Technical Manual

for

Sanitary Landfill Permits and Approvals

Bureau of Landfill and Recycling Management
Division of Solid and Hazardous Waste

March 1999

CHRISTINE TODD WHITMAN, GOVERNOR
STATE OF NEW JERSEY

ROBERT C. SHINN, JR. COMMISSIONER
NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

MISSION STATEMENT

The mission of the New Jersey Department of Environmental Protection is to conserve, protect, enhance, restore and manage our environment for present and future generations. We strive to prevent pollution; ensure the efficient use of safe, environmentally sound and reliable energy resources; provide opportunities for recreation and enjoyment of natural and historic resources; and promote a healthy and sustainable ecosystem.

Bureau of Landfill and Recycling Management
Division of Solid and Hazardous Waste
NJDEP
401 East State Street
P.O. Box 414
Trenton, New Jersey 08625-0414
(609) 984-6650

Prologue

This manual has been produced by the New Jersey Department of Environmental Protection (NJDEP) to make the permit process less complicated and time-consuming for you. This manual is one of a series of technical manuals produced by NJDEP under the requirements of the Environmental Management Accountability Plan (P.L. 1991, Chapter 422) with the goal of making the permit application process more consistent and predictable. In each technical manual, you will find summaries and explanations of policies that may not be fully described or explained in environmental laws or regulations. In addition, the manuals contain guidance on how NJDEP defines other standards, such as "state-of-the-art" control technologies or "best management practices".

Unless otherwise required by federal or state law, the policies and procedures contained in a technical manual on the date an application is filed will be binding on both NJDEP and the applicant. The technical manuals may be updated every six months or whenever a regulatory change requires revisions. Any revision made to a technical manual will have no effect upon a permit application that was submitted to the Department prior to the adoption of the revision. This is a technical manual prepared pursuant to N.J.S.A. 13:1D-111 to 1D-113. Because it by necessity condenses and summarizes statutes, regulations, and other documents, it may not always precisely reflect all the requirements set forth in same. In the case of any inconsistency between this technical manual and any statutes, regulations, or policy determinations upon which this technical manual is based, the requirements of the statutes, regulations, or policy determinations shall prevail. Accordingly, this technical manual should not be used as a substitute for a thorough analysis of the law and the facts as they apply to any specific project or proposal. The State of New Jersey, including its Department of Environmental Protection and all agents and employees thereof, hereby disclaims any warranties (express or implied) and any legal liability for the accuracy, completeness or usefulness of any of the information set forth in this technical manual.

In addition to the information contained in this manual, NJDEP endorses the environmental management hierarchy which establishes an order of preference, placing multi-media pollution prevention first, followed by the recycling, treatment, and finally, disposal options. Therefore, pollution prevention is the first and preferred practice for environmental management as defined in the 1991 New Jersey Pollution Prevention Act (N.J.S.A. 13:1D-35 et seq). Pollution prevention practices reduce the demand for and the generation of hazardous substances prior to treatment, control, storage, or recycling. This reduction is typically attained through process modifications, product reformulations, improved operation and maintenance, raw material substitution and in-process recycling.

NJDEP considers the term "state-of-the-art" to include a process whereby the applicant considers the environmental management hierarchy in an effort to encourage pollution prevention. The Department believes that the applