion and Sediment Control. There was also training provided to the construction supervisors and field personnel who implemented the practices on the construction site. Since the beginning of the soil erosion and sediment control program training has been a consistent part.

The purpose of the plan review was to ensure the construction would not cause problems in the field. It was easier to rectify the problems during plan review rather than after the fact. It also provided quality assurance for the consulting engineer's designs. The program was not a zoning or flood control program. The philosophy was to build what you wanted but don't cause erosion. The implementation of the plan had to work. Looking back, it appears the consulting engineers, directly and/or indirectly, relied on the SCDs for quality control of their projects. In the early years, engineers field visited the site before designing their projects.

(A key element of the "build what you wanted" philosophy was embodied in the December 1975 Committee rules that adopted, for purposes of enforcing the new Act, **only** the vegetative and engineering standards in the Standards the Committee adopted in 1974. **Not** adopted for these purposes were **other** elements in those Standards, such as the following two "General Design Principles" in the Appendix C model ordinances: "Whenever feasible, natural vegetation shall be retained and protected" and "water runoff shall be minimized and retained on site wherever possible to facilitate ground water recharge." These two broad principles could have severely

restricted development of some sites, but might have been difficult for legal and other reasons to enforce.)

Although the USDA SCS was instrumental in getting the NJDA to implement the program, they became aware they were not set up to handle a regulatory program. They may have also become aware of the liability to implement such a program. Eventually around the mid-1980s, USDA SCS urged the NJDA Committee to implement the program independently with the SCS being advisory. Today, the USDA NRCS is no longer directly involved with the implementation of the Chapter 251 program. USDA would only provide advice on the use of their hydrology and hydraulic practices.

Implementation and Latitude by Districts

Implementation

Most Soil Conservation Districts reviewed the applicant's hydrology and hydraulic calculations with the oversight of USDA NRCS engineers and/or the New Jersey Department of Agriculture licensed professional engineer. They checked, for example, for Conduit Outlet Protection; Off Site Stability; Detention Basin, Sediment Basin and Waterway Designs; Riprap Channels, Vegetative Requirements, soils, and hydrology, and became very well aware of the potential problem areas in their county(ies) such as Karst, acid soils or unstable slopes. They addressed stormwater management on a physical basis, not based on political jurisdictional boundaries. They regulated only the 2- and 10-year storm events which is the basis for sediment and erosion control designs. Less frequent storms were required for armor protection or diversion designs to protect downstream properties.

In addition, each Soil Conservation District developed a set of notes pertinent to their area, and the plan implementation requirements that must be included on the required Soil Erosion and Sediment control plan. Most of all, *they required a soil erosion and sediment control plan, and led the State in the protection of downstream properties from soil erosion and sediment control problems.*

The program was fairly insulated from *any* political influences on the technical reviews for soil erosion and sediment control by the SCDs. It provided the engineering community and construction industry with quality control of their plans.

Latitude

Regardless of the Committee's Standards for Soil Erosion and Sediment Control, certain Districts implemented additional or modified practices to provide better soil erosion and sediment control. In particular, they required phasing of the construction to meet the needs for controlling soil erosion and sediment control. One particular SCD tailored their review based on the abilities of the contractor. In fact they required multiple stages Soil Erosion and Sediment Control plans for very large developments.

For example:

- The Hunterdon Soil Conservation District prohibited the use of sediment basins because it was more cost effective to stabilize the area around the streets and lots than to clean out a sediment basin after a storm.
- The Districts found that promptly burying acid soil was more effective than relying on guidance by other entities, and that there was no adequate Standard for acid soil at the time.
- The Hunterdon Soil Conservation District modified the required seed specifications as stipulated by the Standards because of the poor field performance in their District of the Standards seed specifications.
- The Southern Districts limited the slope of grass waterways to 2.5 percent based on past field experiences.

Computation and Map Technology

The personal computer was not widely available until the 1980s. In the 1970s, USDA SCS charts and tables from their National Engineering Handbook, USDA SCS TR-55 technical pamphlet, and paper soil surveys booklets were the resources used to help evaluate soil erosion and sediment control plans. Today, soil surveys are electronically available on the internet. This allows the designer to outline larger projects and generate not only a report of the soils present but also maps indicating steep slopes, high water tables, shallow depth to bedrock, etc. All of which will help in the development of the project.

In the 1960s through the 1970s, USDA NRCS TR-20 and US Army Corps of Engineers HEC-1 and HEC-2 were run on a mainframe computer. It could cost \$200 for a single run of a HEC-2 on a mainframe in the mid-1970s. Later, TR-20, HEC-1 and HEC-2 would become available on the Disk Operating System (DOS).

USDA NRCS Hydrology

In the 1950s, USDA SCS published its Curve Number (CN) method of estimating storm runoff from rainfall events, most notably as a key element of the SCS National Engineering Handbook, Section 4, Hydrology (NEH4). SCS initially used the NEH4 procedure mainly for planning measures (larger than those for individual farms and ranches) under the Watershed Protection and Flood Prevention Act of 1954 (Public Law 566). In the mid-1960s, USDA issued Technical Release No. 20 (TR-20), Computer Program for Project Formulation, Hydrology, intended mainly for SCS hydrologists preparing input data for a computer program (in FORTRAN II for mainframe IBM equipment) incorporating much of the NEH4 procedure.

USDA SCS Technical Paper 149, A Method for Estimating Volume and Rate of Runoff in Small Watersheds (TP-149) was issued in 1968 and revised in April 1973, and presented charts estimating the instantaneous peak discharge rate for “establishing conservation practices on individual farms and ranches and for the design of water control measures in small watersheds.” TP-149 was based on NEH4 including the SCS Curve Number method, but unlike TR-20 was written to be “simple enough to be used by all grades of professional and subprofessional personnel on SCS work unit staffs ... to make quick, on-the-spot estimates of peak discharge rates”. The lower curve number limit of 60 in the TP-149 charts precluded TP-149 use in low runoff drainage areas, such as those with much “Woods” on Hydrologic Soil Group (HSG) “A” soil in the NJ Pinelands.

Chapter 8 in NEH4 (1964) and NEH4 (1972) defined “Woods” as “usually small isolated groves of trees being raised for farm or ranch use.” Unlike NEH4 (1964, 1972), TP-149 did **not** note that in watersheds with much national or commercial forest, the SCS hydrologist is guided by the memorandum between the Forest Service and SCS, or reference provisions concerning curve number determination in two 1959 Forest Service hydrology handbooks.

As the 1970s proceeded, USDA SCS and (on behalf of Somerset County) Killam Associates each developed (using the SCS Curve Number method) a guidance document concerning effects of urbanization on runoff volume and peak rates of discharge. According to Don Woodward (formerly National Hydraulic Engineer) of NRCS, SCS developed urban curve numbers with an accuracy of ± 5 units, using aerial photography and data from 10 urban watersheds gauged by USGS.

In January 1975, SCS issued the document and hydrology package, entitled Urban Hydrology for Small Watersheds, Technical Release 55 (TR-55). TR-55 was developed using the TR-20 computer program, and allowed the District Conservationist to compute runoff from a technical paper document. The 1975 TR-55 Preface included language that focused on TR-55’s tentative, preliminary nature. The curve numbers in TR-55 Table 2-2 assumed what SCS then called Antecedent Moisture Condition (AMC) II. The Table 2-2 curve numbers for “Wood or Forest land” in poor and good condition were the same as the corresponding curve numbers for “Woods” in NEH4 (1972) Table 9.1. Like TP-149 but unlike NEH4 (1972), TR-55 (1975) did not identify any Forest Service role in determining curve numbers in watersheds with much national or commercial forest. The curve number range of 40 to 80 in TR-55 Figure 2-2 precluded application of that figure (used in “areas to which the values in table 2-2 do not apply”) in places where pervious area curve numbers are well below 40.

Meanwhile, due to Tropical Storm Doria in 1971 and the August 2, 1973 storm, a team of SCS hydrologists and Paul DeBarry of Killam Associates developed Somerset County’s Handbook for Storm Water Detention Basins. This Handbook referenced and made much use of TR-55 (1975), and included disclaimers such as: “Recognizing the uniqueness of each design and the essential role that engineering judgment fulfills” the criteria in this handbook “preserve the role of both the design and review engineers in the decision-making process. In keeping with this thinking, the handbook is not ... a design manual but, rather, a guide for reviewing the proposed project.”

The runoff curve numbers in this Handbook's Table III (including those for "Wood or Forest land") were related to TR-55 Table 2-2 curve numbers but based on an average of AMC I and AMC II, and generally differed from TR-55 Table 2-2 curve numbers. Moreover, although this Table III included a column for HSG "A" soil, this Handbook's Appendix A did not list any HSG "A" soil in Somerset County, which implies that this Handbook's authors did not focus on evaluating TR-55 applicability to HSG "A" soil.

USDA SCS or NRCS never referred to TR-55 as a regulatory tool, but as the 1980s approached and proceeded, the Committee and NJDEP began their practice of giving TR-55 various kinds of recognition or status in regulatory standards concerning soil erosion and sediment control, stormwater management, and stream encroachment. An early express reference to TR-55 in Committee Standards was in the 1979 (effective 1980)²³ Sediment Basin Standard: "Flood routing to determine the required temporary floodwater storage for a 2 year frequency 24 hour duration storm may be done using the approximate methods in the SCS 'Engineering Field Manual,' the approximate methods in SCS 'Urban Hydrology for Small Watersheds' (TR 55), or other generally accepted methods of flood routing." The 1987 and 1999 revisions to the Standards included many express references to TR-55. For example, the 1987 revised Channel Stabilization Standard stated:

[Channel] Capacity shall be determined by the following methods:

1. Rational Method - for peak discharge of uniform drainage areas up to one half of a square mile as outlined in Technical Manual for Stream Encroachment, Trenton, N.J., Bureau of Flood Plain Management, August 1984.
2. SCS Technical Release No. 55 for drainage areas less than five square miles.
3. For areas greater than or equal to five square miles, use SCS Technical Release No. 20 or other officially approved methodology.

In former NJAC 7:8-3.4(a)1, NJDEP's initial (1983) Stormwater Management Rules concerning design storms named TR-55 as an example of SCS procedures, and alluded to the SCS Curve Number method in this sentence: "For purposes of computing runoff, all lands in the site shall be assumed, prior to development, to be in good condition (if the lands are pastures, lawns or parks), with good cover (if the lands are woods), or with conservation treatment (if the land is cultivated), regardless of conditions existing at the time of computation" (see 15 NJR 145). NJDEP also stated at 15 NJR 143 in regard to these 1983 rules: "The wording of the General Standards section of the regulations [former NJAC 7:8-3.4] has been revised to clarify the fact that the references to the SCS standards and the modified rational method are not intended to limit the

²³ The September 1979 changes to the 1974 Vegetative and Engineering Standards were incorporated in the Committee's Chapter 251 rules effective July 3, 1980. For convenience, Standards effective that date are sometimes referred to below as "1979" Standards.

designer to the use of these two methodologies.”

In the NJDEP Flood Hazard Area Regulations effective May 21, 1984, former NJAC 7:13-1.8(a) began “On non-delineated streams, the boundaries of 100-year flood plains and encroachment lines may be established accurately by technical engineering methods described in the Manual...” (See former NJAC 7:13-1.2, 15 NJR 2105, and 16 NJR 1208 and 1210 concerning the definition and regulatory role of this “Manual”.) In NJDEP’s August 1984 Technical Manual on Stream Encroachment, Section 3.1-2, Ungaged Streams, began:

The following standard hydrological techniques are recommended for non-delineated ungaged streams or streams with inadequate gage data.

- (a) Special Report 38 - for drainage areas greater than one square mile.
- (b) Rational Method - for peak discharges of uniform drainage areas up to one half of a square mile.
- (c) S.C.S. Technical Release No. 55 - for drainage areas less than five square miles.

As is obvious from the above provision, more than one hydrologic technique is recommended for certain drainage areas. For uniform drainage areas up to one half of a square mile, the use of the rational method and S.C.S. Technical release No. 55 is permissible. Similarly for drainage areas between one to five square miles, use of Special Report 38 and S.C.S. Technical Release No. 55 is applicable. The choice of the technique to be used will depend upon the watershed characteristics and the nature of the project to be designed. The staff of the Bureau of Flood Plain Management (or the delegated [county] agency) should be consulted for concurrence to the proposed method.

Section 3.1-2(c) of this 1984 Technical Manual was devoted to TR-55. Table 3.1-2(C-1) in Section 3.1-2(c) reproduced Table 2-2 in TR55 (curve numbers based on AMC II). However, section 3.1-2 also included Table 3.1-2(B-1) with many substantially different AMC II runoff coefficients and this Note: “Values are based on S.C.S. definitions and are average values derived by an Advisory Committee for this Manual.” Table 3.1-2(B-1) was not listed in this Technical Manual’s “List of Tables,” and this Table’s purpose in Section 3.1-2 was not clear.

SCS published a subsequent TR-55 version in 1986. Also, with the advent of the personal computer using the DOS environment in the 1980s, USDA SCS developed a computer basic language application program to design and check hydrology and hydraulic calculations. In 2002 USDA NRCS issued WinTR-55.

Many assumptions put into TR-55 were not applicable for certain portions of the state such as: areas with Karst geology with little overburden, drainage areas with substantial amount of surface storages (Northwest New Jersey), forest that did not respond in the manner the curve number predicted (NJ Pinelands), areas with flatter unit hydrographs, and areas with outdated HSG classifications. For example, in the 1980s Downer Soil was rated a “B” HSG instead of the present classification of “A” HSG. This meant that for “Woods” in good condition the curve number (CN) was 55 instead of 30 today.

In the 1986 version of TR-55, the paragraphs that focused on TR-55’s tentative, preliminary nature were deleted, and Table 2-2 listed curve numbers for “Woods” rather than for “Wood or Forest land” (the term used in the 1975 Table 2-2). Also, in the 1986 version “Limitations” were added, including:

1. The CN of 30 for “Woods” with HSG “A” soils in good hydrologic condition is accompanied by a note that the CN value is actually less than 30.
2. “When the weighted CN is less than 40, use another procedure to determine runoff.”
3. “The SCS runoff procedures apply to only to direct surface runoff: do not overlook large sources of subsurface flow or high groundwater levels that contribute to runoff. These conditions are often related to HSG A soils and **forest areas** [emphasis added] that have been assigned relatively low CN’s in table 2-2. Good judgement and experience based on stream gage records are needed to adjust CN’s as conditions warrant.”

These limitations were significant in determining whether TR-55 could be used or not. In general, neither the regulatory nor engineering communities outside SCS and NRCS paid attention to these limitations. To some developers and researchers of the Curve Number method, curve numbers of 30 or less should not be used and there are others that feel CNs of 40s and 50s or less should also not be used. According to Don Woodward (formerly National Hydraulic Engineer) of NRCS, no reasonable correlation for forested areas could be made based on P:Q data. In general, the industry makes no distinction between forest and woods and will assume “woods” and “forest” are equivalent in their TR-55 hydrology calculations.

Moreover, engineers would calculate CNs to the decimal point, when the accuracy of the curve number was within the limits of Antecedent Moisture Condition (AMC) I and III. Years later, the concept of the AMC was found not to be valid, and was replaced by the Antecedent Runoff Condition (ARC).

The USDA NRCS recommends regionalized curve numbers. In the late 1980s, Somerset County developed them but they were not accepted by NJDEP. According to Dave Lamm, former NRCS State Conservation Engineer, monies were provided in the 1950s to investigate certain aspects of SCS hydrology methods, and then the funding stopped in the mid-1970s just when stormwater management in New Jersey started to take off.

For more discussion of NRCS hydrology issues, including but not limited to how TR-55 or “curve numbers” were referenced in the Committee’s 1999 revised Channel Stabilization Standard; NJDEP’s Flood Hazard Area Control Rules effective March 20, 1995; and NJDEP’s revised September 1995 Technical Manual for stream encroachment permits, see the USDA NRCS Hydrology Appendix.

Delmarva Unit Hydrograph

In the releases of TP-149 and the first issues of TR-55, the USDA SCS hydrology methods used the Standard 484-unit peak rate factor. In the 1960s and 1970s, USDA SCS investigated the peak rate factor in Virginia, Maryland, and Delaware, and established in 1976 the Delmarva Unit Hydrograph with a Peak Rate Factor of 285. Some New Jersey SCDs demonstrated technical proficiency by checking plans using the Delmarva Unit Hydrograph.

The SCS and NRCS never fully studied the use of the Delmarva Unit Hydrograph in New Jersey even though they used the Delmarva Unit Hydrograph in the calibration of their dams in the Assunpink Watershed. In 2004, Elizabeth Semple of NJDEP secured monies to continue the studies, through the NJ Soil Conservation Districts, to validate the Delmarva Unit Hydrograph in New Jersey. Based on studies by Mr. Norman Miller (formerly USDA NRCS National Hydraulic Engineer) of Dewberry and Davis, the use of the Delmarva Unit Hydrograph was validated.

The Delmarva Unit Hydrograph was a *hydrologic milestone* in New Jersey. It provided a reasonable hydrologic approach to design of detention basins, culverts, dams, etc. in the Inner and Outer Coastal Plain of New Jersey.

Stormwater and Runoff Detention Structures: Pre-1987 General Approaches

The concept of damming rivers for large-scale regional runoff detention was not new in New Jersey. In 1904, the Northern New Jersey Flood Commission considered “projects of flood storage in great reservoirs” (with watersheds ranging from 52 to 773 square miles) to curb flooding of the Passaic River.

A much smaller scale of runoff detention for flood control was advocated in the Water Control Guide for Suburban and Rural-Residential New Jersey (1965) as follows:

"Detention Reservoirs. Flood peaks can frequently be reduced by storing water in detention reservoirs or ponds during periods of heavy runoff. The water is then automatically and slowly released. Thousands of these structures have been built for upstream flood prevention in rural areas, but so far little use has been made of them for suburban developments. There is no reason why well-planned, progressive communities could not use reservoirs of this type for the reduction of flood problems. The ponds might also add certain recreational advantages by offering swimming, fishing, and ice skating facilities." (page 5)

It is estimated that the first individual detention basin for a New Jersey land development project was designed and built in the late 1960s or early 1970s.

The pre-1987 Committee Standards for Soil Erosion and Sediment Control in New Jersey included an engineering standard for **small scale** “floodwater retarding structures,” defined as “a structure providing for temporary storage of floodwater and for its controlled release.” The standard’s “Purpose” stated:

“Floodwater retarding structures are installed to reduce erosion and other flood damages downstream by controlling the release rate from flood flows of predetermined frequencies. They may also permit the use of more economical channel improvements or stabilizing structures in the channel downstream and reduce environment hazards and pollution.”

Note the references to “temporary storage” and “controlling the release rate” (with no mention of infiltration or of volume control), to “flood flows of predetermined frequencies” (see discussion below), and to reducing erosion and “pollution” (which may relate to the Standards’ “Preface” identification of sediment as “by sheer volume, the greatest pollutant” of streams and rivers). This standard applied to structures where the contributing drainage area is no more than 320 acres, the height of the dam is less than 20 feet, and the product of the storage (in acre-feet) and the height of the dam is less than 3,000.

As indicated by the “Purpose” reference to “flood flows of predetermined frequencies,” this standard did **not** specify the frequency of the flood flow to be contained, the degree of release rate control, or similar stormwater control criteria. Instead, this standard included the following general provision:

“Floodwater Storage Requirements - The retarding storage requirements shall be such as to contain the runoff expected to occur at **a frequency consistent with the level of protection to be provided to the downstream benefited area**, with proper allowance made for discharge through the drop inlet spillway. **The minimum reservoir storage volume and associated spillway design discharge shall be adequate to prevent an unstable downstream channel condition.**” (emphasis added)

This standard did, however, specify that the minimum design capacity of an earth emergency spillway “**should** be that required to convey the routed runoff from a 100-year frequency storm, or a storm with a frequency equal to the design life of the structure, whichever is greater.” Mostly this standard set forth design criteria and installation requirements that applied regardless of the frequency of the flood flow to be contained.

These Standards for Soil Erosion and Sediment Control in New Jersey also included an engineering standard for small scale permanent or temporary “sediment basins,” defined as “a basin formed by a barrier or dam constructed across a waterway or at other suitable locations to

intercept and retain sediment and debris.” This standard was limited to sites where (i) basin failure would not result in loss of life or interruption of public utilities; (ii) the drainage area does not exceed 320 acres; and (iii) the water surface area at the crest of emergency spillway (where required) does not exceed 5 acres. The capacity of the basin “shall equal the volume of sediment and debris expected to be trapped at the site during the planned useful life of the structures or improvements it is designed to protect,” taking into account any scheduled removal of sediment and debris.

In the 1970s also began the development, in New Jersey and some other States, of the concept of the “dual purpose detention basin” which retards post-construction runoff from individual or multiple land development projects not only to reduce flooding, but also to retain some particulate pollutants. See, e.g., the article²⁴ by William Whipple, Jr., who in the 1970s was Director of the Water Resources Research Institute at Rutgers University.

New Jersey did not have statewide runoff retention criteria for detention basins until 1983, when NJDEP adopted its first Storm Water Management Regulations (NJAC 7:8) under the New Jersey Storm Water Management Act, P.L. 1981, c.32. These regulations (which were not limited to detention basins) included general standards for flood and erosion control and for water quality control. These regulations applied to individual detention basins for individual developments, but also required any “Phase II storm water management plan” to consider the need for multi-development “master detention basins.”²⁵

*William Minervini
formerly NJDEP*

Detention Basin Standard 1987

In the 1987 revision to the Standards, the structural aspects of detention basins were removed to avoid conflicts with NJDEP and county governments design criteria. The Standard for Floodwater Retarding Structure was renamed to Detention Basin. The design storm was defined for the 2- and 10-year return period. In 1986, a request was made to the USDA SCS to develop an Infiltration Basin Design Standard. The response by USDA SCS was that they could not provide such a Standard and their advice at that time was to assume the infiltration basin failed and to prove off site stability assuming the infiltration basin is full. It didn’t say a designer couldn’t use a infiltration for all other regulatory purposes, it was a safety factor.

²⁴ “Dual Purpose Detention Basins in Storm Water Management,” Water Resources Bulletin, Vol. 17, No. 4, August, 1981.

²⁵ As adopted in 1983, former NJAC 7:8-3.2(a)2i concerning such a plan began: “A Phase II storm water management plan will be based upon a detailed analysis of alternative storm water management approaches on an integrated or regional basis...” Former NJAC 7:8-3.2(a)2 was replaced in the current NJDEP Stormwater Management Rules by much different NJAC 7:8-3, Regional Stormwater Management Planning. The term “Phase II” in this 1983 context was unrelated to the “Phase II” stormwater discharge permit regulations that the U.S. Environmental Protection Agency and NJDEP promulgated in 1999 and 2004, respectively.

Also, NJDEP Dam Safety wanted to use their in-house Professional Engineers to design modifications or designs to some of the dams in New Jersey. The Attorney General's office refused to provide legal protection should Dam Safety get sued.

In 1989, two children drowned in a recently built detention basin in East Brunswick, New Jersey. This caused significant institutional and legal problems throughout the State in the design and building of detention basins

Detention Basin Summary Form

In 1986, the Committee developed the detention basin summary form in coordination with the Freehold Soil Conservation District, Somerset-Union Soil Conservation District, Somerset County, and USDA NRCS. This form led to the development of the New Jersey Department of Agriculture's Hydrologic Modeling Database.

The Acid Soil Problem

Adverse effects on crops of material dug from acid producing, sulfur rich strata in New Jersey's coastal plain, and suggested ways to mitigate these effects, received serious official attention in the 19th century. See, for example, the 1836 and 1868 reports by the New Jersey State Geologist. Much later, the Water Control Guide for Suburban and Rural-Residential New Jersey (1965) stated:

Chemical Properties. There are some wet, poorly drained soil layers and underlying geological strata that contain large amounts of sulphide and soluble iron. When exposed to air the sulphide-bearing material becomes very acid, rendering it corrosive to metal, destructive to concrete, and injurious to plants. Soluble iron in water can quickly plug drainage tile with a gel-like precipitate.

Probably due in part to increasing interest in soil erosion and water pollution (as seen for example in the Federal Water Pollution Control Act Amendments of 1972, the New Jersey Soil Erosion and Sediment Control Act, and increased environmental review of proposed public infrastructure projects), such sulfide-bearing material received increased attention in the 1970s and early 1980s, as evident in the following:

- Project-specific documents and correspondence from or to such entities as SCS, the U.S. Army Corps of Engineers, various NJDEP offices, NJDOT, and Rutgers University
- Addition of references to "soils ... containing iron sulfide" in the 1979 Committee Standards

for Soil Erosion and Sediment Control in New Jersey²⁶

- SCS New Jersey Technical Note 28 (1980) about “establishment of vegetation on extremely acid soils,” and SCS Technical Note Plant Materials No. 9 - Use Of Lime And Soil Cover To Provide Vegetation On Extremely Acid Soils (1981)
- NJAC 7:13-5.10, “Projects exposing acid-producing deposits,” in the NJDEP Flood Hazard Area Regulations that became effective in 1984, and the "Technical Notes Concerning Acid-Producing Deposits" in the associated NJDEP Flood Plain Management Technical Manual, Stream Encroachments (1984)
- The “Acid-Producing Deposits” strategy in the NJDEP Statewide Water Quality Management Program Plan (1985)

The 1990 Interagency Agreement for Coordination of Stormwater Management and Soil Erosion Control between NJDEP and the Committee included an “Acid Soil Mitigation - Monitoring by SCD” provision.

In 1999 the new Committee “Standard for Management of High Acid Producing Soils” became effective and operative.

Matters including but not limited to those outlined briefly in the paragraphs above are discussed in considerable detail in the Acid Soil Appendix (1836-1999), which cites many documents contained in the Acid Soil Supplements (1836-1999).

*William Minervini
formerly NJDEP*

Miscellaneous Technical Revisions and Milestones

1. In the 1979 Standard for Diversion, the use of level spreaders were curtailed because the runoff reconcentrated downslope causing erosion.
2. Although there are mentions in the 1972, 1974, and 1979 Standards regarding stable channels, the Standard for Detention Basin for Control of Downstream Erosion (with its requirement for offsite stability analysis) was introduced in 1987.
3. In 1987, erosion control mats (such as Enkamat and Miramat) were introduced into the Standard for Diversion and Standard for Grassed Waterway.
4. In the 1980s, it was found that grassed waterways could not be built beyond 2.5% slope in South and Coastal New Jersey. See Latitude by Districts.

²⁶ The 1972 and 1974 Standards did not expressly mention sulfides, but did include provisions requiring soils having a pH of 4 or less to be covered.

5. Sod could not be used in Southern New Jersey because of the bluegrass, which could not tolerate droughty conditions.
6. As stated in Appendix A10 of the Standards adopted in 1999, “conventional methods of design and engineering may be inappropriate for karst areas.” For example, USDA NRCS TR-55 could not be applied to Karst geology with little overburden.
7. Some districts banned the use of sediment basins because they were ineffective. Some Mosquito Commissions would ban the use of sediment basins.
8. In 1976, a major apartment complex in Middlesex County almost collapsed down an embankment. It was due to a drainage pipe discharging above a drop off in the landscape. This incident led to the following statement, “There shall be no overfall at the end of the apron or at the end of the culvert.” This statement appeared in the 1979 Standard for Conduit Outlet Protection.
9. In the 1999 Standard for Off-Site Stability, David Lamm, P.E., USDA NRCS State Conservation Engineer introduced a study, performed in Texas, showing the tolerances of point discharges across landforms that minimized erosion. ***It was perhaps the most effective engineering practice that minimized erosion and maintained the integrity of the streams in the State of New Jersey. And yet, it went unappreciated and unrecognized by the public.***

The Hunterdon, Somerset-Union, and Bergen Soil Conservation Districts were good examples of the program’s Soil Conservation Districts. Up to 1999, there were other good SCDs such as Mercer, Burlington, etc.

Hunterdon County Soil Conservation District

The Hunterdon County Soil Conservation District started to implement the Soil Erosion and Sediment Control Standards before Chapter 251 became law. The Hunterdon County Soil Conservation District began implementing the Standards on a watershed basis prior to 1976. The staff was funded by the County and CETA (Comprehensive Employment and Training Act (1973)) program. In 1970, the SCDs received funding for clerical support. The SCDs also held annual seedling sales to help fund the SCD. The Freehold SCD had a dredging operation for farmer’s ponds.

Initially the program was technically run by the USDA SCS, but the administrative institutional rules were never fully developed and many of the Soil Conservation Districts created their own ad hoc administrative rules.

In the early 1970s, USDA SCS technically guided and directed the program. The SCD managers were under the technical guidance of USDA SCS, particularly the District Conservationist. Much of the USDA SCS required technical training was imposed on the SCD staff. The public was well aware of USDA SCS technical field expertise. To the public, there was little distinction between USDA SCS and the SCD.

In the late 1970s and 1980s, USDA SCS changed from emphasizing field engineering practices to becoming planners. At the same time, the SCD's personnel expertise began to technically improve. With soil erosion and sediment control starting to become more of an enforcement program due to Chapter 251, the USDA SCS began to relinquish the program to the State.

The SCDs had Area Foresters until approximately 1978. Forestry became privatized. In the beginning every SCD had a County Agent on their Boards. Two and a half years after the passage of Chapter 251, the County Agents that were secretaries or treasurers had to step down as mandated by Rutgers. They could not be part of an enforcement role. With soil erosion and sediment control becoming more of an enforcement program, the County Agents could no longer be part of the District.

*William Engisch
District Manager
2018*

Somerset-Union Soil Conservation District

In 1972, the Somerset-Union SCD was the first SCD to establish a permanently funded District Manager position. This was the result of Somerset County developing County-wide stormwater regulations and Union County working on County regional flood control projects. Both Counties felt the SCD needed consistently funded professional staff to not only assist the County, but to work with municipalities to implement local soil erosion and sediment control ordinances, and in development of natural resource inventories.

The Somerset-Union Soil Conservation District along with some of the other SCDs encouraged rapidly developing municipalities to adopt local ordinances. The Somerset-Union Soil Conservation District provided model ordinances and reviewed and commented on proposed ordinances. The District would provide technical reviews of the soil erosion and sediment control plan to the municipal engineer. The District would also provide technical assistance on problems during construction to the municipal engineer. About seven municipalities in Somerset County adopted municipal ordinances and used the District services on only large projects. This service was unfortunately limited due to lack of staff. Reviews of Soil Erosion and Sediment Control Plans were conducted by the SCD personnel. At times, the SCD would directly request technical assistance from the USDA NRCS District Conservationist. If needed, the District Conservationist

would contact USDA NRCS engineering for technical assistance. Such technical assistance was submitted to the SCD and not the Soil Erosion and Sediment Control applicant.

Some of the problems with the SCD reviews were the technical conflicts with the local watershed associations. The development of Somerset County's Stormwater Management Practices by USDA NRCS, however, had a major influence on the District's technical credibility with the community.

Prior to the development of the Standard for Off-Site Stability, severe erosion occurred below conduit outlet protection. The solution was to riprap the channel further downstream.

Years later, USDA NRCS ***would regret having to help create a regulatory program using the USDA NRCS hydrology methods.*** TR-55 is looked upon by USDA NRCS as a guidance document and not a regulatory tool. TR-55 is well suited in Somerset County because of the high Curve Numbers within the county. The Curve Number Method is less reliable for Curve Numbers less than 50, which are found in other areas of the State.

The local municipal officials were trained on how the District can interact and assist the municipalities to deal with soil erosion problems. The District was successful in implementing the Certified Professional in Erosion & Sediment Control certification for the Districts.

*Ernest Thurlow, PhD., CPESC, District Manager
Somerset-Union Soil Conservation District
2018*

Bergen County Soil Conservation District

In September of 1946, the State of New Jersey officially organized the Northeast Jersey Soil Conservation District to service the counties of Bergen, Hudson, Essex and Passaic. In October of 1977, the State Legislature approved the split of the Northeast Jersey Soil Conservation District creating the Bergen County Soil Conservation District and the Hudson, Essex, and Passaic Soil Conservation District.

The County of Bergen encompasses approximately 246 square miles and is divided into 70 municipalities. Two of those municipalities, the Borough of Saddle River and the City of Englewood, are responsible for their own soil erosion and sediment control programs as "exempt municipalities" in accordance with State Law.

The Bergen SCD saw a major boom in the development of residential subdivisions (single family dwellings, multifamily townhouses and condominiums, etc.) in the late 1970s through the 1980s. Large acreage of wooded areas were cleared for these developments, creating the need for many above ground stormwater detention basins. Streams were diverted and, in some cases, piped to

accommodate development. Prior to the development of the Standard for Off-Site Stability, many natural channels required riprap stabilization at stormwater outfalls and in some cases entire channels were lined with stone to achieve stability in accordance with the NJ Standards for Soil Erosion and Sediment Control.

Initially, the District relied on the technical assistance of the NRCS (SCS) engineers and conservation staff. In the 1980s, the NJDA State Soil Conservation Committee hired its own erosion control engineer to assist the Districts. This also led to increased training of district personnel and revised versions of the NJ Standards.

Changes in the economy and the gradual addition of local ordinances and State regulations (NJDEP buffer requirements, restrictions on the use of riprap, wetlands and highlands protection, etc.) reduced the number of large subdivisions and decreased the amount of open space available for development. The late 1990s and 2000s saw major increase in the design of subsurface detention basins with points of discharge tying into existing municipal storm sewer systems to avoid additional permitting required for a direct discharge to a stream or other water body. Development also shifted to a redevelopment of existing properties (teardown rebuilds, paved parking to parking garages, etc.).

In 2015, the State Soil Conservation Committee adopted rule changes that required a certified soil erosion and sediment control plan for the construction of a single-family dwelling and other disturbances on a single-family dwelling lot in excess of 5,000 square feet. This greatly increased the number of potential Chapter 251 projects. While the District still has some large multi-acreage projects, today the majority of the applications received are for redevelopment and improvement of single-family dwelling lots.

Angelo Caruso
District Manager 2018

Geology and Land Use in New Jersey

New Jersey is not homogenous. New Jersey is diverse in many ways including geologically and in land use. Developing technically appropriate Statewide Standards for a diverse State was difficult. For its part, the New Jersey Soil Erosion and Sediment Control Act acknowledges and addresses this diversity by expressly stating that the standards for the control of soil erosion and sedimentation “shall be based upon relevant physical and developmental information concerning the watersheds and topography of the State, including, but not limited to, data relating to land use, soils, slope, hydrology, geology, size of land area being disturbed, proximate water bodies and their characteristics,” and “shall include criteria, techniques and methods for the control of erosion and sedimentation resulting from land disturbing activities for various categories of soils, slopes, and land uses” (NJSA 4:24-42).

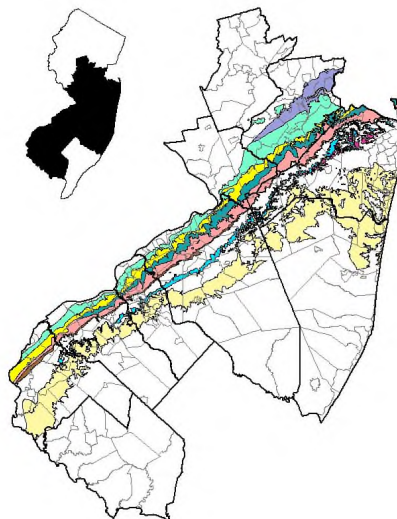
Land Use



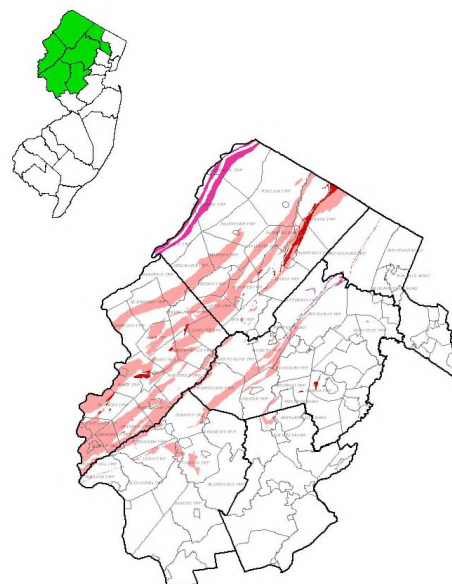
5 Physiographic Regions



Acid Soil



Karst Formations in the North



Source: New Jersey Geological Survey

Since 1999, the regulatory culture of the program has changed

A Chronological Tour of the Standards

Many of the initial vegetative and engineering Standards adopted in the 1972 Standards for Soil Erosion and Sediment Control were to be modified four or five times between 1974 and 2013. The Standards for SESC started out in 1972 with 14 Standards and ended up with 35 vegetative and engineering Standards in 1999 (consolidated into 32 Standards in 2011). Today, with the shrinking of open space, there is a question as to whether all 32 Standards are needed anymore. The program that was implemented in 1976, rose to the occasion to protect the land and peoples' property.

The 1972 Vegetative and Engineering Standards

June 1972		
Standard	Adopted/Revised	Comments
Vegetative Standards		
Dune Stabilization	Adopted	
Maintaining Vegetation	Adopted	
Permanent Vegetation Cover	Adopted	
Stabilization with Mulch Only	Adopted	
Permanent Stabilization with Sod	Adopted	
Temporary Vegetative Cover	Adopted	
Topsoiling	Adopted	
Engineering Standards		
Channel Stabilization	Adopted	
Diversions	Adopted	Level spreaders were included in the Diversions Standard
Floodwater Retarding Structures	Adopted	
Grassed Waterway or Outlet	Adopted	
Land Grading	Adopted	
Sediment Basins	Adopted	
Slope Protection Structures	Adopted	
7 Vegetative Standards, 7 Engineering Standards The Standards for Soil Erosion and Sediment Control were for State agencies, SCDs, Counties, and Municipalities-to use or enforce at their discretion, and to assist land users The committee for developing the Standards included representatives of SCS (now NRCS), NJDEP, NJDOT, County and Municipal Engineers, Rutgers, and the State Soil Conservation Committee.		

The 1972 Committee for Development of Standards for Soil Erosion and Sediment Control in New Jersey:

Mr. Thomas Birdsall, P.E., L.S., & P.P. (Chairman)
New Jersey Society of Municipal Engineers

Dr. Robert Duell
Assoc. Research Professor in Soils and Crops
College of Agriculture and Environmental Science
Rutgers, the State University

Mr. Richard Marston, P.E.
State Conservation Engineer
USDA, Soil Conservation Service

Mr. Eugene Hanchett
Field Resource Specialist
USDA, Soil Conservation Service

Mr. Wilson Parker
State Conservationist
USDA, Soil Conservation Service

Mr. Earl Higginbotham, P.E. & L.S.
Burlington County Engineer
New Jersey State Association of County Engineers

Mr. Dirk Hofman, P.E., Chief
Bureau of Water Control
N.J. Dept. of Environmental Protection

Mr. Andrew Lennert, L.A.
Principal Landscape Architect
N.J. Dept. of Transportation

Mr. Clarence Pell
Chief, Bureau of Landscape
N.J. Dept. of Transportation

Mr. Samuel Race (Secretary) and Mr. Juan Carlile (Field Rep.)
State Soil Conservation Committee
N.J. Dept. of Agriculture

Mr. William Roberts, Chairman,
Dept. of Agricultural Engineering
College of Agriculture and Environmental Sciences
Rutgers, the State University

Mr. Harold Stephens
Agronomist
USDA, Soil Conservation Service

There was no representative of any Soil Conservation District. Dirk Hofman referred to these Standards as also being NJDEP, Division of Water Policy and Supply Standards. The Soil Erosion and Sediment Control Program was advisory except insofar as a government entity at its discretion chose to enforce such control within that entity's jurisdiction.

The 1974 Vegetative and Engineering Standards, and Early Implementation of the Soil Erosion and Sediment Control Act

June 1974		
Standard	Adopted/Revised	Comments
Vegetative Standards		
Dune Stabilization	Revised	
Maintaining Vegetation		
Permanent Vegetation Cover	Revised	
Stabilization with Mulch Only	Revised	
Permanent Stabilization with Sod	Revised	
Temporary Vegetative Cover	Revised	
Topsoiling		
Tree Protection During Construction	Adopted	
Trees, Shrubs and Vines	Adopted	
Engineering Standards		
Channel Stabilization	Revised	
Diversions		Level spreaders were still included in the Diversions Standard

Dust Control	Adopted	
Floodwater Retarding Structures	Revised	
Grassed Waterway or Outlet		
Land Grading		
Sediment Basins	Revised	
Slope Protection Structure	Revised	
Subsurface Drainage	Adopted	
Traffic Control	Adopted	
9 Vegetative Standards, 10 Engineering Standards 2 Vegetative and 3 Engineering Standards added.		

The 1974 Committee for Review and Development of Standards for Soil Erosion and Sediment Control in New Jersey:

Mr. Thomas Birdsall, P.E., L.S., & P.P. (Chairman)
New Jersey Society of Municipal Engineers

Mr. Chester Bellard
State Conservationist
USDA, Soil Conservation Service

Mr. Kurt Nathan
Dept. of Agricultural Engineering
Cook College, Rutgers, the State University

Dr. Robert Duell
Assoc. Research Professor in Soils and Crops
Cook College, Rutgers, the State University

Mr. Clarence Pell
Chief, Bureau of Landscape
N.J. Dept. of Transportation

Mr. Robert Francis
State Resource Conservationist
USDA, Soil Conservation Service

Mr. Samuel Race (Secretary) and Mr. Juan Carlile (Field Rep.)
State Soil Conservation Committee
N.J. Dept. of Agriculture

Mr. Donald Haslem, P.E.
State Conservation Engineer
USDA, Soil Conservation Service

Mr. Lester Seglin
Field Resource Conservationist
USDA, Soil Conservation Service

Mr. Dirk Hofman, P.E., Chief
Bureau of Water Control
N.J. Dept. of Environmental Protection

Mr. Harold Stephens
Agronomist
USDA, Soil Conservation Service

Mr. Andrew Lennert, L.A.
Principal Landscape Architect
N.J. Dept. of Transportation

Mr. Ross Sweeny
Burlington County Engineering Department
New Jersey State Association of County Engineers

Until January 1, 1976, the program was still advisory except insofar as a government entity at its discretion chose to enforce the program within that entity's jurisdiction.

On January 1, 1976, however, (i) the Soil Erosion and Sediment Control Act (Chapter 251, P.L. 1975; NJSA 4:24-39 et seq.) became fully effective; and (ii) the **1974** vegetative and engineering Standards were incorporated in the first NJDA State Soil Conservation Committee rules for implementing that Act. See NJAC 2:90-1.3 as published at 8 NJR 3(b). Following are the title, subtitle, chapter, subchapter, and authority designations for these rules:

New Jersey Administrative Code

Title 2

Department of Agriculture

Subtitle 1

State Soil Conservation Committee

Chapter 90

State Soil Conservation Committee

Subchapter 1

General Provisions

Authority

NJSA 4:24-3 and 4:24-42

The vegetative and engineering Standards for Soil Erosion and Sediment Control became mandatory Statewide. There are 16 Soil Conservation Districts that must rely heavily on USDA SCS (now USDA NRCS) for technical guidance. In the beginning of the program, personnel of USDA SCS provide technical leadership in the implementation of the program. (Starting in the 1980s, District personnel became trained to technically implement the program.) There was no procedures manual on how Districts were to operate nor were/are there civil service requirements for hiring personnel to implement the program. The Districts varied in technical capability. An Agriculture (Soil Conservation District) entity now has influence in an urban environment. 1979 amendments to the Act provide that all NJDOT projects are to implement the Soil Erosion and Sediment Control program themselves, without review by the Soil Conservation Districts.

Construction of single homes or any disturbance less than 5,000 sq. ft. was considered exempt from the implementation of the Act.

In 1976, reaction to the program varied among the soil conservation districts (SCDs). Some SCDs such as Cape-Atlantic decided they wanted to administer the Act themselves. The Morris SCD did not want to administer the Act.

The 1979 (Effective 1980) Vegetative and Engineering Standards

September 1979 (Effective July 1980)		
Standard	Adopted/Revised	Comment
Vegetative Standards		
Dune Stabilization	Revised	
Maintaining Vegetation		
Permanent Vegetation Cover for Soil Stabilization	Revised	
Stabilization with Mulch Only	Revised	
Permanent Stabilization with Sod	Revised	
Temporary Vegetative Cover for Soil Stabilization	Revised	
Topsoiling		
Tree Protection During Construction		
Trees, Shrubs and Vines		
Engineering Standards		
Channel Stabilization	Revised	
Conduit Outlet Protection	Adopted	
Diversions	Revised	
Dust Control	Revised	
Floodwater Retarding Structure		
Grassed Waterway	Revised	
Land Grading		
Lined Waterway	Adopted	
Riprap	Adopted	
Sediment Barrier	Adopted	
Sediment Basin	Revised	
Slope Protection Structure		
Stabilized Construction Entrance	Adopted	
Storm Sewer Inlet Protection	Adopted	
Subsurface Drainage		
Traffic Control		
9 Vegetative Standards, 16 Engineering Standards 6 Engineering Standards Added The vegetative and engineering Standards for Soil Erosion and Sediment Control have been mandatory Statewide since January 1, 1976 and implemented by the 16 Soil Conservation Districts. The September 1979 changes to the 1974 Vegetative and Engineering Standards were incorporated in the Committee's Chapter 251 rules at NJAC 2:90-1.3 effective July 3, 1980. See 12 NJR 301(b) and 451(a).		

The 1979 committee for review and development of the Standards increased to 16 individuals, and now included representatives of consulting engineers, SCDs, and builders.

Mr. James Alatsas, P.E.
N.J. Society of Professional Engineers

Mr. Raymond Brown
State Resource Conservationist
USDA, Soil Conservation Service

Mr. Plater Campbell
State Conservationist
USDA, Soil Conservation Service

Dr. Robert Duell
Assoc. Research Professor in Soils and Crops
Cook College, Rutgers, the State University

Mr. Anthony Esser
Soil Erosion and Sediment Control Specialist
State Soil Conservation Committee
N.J. Dept. of Agriculture

Mr. Raymond Gravatt
District Manager
Burlington County Soil Conservation District

Mr. Dirk Hofman, P.E.
Acting Deputy Director
Division of Water Resources
N.J. Dept. of Environmental Protection

Mr. Andrew Lennert, L.A.
Principal Landscape Architect
N.J. Dept. of Transportation

Mr. Carl Montana, P.E.
State Conservation Engineer
USDA, Soil Conservation Service

Mr. Kurt Nathan, P.E. & L.S.
Professor of Agricultural Engineering
Cook College, Rutgers, the State University

Mr. Clarence Pell
Chief, Bureau of Landscape
N.J. Dept. of Transportation

Mr. Samuel Race (Secretary) and Mr. Juan Carlile (Field Rep.)
State Soil Conservation Committee
N.J. Dept. of Agriculture

Mr. William Rafferty, P.E.
Cumberland County Engineering Department
New Jersey State Association of County Engineers

Mr. John Reed
Environmental Advisor and Presidential Liaison
N.J. Builders Association

Mr. Harold Stephens
Agronomist
USDA, Soil Conservation Service

Colonel C. E. Tarvin
President
N.J. Association of Natural Resource Districts

September 1979 (Effective July 1980) Comments

Diversion Standard

Level spreaders are removed due to a history of failure to control downstream erosion.

The following 1979 Engineering Standards were added:

Lined Waterway Standard

It was developed as a companion to the grassed waterway standard taking care of situations where grass would not provide adequate stability. The current NRCS standard for lined waterways has a 200 cfs limit, although no cfs limit is given in the grassed waterway standard. To some extent because of the 200 cfs limit the design procedures are simplified. The standard doesn't get much into transitions, energy dissipation, super-elevation on curves, hydraulic jump,

etc. and is basically limited to straight reaches well out of the critical flow range. At higher flows where risks and damages could be greater more detailed analysis and procedures are needed. Minimum design storm requirements or freeboard amounts may be greater. The 200 cfs limit has been retained in the NRCS standard also because many standard drawings and details have been developed for these smaller less critical situations, some of which might not be appropriate under higher discharges.

There is no standard to turn to when the 200 cfs limit is reached.

In some cases the lined waterway standard might still be used even at higher flow rates if acceptable according to the site conditions. In other cases more rigorous design procedures might be used at lower discharges because of potential damages due to failure.

Many of the software available today for hydrologic and hydraulic analysis have made it easier to use some of the more complex procedures even for smaller jobs where at one time it wasn't practical to do so. The same procedure today for 100 cfs or for 1000 cfs. All design considerations should be considered, if the discharge limit were to be removed.

David Lamm, USDA NRCS State Conservation Engineer

Riprap, Storm Sewer Inlet Protection, Sediment Barrier, Stabilized Construction Entrance introduced.

Conduit Outlet Protection was also introduced and was defined as, “an erosion resistant section **between the outlet of the conduit and a stable condition.**” This statement would lead to further techniques for off-site stability from a construction project. This statement further paved the way for the Off-Site Stability standard adopted in 1999. (The 1972 and 1974 Standards for Floodwater Retarding Structures first introduced the issue of off-site stability by stating that “The minimum reservoir storage volume and associated spillway design discharge shall be adequate to prevent an unstable downstream channel condition. Channel stability can be checked by the methods contained in standard for channel stabilization ...”)

The 1987 Vegetative and Structural Standards

In this edition the name “Engineering Standards” was changed to “Structural Standards.” This change is reflected below and in the above subheading. (In 1999 the name was changed back to “Engineering Standards.”)

April 1987		
Standard	Adopted/Revised	Comment
Vegetative Standards		
Dune Stabilization	Revised	
Maintaining Vegetation		
Permanent Vegetation Cover for Soil Stabilization	Revised	
Stabilization with Mulch Only		
Permanent Stabilization with Sod		
Temporary Vegetative Cover for Soil Stabilization	Revised	
Topsoiling		
Tree Protection During Construction	Revised	
Trees, Shrubs and Vines		
Structural Standards		
Channel Stabilization	Revised	
Conduit Outlet Protection	Revised	Correction Occurred 1980
Diversions	Revised	
Dust Control	Revised	
Detention Basin	Revised	Changed from Floodwater Retarding Structure. Eliminated structural requirements of Detention Basin to conform to other governing entities
Grade Stabilization Structure	Adopted	
Grassed Waterway	Revised	D and E Retardance
Land Grading	Revised	
Lined Waterway	Revised	
Parking Lot Storage	Adopted	
Riprap	Revised	
Rooftop Storage	Adopted	
Sediment Barrier	Revised	
Sediment Basin		
Slope Protection Structures	Revised	
Stabilized Construction Entrance	Revised	
Storm Sewer Inlet Protection	Revised	
Subsurface Drainage	Revised	
Traffic Control	Revised	
Underground Tanks	Adopted	
9 Vegetative Standards, 20 Structural Standards 4 Structural Standards Added In June 1986 the Committee endorsed (for subsequent rule proposal) changes to the Vegetative and Engineering ("Structural") Standards. With some modifications, these changes were incorporated in the Committee's Chapter 251 rules at NJAC 2:90-1.3 effective April 6, 1987. See 18 NJR 2081(a) and 19 NJR 513(a).		

The 1987 Committee for Review and Development of Standards for Soil Erosion and Sediment Control in New Jersey:

Mr. Narinder Ahuja, P.E.
Acting Chief
Bureau of Flood Plain Management
N.J. Dept. of Environmental Protection

Mr. Obie Ashford
State Resource Conservationist
USDA, Soil Conservation Service

Mr. Hunter Birkhead, P. E., P. P.
Erosion Control Engineer
State Soil Conservation Committee
N.J. Dept. of Agriculture

Mr. Joseph Branco
State Conservationist
USDA, Soil Conservation Service

Dr. Robert Duell
Assoc. Research Professor in Soils and Crops
Cook College, Rutgers, the State University

Mr. Charles Monahan, Acting Chief
Bureau of Landscape Architecture
N.J. Dept. of Transportation

Mr. Kurt Nathan, P.E. & L.S.
N.J. Society of Professional Engineers

Mr. Patrick J. O'Keefe
Executive Vice President
N.J. Builders Association

Mr. Louis Pace
Project Engineer
N.J. Dept. of Transportation

Mr. Charles Pratschler
President
N.J. Association of Conservation Districts

Mr. Samuel Race, Secretary
State Soil Conservation Committee
N.J. Dept. of Agriculture

Mr. William Roberts, P.E., Chairman
Dept. of Biological & Agricultural Engineering
Cook College, Rutgers, the State University

Mr. James Sadley
Soil Erosion Control and Sediment Control Specialist
State Soil Conservation Committee
N.J. Dept. of Agriculture

Mr. John Tibbetts, P.E.
State Conservation Engineer
USDA, Soil Conservation Service

Mr. Charles VanBenschoten, P.E.
New Jersey State Association of County Engineers

Mr. Stan Werchinski, Jr., P. E.
N.J. Society of Municipal Engineers

April 1987 Comments

1. The full name of the Detention Basin Standard is "Standard for Detention Basin for Control of Downstream Erosion." This full name and other language in this Standard establishes that this Standard's primary purpose is "**to reduce erosion damages downstream** by controlling the release from flows of predetermined frequencies" (emphasis added). Such control might also have other benefits (e.g., flood or more general water pollution control), but this Standard is not specifically designed with such benefits in mind.

For the purpose of reducing erosion damages downstream, the Detention Basin Standard specifies the peak discharge from the 2 and 10 year storm for the first time. The 2 and 10 year storm is a "rule of thumb" for bankful and out of bank. In either scenario, either the 2 or the 10 year storm exhibits the greater velocity.

2. Structural criteria for Detention Basins are removed so as not to overlap other governmental agencies requirements.

3. This statement is inserted in the Detention Basin Standard: “If the detention basin is also intended to comply with the provisions of the Stormwater Management Act of 1981, regulations promulgated by DEP pursuant to that Act shall apply.” The purpose of the statement is to: (i) expressly defer to NJDEP’s more broadly based (but at that time spottily implemented) regulation of detention basins where applicable and (ii) accommodate the eventual development of the watershed approach authorized in NJDEP’s 1983 stormwater regulations.²⁷
4. “D” and “E” Retardance requirements added in the Grassed Waterway Standard because during urban development, the grass waterways have little time to be established compared to grass waterways that are built under agricultural conditions (i.e., under Ag conditions, “D” and “C” or “C” and “B” are used). Under Ag conditions, the grass waterways are first established and then the drainage area is connected to the waterway.
5. In the Diversions Standard, the “n” value for bare channel is lowered from 0.033 to 0.025 because of recent washouts of diversions.
6. In the Channel Stabilization Standard, the allowable velocity for sand is lowered to 1.75 fps from 2.5 fps with (for sand) an “n” value of 0.025. This correction is due to recent washouts.
7. Off-Site Stability is addressed by the Detention Basin and Conduit Outlet Protection Standards. The Detention Basin Standard expressly requires Off-Site Stability analysis, and states in part that for the 2 and 10 year storm, “it must be shown for the peak outflow, as determined by the Rational Method or TR55, that there will be no soil erosion and sedimentation problems offsite,” and that “no increase in peak discharge caused by construction operations or changes in land use shall be allowed unless the increase in peak discharge does not result in increased potential for erosion.”

The Conduit Outlet Protection Standard defines Conduit Outlet Protection as “an erosion resistant section between a conduit outlet and a stable downstream channel” (underline in original). Such language allows for checking for erosion control beyond the conduit outlet. In July 1988, an Off-Site Stability guidance was developed in cooperation with the Soil Conservation Districts, Kurt Nathan (Rutgers), and Jack Tibbetts (USDA SCS, State Conservation Engineer).
8. For peak runoff, the reduction in design drainage area for the rational method to no more than one half square mile.
9. For the Modified Rational Method, **“Design storm and volume may be determined by the modified rational method on drainage basins up to 20 acres, as described in Special Report 43 by the American Public Works Association, Practices in Detention of Urban Stormwater.”**

²⁷ NJDEP’s initial 1983 NJAC 7:8 regulations under this Act included “general standards” for both flood and erosion control and water quality control. It was assumed that in many instances these standards would be satisfied by means of detention basins. The only enforcement mechanism for NJDEP regulations mentioned in the 1981 Act was the municipal stormwater control ordinance. See 22 NJR 2873 for a 1990 account of NJDEP’s experience and limited success in, and strategy for, seeking adoption of such ordinances. The “general standards” for flood and erosion control were concerned with peak runoff from the development site for a 2, 10, and 100 year storm. The “general standards” for water quality control were concerned with retention of either a 1 year Type II storm or a storm of 1¼ inches of rain in 2 hours. A watershed approach to stormwater management was envisioned in the “Phase II” stormwater management plans authorized but not required by these 1983 NJDEP regulations.

10. Erosion control mats (such as Enkamat and Miramat) are introduced into the Diversion and Grassed Waterway Standards.

The 1988 NJDOT Vegetative and Structural Standards

For NJ Department of Transportation (NJDOT) projects, the 1979 amendments to the Soil Erosion and Sediment Control Act require NJDOT certification pursuant to soil erosion and sediment control standards developed jointly by NJDOT, NJDEP, and the Committee, and promulgated by NJDOT. In 1988, NJDOT promulgated its first Standards at NJAC 16:25A. See the proposal and adoption notices published at 19 NJR 2126(a) and 20 NJR 1728(a), respectively.

July 1988
Standard
Vegetative Standards
Temporary Vegetative Control for Soil Stabilization
Permanent Vegetative Control for Soil Stabilization
Stabilization with Mulch Only
Permanent Stabilization with Sod
Topsoiling
Vines, Shrubs and Trees
Tree Protection During Construction
Maintaining Vegetation
Soil Stabilization Matting
Slope Boards
Preparation of Existing Soil
Structural Standards
Land Grading
Diversion
Grassed Waterway
Sediment Basin
Slope Protection Structures (Temporary Slope Drain)
Channel Stabilization
Detention Basin for Control of Downstream Erosion
Subsurface Drainage`
Traffic Control
Dust Control
Lined Waterway
Riprap (Channel Liner)
Sediment Barrier (Baled Hay Erosion Check) -
Conduit Outlet Protection

Stabilized Construction Entrance
Storm Sewer Inlet Protection
Grade Stabilization Structure
Parking Lot Storage
Rooftop Storage
Underground Tanks
Cut to Fill Slope Treatment
Swales and Ditches Only
Sediment Barrier (Hay Bales)
Inlet Protection - Hay Bale Barrier
Inlet Sediment Trap
Storm Sewer Inlet Protection
Temporary Slope Drain
Floating Turbidity Barrier
Staked Turbidity Barrier
11 Vegetative Standards, 29 Structural Standards

The 1999 Vegetative, Engineering, and Stormwater Runoff Treatment Standards

In this edition the name “Structural Standards” was changed back to “Engineering Standards.”

July 1999		
Standard	Adopted/Revised	Comment
Vegetative Standards		
Acid Soil Management	Adopted	Resolution to acid soil condition
Dune Stabilization	Revised	
Maintaining Vegetation		
Permanent Vegetation Cover for Soil Stabilization	Revised	
Stabilization with Mulch Only	Revised	
Stabilization with Sod	Revised	
Temporary Vegetative Cover for Soil Stabilization	Revised	
Topsoiling	Revised	
Tree Protection During Construction	Revised	
Tree, Shrubs and Vines	Revised	
Engineering Standards		
Channel Stabilization	Revised	
Conduit Outlet Protection	Revised	
Detention Basin	Revised	Peak flow reduction statement added

Dewatering	Adopted	
Diversions	Revised	
Dust Control	Revised	
Grade Stabilization Structure	Revised	
Grassed Waterway	Revised	
Land Grading	Revised	
Lined Waterway	Revised	
Off-Site Stability	Adopted	Clarification
Parking Lot Storage	Revised	
Riprap	Revised	
Rooftop Storage	Revised	
Sediment Barrier	Revised	
Sediment Basin	Revised	
Slope Protection Structures	Revised	
Soil Bioengineering	Adopted	Defines conditions
Stabilized Construction Entrance	Revised	
Storm Sewer Inlet Protection	Revised	Provided overflow
Stream Crossing	Adopted	
Subsurface Drainage	Revised	
Traffic Control	Revised	
Turbidity Barrier	Adopted	
Underground Detention Storage	Revised	
Stormwater Runoff Treatment Standards		
Dry Wells	Adopted	
Extended Detention Basins	Adopted	
Infiltration Structures	Adopted	
On-Line Water Quality Storm Sewer Catch Basin	Adopted	
Sand Filters	Adopted	
Vegetative Filter Strip	Adopted	
Wet Ponds	Adopted	
10 Vegetative Standards, 25 Engineering Standards 1 Vegetative Standard and 5 Engineering Standards Added 7 Stormwater Runoff Treatment Standards Added Proposal and adoption notices at 30 NJR 2105(a) and 31 NJR 1799(a), respectively		

The July 1996 - April 1999 Committee for Review and Development of Standards for Soil Erosion and Sediment Control:

Mr William Brash
District Director
Mercer County Soil Conservation District

Mr. David Lamm, P.E
State Conservation Engineer
USDA, Natural Resources Conservation Service

Mr. Hunter Birkhead, P.E.
State Erosion Control Engineer
State Soil Conservation Committee
N.J. Dept. of Agriculture

Mr. Christopher Miller, M.S.
Plant Materials Specialist
USDA, Natural Resources Conservation Service

Mr. Richard Bush Project Engineer, Landscape N.J. Dept. of Transportation	Ms. Linda Peterson, P.E Civil Engineer USDA, Natural Resources Conservation Service
Mr. Howard Davis Executive Director N.J. Nursery & Landscape Association	Ms. Anita Psauth Executive Director Land Improvement Contractors Association
Mr. Anthony DiLodivico Manager, Regulatory Compliance Department Schoor DePalma	Mr. Samuel Race, Executive Secretary State Soil Conservation Committee N.J. Department of Agriculture
Mr. William Dressel, Jr. Executive Director N.J. League of Municipalities	Dr. Michael Richardson Assistant Professor, Plant Science Cook College, Rutgers, the State University
Dr. Robert Duell Professor Emeritus, Plant Science Cook College, Rutgers, the State University	Mr. James Sadley Erosion Control Specialist State Soil Conservation Committee N.J. Department of Agriculture
Mr. William Engisch District Manager Hunterdon County Soil Conservation District	Mr. John Showier, M.S. Erosion Control Specialist State Soil Conservation Committee N.J. Department of Agriculture
Mr. Robert Eschelman Landscape Architect USDA, Natural Resources Conservation Service	Dr. Ernest Thurlow District Manager Somerset-Union Soil Conservation District
Mr. Theodore Giannechini, P.E. President N.J. State Association of County Engineers	Mr. William Voeltz, P.E. President N.J. Society of Professional Engineers
Mr. Steven Jacobus Watershed Team Leader Division of Watershed Management N.J. Dept. of Environmental Protection	Mr. John Wiggins, P.E. President N.J. Society of Municipal Engineers
Mr. Jay Kandle President N.J. Association of Conservation Districts	Ms. Nancy Wittenberg Director of Environmental Affairs N.J. Builders Association

July 1999 Comments

1. Acid Soil Management Standard developed after many years of trying to solve a problem only partly addressed by pre-1999 Committee Standards and NJDEP Flood Hazard Area Regulations (see “The Acid Soil Problem” above) and individual SCD initiatives.
2. Added Stormwater Runoff Treatment Standards, developed in cooperation with NJDEP, to provide and enforce new design specifications for devices and methodologies targeted to post-construction water quality protection. These Standards facilitated project approvals where such approvals were required by both the SCD and NJDEP, and established technical criteria and guidance for implementing conceptual guidelines in the December 1994 Stormwater and Nonpoint Source Pollution Control, Best Management Practices Manual developed jointly by NJDEP and NJDA. These Standards were also important for projects that were **not** subject to the

Residential Site Improvement Standards and did **not** require NJDEP land use permits. Some provisions of these Standards had a tenuous relationship at best to soil erosion and sediment control.

These Standards (which were deleted from the Committee rules in 2006) served an interim purpose which ended soon after 2004 when NJDEP's substantially updated Stormwater Management Rules (NJAC 7:8), new NJPDES municipal stormwater rules (NJAC 7:14A-25) and permits (e.g., the "Tier A" and "Tier B" NJPDES permits), and New Jersey Stormwater Best Management Practices Manual (modeled after these Standards) went into effect.

3. Added the following statement in the Detention Basin Standard: "In general the practice applies to reducing the post development peak flows to 50% and 75% of predevelopment peak flows for the 2- and 10-year storms, respectively."

Chapter 251 Legislative History Appendix

By
William Minervini
formerly NJDEP

The path to the New Jersey Soil Erosion and Sediment Control Act (NJSA 4:24-39 et seq., Chapter 251, Laws of 1975) was not short or direct. For example, New Jersey's State Soil Conservation Committee (Committee) issued comprehensive Standards for Soil Erosion and Sediment Control in New Jersey in 1972 three years **before** this Act ensuring Statewide implementation of Committee standards was adopted, and this Act (or something similar) was not the only approach considered. The following pages outline major steps on this path up to and including the 1974 introduction of the bill that with certain changes became this Act. (I am not an attorney, and this Appendix and my other writings are not a substitute for legal research or advice by an attorney.)

As discussed elsewhere²⁸, starting in the mid-1960's there was a growing call for some type of control to prevent severe soil erosion and sedimentation problems attendant to New Jersey's rapid population growth and urban expansion, accompanied by belief that such control should include (i) a role for the soil conservation districts (SCDs); and (ii) integration with municipal approval of land development proposals. There were, however, multiple options and issues to be addressed in establishing such control. For example, at a general level there was the option of using *existing statutes alone* (if only for an interim period pending new legislation), and the alternative of enacting new legislation. There were also issues such as regulatory thresholds and application processing deadlines and content; regulation by municipal ordinance versus or in combination with direct SCD regulation of land disturbance (under the NJ Soil Conservation Act of 1937 or new legislation); the specific role of SCDs and particular municipal officials in municipal ordinances; the Committee and/or NJDEP role if any; and possible regulation of agricultural soil erosion. These options and issues (some of which are highlighted below) were illustrated by various model municipal ordinances, Camden County SCD regulations, and legislative bills recommended, adopted, or drafted in the early 1970's before the New Jersey Soil Erosion and Sediment Control Act was adopted on November 12, 1975.

Examples (from 1972 and 1974) of the *existing statutes alone* option: two model municipal ordinances

Examples of the *existing statutes alone* option included the two model ordinances in the Committee's 1972 and 1974 Standards for Soil Erosion and Sediment Control in New Jersey: the "Model Soil Erosion and Sediment Control Ordinance to Amend Municipal Subdivision and Zoning Ordinances" (for short, "model subdivision/zoning version") and the "Model Municipal Land Disturbance Ordinance to Control Soil Erosion and Sedimentation" (for short, "model land

²⁸ See "The Urban and Suburban Soil Erosion and Sediment Control Problem in New Jersey" in the Chronological History of the Standards for Soil Erosion and Sediment Control in New Jersey to 1999 & The Early Years of the Soil Erosion and Sediment Control Program in New Jersey.

disturbance ordinance”) These model ordinances required development in accordance with the Committee’s Standards for Soil Erosion and Sediment Control in New Jersey. These model ordinances also expressly enabled, but did **not** require, municipalities to allow SCD participation in the development and review of these plans. See, for example, Articles III.A and III.C of the “model subdivision/zoning version,”²⁹ which are quoted elsewhere.³⁰

The “model subdivision/zoning version” applied to each “site plan or preliminary plan” submitted to the **municipal planning board**³¹, except for “minor subdivisions,”³² “site plans ... where the land will not be disturbed,” and (with SCD consent) some agricultural uses. See Articles III.A and V, which are quoted elsewhere.³³ This version further explained its scope by its Article III.B reference to the following items: “each subdivision, site plan review, special exception, zoning variance or planned unit development application.” (This reference should probably be understood as being limited to those instances where the item is directly associated with a site plan or preliminary plan submitted to the municipal planning board.) Article III.C provided that “erosion and sediment control plans shall be reviewed by the [municipal] **planning**

²⁹ This model ordinance superseded the “Model Ordinance to Amend Municipal Subdivision and Zoning Ordinances to Control Soil Erosion and Sedimentation” (marked “Draft 9/3/71”), which included no provision for SCD review or consultation concerning individual projects, but required (see Article III.A) compliance not with Committee standards, but with local SCD standards presumably adopted under the NJ Soil Conservation Act of 1937. This 1971 draft was reprinted in Local Environmental Planning Procedures: A Municipal Handbook For Flood Control, Land Use, and Environmental Protection by South Branch Watershed Association, Inc. (1973). South Branch Watershed Association, Inc.: Clinton, New Jersey.

³⁰ See “The Urban and Suburban Soil Erosion and Sediment Control Problem in New Jersey” in the Chronological History of the Standards for Soil Erosion and Sediment Control in New Jersey to 1999 & The Early Years of the Soil Erosion and Sediment Control Program in New Jersey.

³¹ The “preliminary plan” likely meant, mainly, the subdivision plat submitted for “tentative approval” or “preliminary approval” under the then existing “Municipal Planning Act” (former NJSA 40:55-1 through 1.29). See, e.g., former NJSA 40:55-1.18 and -1.18a. A proposed planned unit development submitted to the municipal planning board for “tentative approval” under the then existing “Municipal Planned Unit Development Act (1967)” (former NJSA 40:55-54 et seq.) would also likely be considered a “preliminary plan.” The “site plan” likely meant any site plan referred under former NJSA 40:55-1.13 to the planning board (if a municipal zoning ordinance or other municipal ordinance required such referral) before final action (such as issuing a building permit) thereon by a municipal public body or officer. See, e.g., *Guaclides v. Mayor and Council of Borough of Englewood Cliffs*, 119 N.J. Super. 403 (L. 1972) and *Bederson v. Ocean Tp.*, 134 N.J. Super. 9 (A.D. 1975).

³² Although the then existing “Municipal Planning Act” (former NJSA 40:55-1 through 1.29) did not use the term “minor subdivision,” that Act did provide at former NJSA 40:55-1.14 that any municipal subdivision ordinance “may exempt from the requirement of local municipal approval, subdivisions wherein the number of new lots is less than a designated number, or plats that do not involve new streets, or such other classes of subdivisions as such ordinance shall designate.” Such exempt subdivisions were often called “minor subdivisions.” See, e.g., *Lakeland Parks, Inc. v. Washington Tp.*, 147 N.J. Super. 528 (A.D. 1977).

³³ See “The Urban and Suburban Soil Erosion and Sediment Control Problem in New Jersey” in the Chronological History of the Standards for Soil Erosion and Sediment Control in New Jersey to 1999 & The Early Years of the Soil Erosion and Sediment Control Program in New Jersey.

board (emphasis added) and approved when in conformance” with the Committee Standards, and gave this board the **option** of seeking SCD assistance in this regard.

In contrast, Article III.A.1 of the broader “model land disturbance ordinance” provided that “no land area shall be disturbed” (except as exempted in Article V) by any person, corporation, public agency, etc. unless “the applicant has submitted to the **building inspector**” a soil erosion and sediment control plan in accordance with the Committee Standards “and such plan has been approved; and a valid **land disturbance permit** has been issued by the **building inspector**” (emphasis added). Article V of this model ordinance exempted “land disturbance associated with existing one and two family dwellings,” gardening “primarily for home consumption,” and agricultural uses when operated in accordance with an SCD approved “farm conservation plan” or when the SCD determines “that such use will not cause excessive erosion and sedimentation.” Article III.C provided that “soil erosion and sediment control plans shall be reviewed by the **municipal engineer (or other designated official)** (emphasis added) and approved when in conformance” with the Committee Standards, and gave the municipal engineer the **option** of seeking SCD assistance in this regard.

Both this model ordinance and the “model subdivision/zoning version” required conformance with the full Committee Standards (not just some provisions in those Standards), and had essentially the same Article III.B application data requirements and Article IV.A “General Design Principles.” (Neither model ordinance included a deadline for municipal review of the submitted soil erosion and sediment control plan.) In both model ordinances, Article IV.B required that all necessary soil erosion and sediment control measures be adequately maintained for one year after the approved plan’s completion or until such measures are permanently stabilized, and required the municipality to give the applicant upon request a certificate indicating the date on which these measures were completed. (In the “model land disturbance ordinance” and “model subdivision/zoning version,” Article IV.B was to be administered by the municipal engineer and building inspector, respectively.)

These two model ordinances did not identify existing statutes authorizing municipalities to adopt these ordinances. For the “model subdivision/zoning version,” the primary statutes were probably (i) the then existing “Municipal Planning Act” (former NJSA 40:55-1 through 1.29), which among other things provided that “the planning agency shall further require that all lots shown on the plats [“plat” defined as “the map of a subdivision”] shall be adaptable for the intended purposes without danger to health or peril from flood, fire, **erosion**, or other menace” (former NJSA 40:55-1.20, emphasis added)³⁴; (ii) the then existing statute often called the “Zoning Act” (former NJSA 40:55-30 through -51), which may have provided some authority for erosion control requirements in zoning ordinances; (iii) the then existing “Municipal Planned Unit Development Act (1967)” (former NJSA 40:55-54 et seq.), whose provisions concerning “standards and conditions” (former NJSA 40:55-57) may have provided some authority for erosion control requirements³⁵; and (iv) the Home Rule Act provision (NJSA 40:48-2) authorizing

³⁴ See also former NJSA 40:55-1.11, which expressly authorized but did not require the municipal master plan to “cover proposals” for soil conservation.

³⁵ This Act and the “Municipal Planning Act” and “Zoning Act” were among the statutes replaced by the “Municipal Land Use Law,” NJSA 40:55D, enacted in 1975.

municipalities to adopt ordinances to preserve the public health, safety and welfare. This Home Rule Act provision was also the probable primary statute authorizing the “model land disturbance ordinance.”³⁶

A different example of the *existing statutes alone* option: the 1974 "Regulations for Control of Soil Erosion and Sedimentation in Camden County"

A considerably different (in some respects) example of the *existing statutes alone* option was the "Regulations for Control of Soil Erosion and Sedimentation in Camden County" adopted by the Camden County SCD on February 25, 1974. These regulations (also called “The Camden County Soil Conservation District Ordinance for control of soil erosion and sedimentation”) stated expressly that were established pursuant to the NJ Soil Conservation Act of 1937³⁷ (1937 Act), which expressly authorized (but did not require) SCD supervisors “to formulate regulations governing the use of lands within the district in the interest of conserving soil and soil resources and preventing and controlling soil erosion” (see N.J.S.A. 4:24-23 through -34). These 1974 regulations were the first such regulations enacted in New Jersey.

Article II of these 1974 regulations set forth their “Purpose” as follows: “The purpose of this Ordinance shall be to provide rules, regulations and standards to guide **land development** in the interest of conserving soil, soil resources and preventing and controlling soil erosion in the Camden County Soil Conservation District in order to promote public health, safety, convenience and general welfare of the community... This Ordinance shall not apply to the construction of **one or two family residences** where the total land area involved is **one acre or less**” (emphasis added).

Article V stipulated in part that “Any local governing body that issues building permits and/or approves development plans shall notify the District immediately upon receipt of **a development plan or application for a building permit involving more than one acre of land**. The local governing body shall not approve the subject development plan nor issue such building permits until the applicant has complied with the applicable requirements of this Ordinance.” Except as discussed below in regard to “Delegation,” however, these 1974 SCD regulations applied directly to landowners whether or not the land development in question required “local” government approval.³⁸ Article V specified details of the “sketch plat” and supporting data that the applicant was required to submit directly to the **SCD**. These details focused mainly on map

³⁶ Although these two model ordinances differed from what the New Jersey Supreme Court in 1968 called the “typical” municipal “soil removal ordinance,” the New Jersey courts’ upholding of such soil removal ordinances (see *Koslow, et al. v. Municipal Council of Tp. of Wayne*, 52 N.J. 441 (1968)) suggests that there was adequate statutory authority for these model ordinances.

³⁷ Including post-1937 amendments thereto.

³⁸ These 1974 regulations did not specifically mention agriculture (although some agricultural activity might be considered “land development”), but did state in Article IV that “any landowner who has a conservation plan, approved by the Soil Conservation District, in effect shall be considered to be in compliance with the land use requirements of this Ordinance.”

content rather than on the “Suggested Requirements” in Appendix A2 of the Committee’s 1972 Standards for Soil Erosion and Sediment Control in New Jersey. Article V further specified that “the District shall take action on the application within thirty (30) days of complete submission to the District Secretary” and that “the District shall issue a land use permit as a vehicle to confer approval of the applicant's sketch plat ...”

Article VI stipulated in part that “the applicant or landowner shall conform to the published Standards for Soil Erosion and Sediment Control in New Jersey as issued by the New Jersey State Soil Conservation Committee” (the full Committee Standards, not just some provisions in those Standards). In addition, however, Article VI established “General Principles for Performance” that varied substantially in some respects from the “General Design Principles” in the two above mentioned Committee model ordinances, and from the “Guide Lines [sic] for Soil Erosion and Sediment Control” in the Committee’s 1972 (and 1974) Standards for Soil Erosion and Sediment Control in New Jersey.

The “Delegation” section of Article V provided that “The District may, at its discretion, delegate the administration and enforcement of this Ordinance or its equivalent to townships and other units of local government. Continuance of such delegation shall be contingent upon the local unit of government carrying out an adequate program of control. An adequate program must include surveillance and enforcement, by a qualified staff, of local ordinances equivalent in intent and scope to this Ordinance.”

Article VIII (“Penalty”) provided that “If any landowner proceeds to develop and use lands in the conduct of his business or enterprise in a manner not consonant with the provisions and regulations as contained herein, he is subject to action by the District Supervisors for injunctive relief through the Superior Court as provided by Chapter 5 Laws of 1953. (N.J.S. 4:24-28).”³⁹ This statute restricts such relief, however, to instances where “nonobservance tends to increase erosion on such lands **and is interfering with the prevention or control of erosion on other lands within the district**” (emphasis added). Moreover, the 1937 Act did **not** specifically authorize (i) the Article V regulation of the “local governing body”; or (ii) two other noteworthy features of these 1974 regulations: provisions concerning application fees and performance bond amounts, and the SCDs broad discretion to establish such fees and amounts on a project-by-project basis.

The new legislation option: Senate Bill No. 1083 (S-1083) introduced June 26, 1972, and Senate Bill No. 806 (S-806) introduced February 11, 1974

The following discussion of the *new legislation* option focuses on two bills that the New Jersey Legislature considered in 1972-1975: Senate Bill No. 1083 (S-1083) and Senate Bill No. 806 (S-806), the latter of which was adopted on November 12, 1975 as the New Jersey Soil Erosion and Sediment Control Act (the “adopted 1975 Act”). Although these two bills differed greatly in many respects, both bills sought to establish a soil erosion and sediment control program for land development that would be implemented Statewide rather than at the discretion of

³⁹ As amended in 1953, NJS 4:24-28 replaced an original 1937 Act provision that authorized the SCD supervisors to present to the Court of Chancery a bill of complaint concerning such a landowner.

individual municipalities or SCDs, and that would include a major role for the SCDs and integration with municipal approval of development proposals.⁴⁰

Senate Bill No. 1083

The earlier of these two bills, S-1083, introduced on June 26, 1972 by State Senators Parker and Hughes, was very brief (see, in “print layout” view, copy of bill on next page).

The most important by far of this bill’s provisions was section 2: “No **subdivision of land** shall be approved or a **building permit** issued **until the soil conservation district** within which the land is situate **certifies** that plans for soil erosion and sediment for the land to be subdivided or upon which construction is proposed, conform to regulations of the **district** promulgated by the supervisors thereof under R. S. 4:24-23” (emphasis added). In one sentence, this provision specified the program’s scope (projects requiring land subdivision or building permits), the governmental entity responsible for certifying soil erosion and sediment control plans **and** establishing regulations for such plans (the SCD), and the statutory authority for those regulations (the 1937 Act, including NJSA 4:24-23)⁴¹. This sentence also imposed a specific prohibition — the command to not approve a land subdivision or building permit until such SCD certification occurs — on the governmental entities, unnamed in this bill, that issue such approvals and permits. Moreover, this bill and NJSA 4:24-23 must be read together with the regulation adoption, enforcement, and other 1937 Act provisions in NJSA 4:24-22 through -33.

Also important is what S-1083 (and the 1937 Act) did **not** include. This bill included **no** direct references to the Committee (or NJDEP), or to Statewide soil erosion and sediment control standards. Instead, this bill expressly referenced NJSA 4:24-23, which provides that draft SCD regulations shall be submitted to the Committee “which may within thirty days **suggest** amendments thereto for consideration by the [SCD] supervisors” (emphasis added). (N.J.S.A. 4:24-6.1, which authorizes the Committee to review and approve, modify or reject any SCD decision, was enacted in 1979.) Nor did this bill expand the narrow enforcement authority in NJSA 4:24-28. Nor did this bill (or the 1937 Act) expressly authorize the SCD to collect fees from applicants; or specify a deadline for SCD review of applications; or expressly exempt construction of one or two family residences or projects involving or disturbing less than some specified amount of land; or expressly allow qualifying municipalities to administer the program.

⁴⁰ The full text of S-1083 and several versions of S-806 is contained in the Chapter 251 Legislative History Supplement, a compilation of “Proposed and Adopted New Jersey Soil Erosion and Sediment Control Legislation — Senate No. 1083 and No. 806 — June 26, 1972–November 12, 1975.”

⁴¹ Although this bill did not expressly require SCDs to promulgate the regulations in question, there would have been great pressure on the SCDs to do so very soon after this bill’s enactment.

SENATE, No. 1083
STATE OF NEW JERSEY

INTRODUCED JUNE 26, 1972

By Senators PARKER and HUGHES

Referred to Committee on Agriculture and Environment

AN ACT requiring certification of soil erosion and sediment control plans prior to approval of subdivisions or issuance of building permits and supplementing chapter 55 of Title 40 of the Revised Statutes.

1 BE IT ENACTED by the Senate and General Assembly of the State
2 of New Jersey:

1 1. As used in this act:

2 a. "erosion" means detachment and movement of soil or rock
3 fragments by water, wind, ice and gravity.

4 b. "sediment" means solid material, both mineral and organic,
5 that is in suspension, is being transported, or has been moved from
6 its site of origin by air, water or gravity as a product of erosion.

1 2. No subdivision of land shall be approved or a building permit
2 issued until the soil conservation district within which the land is
3 situate certifies that plans for soil erosion and sediment control for
4 the land to be subdivided or upon which construction is proposed,
5 conform to regulations of the district promulgated by the super-
6 visors thereof under R. S. 4:24-23.

1 3. Application for certification shall be made on forms provided
2 by the soil conservation district within which the land is situate.
3 Each application shall include the following information:

4 a. Location and description of existing natural and man-made
5 features on and surrounding the site including general topography
6 and soil characteristics.

7 b. Location and description of proposed changes to the site.

8 c. Measures for soil erosion and sediment control.

9 d. A schedule of the sequence of installation of planned erosion
10 and sediment control measures as related to the progress of the
11 project including anticipated starting and completion dates.

12 e. Such other information as the soil conservation district shall
13 deem necessary.

1 4. This act shall take effect the first day of the calendar month
2 next occurring not less than 90 days after enactment.

It is perhaps such omissions that prompted the NJDA to declare, in its Annual Report for July 1, 1972 to June 30, 1973, that "... language was drafted for a statewide erosion control bill. Language will be used to modify S-1083 to be more comprehensive in nature." S-1083 was so different from the New Jersey Soil Erosion and Sediment Control Act adopted in 1975 that S-1083 should not even be considered an early draft of the adopted 1975 Act. Nevertheless, S-1083 was still significant. First, S-1083 demonstrated two State legislators' early 1970s interest in soil erosion and sediment control at land development projects Statewide. Second, S-1083 set forth the basic principle, later incorporated with modifications in the adopted 1975 Act, that on a Statewide basis, projects that need a building permit require soil erosion and sediment control plans certified by the SCD.

Senate Bill No. 806

The second and much lengthier bill, Senate Bill No. 806 (S-806), introduced on February 11, 1974 by State Senators Martindell, Merlino, Parker, Hughes, and Zane, introduced the name "Soil Erosion and Sediment Control Act," and unlike S-1083 was identical in many ways to the adopted 1975 Act. Some of the major differences between S-806 (**as first introduced**) and S-1083 are briefly noted in the following list. (Asterisks in this list indicate provisions affected by major changes made to S-806 before its November 12, 1975 adoption.⁴²)

1. S-806 added extensive findings and declarations focusing on water pollution control, natural resource conservation, and establishment and implementation, through the Committee and the SCDs, in cooperation with the counties, municipalities and NJDEP, of "a Statewide comprehensive and coordinated erosion and sediment control program."
- 2*. S-806 expressly authorized the **Committee** (after consulting with NJDEP) to promulgate regulatory standards for control of soil erosion and sedimentation, and expressly required SCDs (and certain municipalities) to apply those standards in reviewing soil erosion and sediment control plans required at "projects," which S-806 initially defined as "the disturbance of more than **1,000** square feet of the surface area of land for the accommodation of construction for which the Standard Building Code of the State of New Jersey would require a building permit" (emphasis added). S-806 also provided initially that "the local building inspector is authorized to exempt any single-family dwelling from the provisions of this act."
3. S-806 also provided that approval of an "**application for development**" for any project by a **municipal** officer or agency shall be **conditioned upon** SCD certification of a soil erosion and sediment control plan; and broadly defined "application for development" as "**a proposed subdivision of land, site plan, special exception, zoning variance, planned unit development or building permit**" (emphasis added). An exemption was provided, however, for any municipality (often called an "exempt municipality") which adopts an ordinance that conforms to the Committee standards within 12 months of their promulgation and obtains Committee approval thereto, until such time as the SCD determines that the municipality is not enforcing said ordinance.

Furthermore, S-806 provided that "no **certificate of occupancy** for a project shall be issued by a **municipality** unless there has been **compliance with** the provisions of a **certified plan** for permanent measures to control soil erosion and sedimentation (emphasis added)."
4. S-806 added provisions expressly directing the SCD to collect fees from applicants for plan certification and later on-site inspections; and specifying a deadline (generally 30 days) for SCD review of applications.

⁴² These changes are discussed under "The Adopted Statute" in the Chronological History of the Standards for Soil Erosion and Sediment Control in New Jersey to 1999 & The Early Years of the Soil Erosion and Sediment Control Program in New Jersey.

- 5.* S-806 also added provisions authorizing (outside an “exempt municipality”) the SCD or the municipality to issue a stop-construction order if a project is not being executed in accordance with an SCD certified soil erosion and sediment control plan; and (if a person violates the Act, a Committee standard, or the certified plan) authorizing the municipality or the SCD to institute a civil action in the Superior Court for injunctive relief, and subjecting such a person to a penalty of not more than \$500, with each day of a continuing violation constituting an additional offense.
6. Unlike S-1083, S-806 did not list information required in the application for certification.

It is evident that the authors of S-806 were particularly interested in (i) establishing a Statewide erosion and sediment control program, based on standards in Committee regulations, for most but not all development projects requiring municipal approval; (ii) requiring SCD certification of the soil erosion and sediment control plans prepared in this program, unless the municipality adopted and enforced the Committee standards; (iii) funding SCD plan review and inspections with fees from applicants, who in return are guaranteed an SCD decision to grant or deny certification within 30 days of a complete application⁴³ (with absence of that decision constituting certification); (iv) specifying that several kinds of municipal development approvals shall be “conditioned upon” such SCD certification (whether or not a municipal planning board participates in the approval); (v) prohibiting municipalities from issuing certificates of occupancy unless there has been compliance with the certified plan; and (vi) authorizing stop-construction orders and other enforcement actions for noncompliance.

⁴³ Unless extended 30 days by mutual agreement in writing between the SCD and the applicant.

USDA NRCS Hydrology Appendix

In the 1950s, USDA SCS published its well-known Curve Number (CN) method of estimating storm runoff from rainfall events, most notably as a key element of the SCS National Engineering Handbook, Section 4, Hydrology (NEH4).⁴⁴ SCS initially used the NEH4 procedure primarily for planning and designing larger measures—larger than those for individual farms and ranches—in watersheds planned under the Watershed Protection and Flood Prevention Act of 1954 (Public Law 566). The NEH4 procedure developed complete hydrographs, and required more detailed computations than previous design methods did. In the mid-1960s, USDA issued Technical Release No. 20 (TR-20), Computer Program for Project Formulation, Hydrology, which was intended primarily for use by SCS hydrologists in preparing input data for processing through a computer program (in FORTRAN II for mainframe IBM 7090/7094 equipment) incorporating much of the NEH4 procedure. This input data included NEH4 based curve numbers provided by TR-20 users.

USDA SCS Technical Paper 149, A Method for Estimating Volume and Rate of Runoff in Small Watersheds (TP-149) was issued in 1968 and revised in April 1973, and presented charts estimating the instantaneous peak discharge rate for “establishing conservation practices on individual farms and ranches and for the design of water control measures in small watersheds.” TP-149 was based on NEH4 including the SCS Curve Number method, but unlike TR-20 was written to be “simple enough to be used by all grades of professional and subprofessional personnel on SCS work unit staffs ... to make quick, on-the-spot estimates of peak discharge rates for planning and designing of soil and water conservation measures.” The TP-149 charts were limited to drainage areas between 5 and 2,000 acres, with curve numbers between 60 and 90. The lower curve number limit of 60 precluded use of TP-149 in low runoff drainage areas such as those with much “Woods” on Hydrologic Soil Group (HSG) “A” soil in the NJ Pinelands. Like Table 9.1 in NEH4 (1964) and NEH4 (1972), the TP-149 Table 2 of curve numbers listed the land use of “Woods,” but not “forest.”

Chapter 8 in NEH4 (1964) and NEH4 (1972) defined “Woods” as “usually small isolated groves of trees being raised for farm or ranch use.” Unlike NEH4 (1964) and NEH4 (1972), TP-149 did **not** note that in areas where national or commercial forest covers a large part of a watershed, the SCS hydrologist is guided by the memorandum of understanding between the

⁴⁴ According to Rallison (1980), Freehold, New Jersey was one of the 24 locations of “research watersheds used in the analyses that produced the curve number array.” For information about USDA’s small research watersheds at Freehold (discontinued many years ago), see Hobbs (1946) and U.S. Department of Agriculture (1957).

Rates of runoff in the coastal plains of New Jersey, Delaware, and Maryland by Harold W. Hobbs (1946). SCS-TP-60. U.S. Soil Conservation Service: Washington, D.C.

“Origin and evolution of the SCS runoff equation” by Robert E. Rallison (1980). In: Proceedings of Symposium on Watershed Management 1980, American Society of Civil Engineers, New York, 912-924.

Monthly precipitation and runoff for small agricultural watersheds in the United States by U.S. Department of Agriculture, Agricultural Research Service, Soil and Water Conservation Research Branch, in cooperation with the State Agricultural Experiment Stations (1957). Washington, D.C.

Forest Service and the SCS, or reference associated provisions concerning curve number determination in two 1959 Forest Service hydrology handbooks.

As the 1970s proceeded, USDA SCS and (on behalf of Somerset County) Killam Associates each developed (using the SCS Curve Number method) a guidance document concerning effects of urbanization on runoff volume and peak rates of discharge. According to Don Woodward (formerly National Hydraulic Engineer) of NRCS, SCS developed urban curve numbers, with an accuracy of ± 5 units using aerial photography and data from 10 urban watersheds gauged by USGS.

In January 1975, USDA issued the document and hydrology package, entitled Urban Hydrology for Small Watersheds, Technical Release 55 (TR-55). TR-55 was prepared by the Engineering and Watershed Planning Unit, Upper Darby, Pa., and the Central Technical Unit, Hyattsville, Md., and developed by mainframe computer runs using the TR-20 computer program. TR-55 allowed the District Conservationist to compute runoff from a technical paper document. The 1975 TR-55 Preface included the following paragraphs that focused on TR-55's tentative, preliminary nature:

This technical release is presented as a guide for field personnel in estimating the effects of land use changes and structural measures on hydraulic and hydrologic, parameters, runoff volume, and peak rates of discharge. Field engineers should recognize that some of the proposed methods are in the formative stage and thus have not been fully tested. The results should be compared with other available methods, and engineering judgment should be used in arriving at a final estimate. Careful consideration should be given to the scope and importance of the job when deciding on a particular procedure. It is not intended that all procedures fit all situations that arise.

As more data become available procedures described in this technical release will be revised.

The curve numbers for urban and other land uses in TR-55 Table 2-2 assumed what SCS then called Antecedent Moisture Condition (AMC) II. The curve numbers in Table 2-2 for "Wood or Forest land" in poor and good condition were the same as the corresponding curve numbers for "Woods" in NEH4 (1972) Table 9.1. Like TP-149 but unlike NEH4 (1972), TR-55 (1975) did not identify a large (or, indeed, any) Forest Service role in determining curve numbers in areas where national or commercial forest covers much of a watershed. Although parts of TR-55 (1975) including Chapter 3 did not apply to watersheds over 2,000 acres, TR-55 (1975) also applied to larger watersheds via its discussion of the computer program distributed through TR-20 (see, e.g., Chapter 6, which noted that the TR-20 computer program can "route through as many as 120 stream reaches"). The curve number range of 60 to 95 in Figure 3-3 did not preclude use of Chapter 3 in low runoff drainage areas, because equation 3-2 could be used instead of Figure 3-3. However, the curve number range of 40 to 80 in Figure 2-2 precluded application of that figure (used in

“areas to which the values in table 2-2 do not apply”) in places where pervious area curve numbers are well below 40.

Meanwhile, due to Tropical Storm Doria in 1971 and the August 2, 1973 storm, a team of hydrologists from USDA SCS and Paul DeBarry of Killam Associates developed the Handbook for Storm Water Detention Basins issued by Somerset County. This Handbook referenced and made extensive use of TR-55 (1975), and included disclaimers such as the following:

Recognizing the uniqueness of each design and the essential role that engineering judgment fulfills in the design environment, the criteria presented in this handbook has been so prepared as to preserve the role of both the design and review engineers in the decision-making process. In keeping with this thinking, the handbook is not to be considered a design manual but, rather, a guide for reviewing the proposed project.

The runoff curve numbers in this Handbook's Table III (including those for “Wood or Forest land”) were related to TR-55 Table 2-2 curve numbers but based on an average of AMC I and AMC II, and generally differed from TR-55 Table 2-2 curve numbers. Moreover, although this Table III included a column for HSG “A” soil, this Handbook's Appendix A did not list any HSG “A” soil in Somerset County. One can thus assume that this Handbook's authors did not focus on evaluating the applicability of TR-55 to HSG “A” soil.

USDA SCS or NRCS never referred to TR-55 as a regulatory tool, but as the 1980s approached and proceeded, the Committee and NJDEP began their practice of giving TR-55 various kinds of recognition or status in regulatory standards concerning soil erosion and sediment control, stormwater management, and stream encroachment. An early express reference to TR-55 in Committee Standards was in the 1979 (effective 1980)⁴⁵ Sediment Basin Standard: “Flood routing to determine the required temporary floodwater storage for a 2 year frequency 24 hour duration storm may be done using the approximate methods in the SCS ‘Engineering Field Manual,’ the approximate methods in SCS ‘Urban Hydrology for Small Watersheds’ (TR 55), or other generally accepted methods of flood routing.” The 1987 and 1999 revisions to the Standards included many express references to TR-55. For example, the 1987 revised Channel Stabilization Standard stated:

[Channel] Capacity shall be determined by the following methods:

1. Rational Method - for peak discharge of uniform drainage areas up to one half of a square mile as outlined in Technical Manual for Stream Encroachment, Trenton, N.J., Bureau of Flood Plain Management, August 1984.

⁴⁵ The September 1979 changes to the 1974 Vegetative and Engineering Standards were incorporated in the Committee's Chapter 251 rules effective July 3, 1980. For convenience, Standards effective that date are sometimes referred to below as “1979” Standards.

2. SCS Technical Release No. 55 for drainage areas less than five square miles.
3. For areas greater than or equal to five square miles, use SCS Technical Release No. 20 or other officially approved methodology.

In the 1999 revision to the Committee Standards, this part of the Channel Stabilization Standard was modified to read as follows:

[Channel] Capacity (peak discharge) shall be determined by the following methods:

1. Rational Method - for peak discharge of uniform drainage areas as outlined in Technical Manual for Stream Encroachment, Trenton, N.J., Bureau of Flood Plain Management, June 1995.
2. USDA NRCS Technical Release No. 55 or Technical Release 20.
3. U.S. Army Corps of Engineers HEC-1.
4. Other methods which produce similar results to the models listed above.

NJDEP's initial Stormwater Management Rules (effective February 7, 1983) adopted under the Stormwater Management Act of 1981 recognized TR-55 and the SCS Curve Number method in former NJAC 7:8-3.4(a)1 as follows (emphasis added; see 15 NJR 145):

1. Flood and erosion control: The flood and erosion control standard for detention will require that volumes and rates be controlled so that after development the site will generate no greater peak runoff from the site than prior to development, for a two-year, 10-year, and 100-year storm considered individually. These design storms shall be defined as either a 24-hour storm using the rainfall distribution recommended by the U.S. Soil Conservation Service when using U.S. Soil Conservation Service procedures, (**such as U.S. Soil Conservation Service, "Urban Hydrology for Small Watersheds," Technical Release No. 55**) or as the estimated maximum rainfall for the estimated time of concentration of runoff at the site when using a design method such as the Modified Rational Method. Tabulations of estimated maximum rainfall are available from the Department. **For purposes of computing runoff, all lands in the site shall be assumed, prior to development, to be in good condition**

(if the lands are pastures, lawns or parks), with good cover (if the lands are woods), or with conservation treatment (if the land is cultivated), regardless of conditions existing at the time of computation.

NJDEP's Summary of Public Comments and Agency Responses for these adopted rules included the following related Comment-Response at 15 NJR 143:

8. Comment: The regulations allow for storm water runoff to be computed using either the U.S. Soil Conservation procedures, or the Modified Rational Method. The use of other appropriate methods or computer models should be allowed to compute storm water runoff volumes.

Response: The wording of the General Standards section of the regulations [former NJAC 7:8-3.4] has been revised to clarify the fact that the references to the SCS standards and the modified rational method are not intended to limit the designer to the use of these two methodologies.

In the NJDEP Flood Hazard Area Regulations effective May 21, 1984, former NJAC 7:13-1.8(a) began "On non-delineated streams, the boundaries of 100-year flood plains and encroachment lines may be established accurately by technical engineering methods described in the Manual..." Former NJAC 7:13-1.2 defined "Manual" as "the Technical Manual on Stream Encroachment published by the Department in draft form in December, 1981 and any subsequent amendments thereto" (see 16 NJR 1208 and 1210). (At 15 NJR 2105, NJDEP's 1983 proposal notice for these rules stated "these regulations omit reference to many engineering and technical matters, which have been issued by the department in a technical manual.") In NJDEP's August 1984 Technical Manual on Stream Encroachment, Section 3.1-2, Ungaged Streams, began:

The following standard hydrological techniques are recommended for non-delineated ungaged streams or streams with inadequate gage data.

- (a) Special Report 38 - for drainage areas greater than one square mile.
- (b) Rational Method - for peak discharges of uniform drainage areas up to one half of a square mile.
- (c) S.C.S. Technical Release No. 55 - for drainage areas less than five square miles.

As is obvious from the above provision, more than one hydrologic technique is recommended for certain drainage areas. For uniform drainage areas up to one half of a square mile, the use of the rational method and S.C.S. Technical release

No. 55 is permissible. Similarly for drainage areas between one to five square miles, use of Special Report 38 and S.C.S. Technical Release No. 55 is applicable. The choice of the technique to be used will depend upon the watershed characteristics and the nature of the project to be designed. The staff of the Bureau of Flood Plain Management (or the delegated [county] agency) should be consulted for concurrence to the proposed method.

(Section 3.1-2(a) of this Technical Manual identified “Special Report 38” as Magnitude And Frequency of Floods in New Jersey With Effects of Urbanization (1974), prepared by USGS in cooperation with the NJDEP Division of Water Resources.)

Section 3.1-2(c) of this 1984 Technical Manual was devoted to TR-55. Table 3.1-2(C-1) in Section 3.1-2(c) reproduced Table 2-2 in TR55 (curve numbers based on AMC II). However, section 3.1-2 of this Technical Manual also included a separate Table 3.1-2(B-1) with many substantially different AMC II runoff coefficients and this Note: “Values are based on S.C.S. definitions and are average values derived by an Advisory Committee for this Manual.” Table 3.1-2(B-1) was not listed in this Technical Manual’s “List of Tables,” and this Table’s purpose in Section 3.1-2 was not clear.

SCS would publish a subsequent TR-55 version in 1986. Also, with the advent of the personal computer using the DOS environment in the 1980s, USDA SCS developed a computer basic language application program to design and check hydrology and hydraulic calculations. In 2002 USDA NRCS issued WinTR-55.

Many assumptions put into TR-55 were not applicable for certain portions of the state such as: areas with Karst geology with little overburden, drainage areas with substantial amount of surface storages (Northwest New Jersey), forest that did not respond in the manner the curve number predicted (NJ Pinelands), areas with flatter unit hydrographs, and areas with outdated HSG classifications. For example, in the 1980s Downer Soil was rated a “B” HSG instead of the present classification of “A” HSG. This meant that for woods in good condition the curve number (CN) was 55 instead of 30 today.

In the 1986 version of TR-55, the paragraphs in the 1975 version that focused on TR-55’s tentative, preliminary nature were deleted, along with the 2,000 acres threshold above which parts of TR-55 did not apply. Also, Table 2-2 in the 1986 version listed curve numbers for “Woods” rather than for “Wood or Forest land” (the term used in Table 2-2 of the 1975 version). In addition, however, in the 1986 version, “Limitations” of the method were added, including:

1. The CN of 30 for “Woods” with HSG “A” soils in good hydrologic condition is accompanied by a note that the CN value is actually less than 30.
2. “When the weighted CN is less than 40, use another procedure to determine runoff.”

3. “The SCS runoff procedures apply to only to direct surface runoff: do not overlook large sources of subsurface flow or high groundwater levels that contribute to runoff. These conditions are often related to HSG A soils and **forest areas** [emphasis added] that have been assigned relatively low CN’s in table 2-2. Good judgement and experience based on stream gage records are needed to adjust CN’s as conditions warrant.”

These limitations were significant in determining whether TR-55 could be used or not. In general, neither the regulatory nor engineering communities outside SCS and NRCS paid attention to these limitations.

To some developers and researchers of the Curve Number method, curve numbers of 30 or less should not be used and there are others that feel CNs of 40s and 50s or less should also not be used.

However, engineers would calculate CNs to the decimal point, when the accuracy of the curve number was within the limits of Antecedent Moisture Condition (AMC) I and III. Years later, the concept of the AMC was found not to be valid, and was replaced by the Antecedent Runoff Condition (ARC).

The NRCS recommends regionalized curve numbers. In the late 1980s, Somerset County developed them but they were not accepted by the New Jersey Department of Environmental Protection.

As discussed above, the TR-55 1986 version included limitations concerning application of the curve number method in woods and forested areas, and did **not** clearly distinguish “woods” from “forest”. According to Don Woodward (formerly National Hydraulic Engineer) of USDA NRCS, no correlation could be made based on P:Q data of forested drainage areas to give a reasonable correlation for forested areas. In general, the industry makes no distinction between forest and woods and will assume “woods” and “forest” are equivalent in their TR-55 hydrology calculations.

According to Dave Lamm, former NRCS State Conservation Engineer, monies were provided in the 1950s to investigate certain aspects of SCS hydrology methods, and then the funding stopped in the mid-1970s just when stormwater management in New Jersey started to take off.

NJDEP’s new Flood Hazard Area Control Rules effective March 20, 1995 did not mention TR-55 or (except in regard to acid-producing soils) NJDEP’s Technical Manual for those rules. The “Stormwater management” section in those rules did, however, include the following provision concerning “curve numbers” in former NJAC 7:13-2.8(b)2 (see 27 NJR 1251):

2. The water quality design storm shall be defined as either 1.25 inches of rainfall falling uniformly in two hours or the one year 24 hour storm using the U.S. Soil Conservation Service type III rainfall distribution. Due to the relatively small

amount of rainfall produced by the design storms, a separate and accurate determination of the runoff from the pervious and impervious areas of the site shall be provided to ensure curve numbers that produce an accurate calculation of peak rate of runoff.

Moreover, NJDEP's Technical Manual for those rules continued to refer to TR-55. For example, in NJDEP's Technical Manual for Land Use Regulation Program Bureaus of Inland and Coastal Regulations Stream Encroachment Permits (revised September 1995), Section 2.1-2, Ungaged Watercourses, began:

The following standard hydrological techniques are recommended for non-delineated ungaged watercourses or watercourses with inadequate gage data.

- (a) Special Report 38 - for urban drainage areas greater than one square mile.
- (b) Rational Method - for peak discharges of uniform* drainage areas up to one half of a square mile.

****Uniform** means that the C coefficient for the various portions of the drainage area do not vary by more than a factor of 0.1. [emphasis in original]*

- (c) S.C.S. Technical Release No. 55 - for drainage areas less than five square miles.

As is obvious from the above provision, more than one hydrologic technique is recommended for certain drainage areas. For uniform drainage areas up to one half of a square mile, the use of the rational method and the S.C.S. Technical Release No. 55 (TR55) is permissible. Similarly for drainage areas between one to five square miles, use of Special Report 38 and TR55 is applicable. The choice of the technique to be used will depend upon the watershed characteristics and the nature of the project being designed. **In most cases the TR55 method will be preferred over either of the other two because it more accurately models the watershed.** [emphasis added]

Section 2.1-2(c) of this 1995 Technical Manual referenced the TR-55 1986 version, and stated in part that "Table 2-2 in TR55 lists runoff curve numbers based on Antecedent Moisture Condition (AMC) II for use in computing the runoff volume." However, this section 2.1-2(c) also included Table 2.1-2(B-1), with many substantially different AMC II runoff coefficients and this Note: "Values are based on S.C.S. definitions and are average values derived by an Advisory Committee for this Manual." (In substance, this Table 2.1-2(B-1) was the same as Table 3.1-2(B-1) in the 1984 version of this Technical Manual.)

This 1995 Technical Manual presumably had legal force under the statute enacted in 1991 concerning NJDEP technical manuals for permit applications (NJSA 13:1D-111 through -113). This legal force was mitigated, however, by the following sentence in this Technical Manual's Section 1: "The technical material is provided for general guidance; but circumstances may arise in which deviations may be allowed as a matter of engineering judgment or when a balance among conflicting objectives is necessary."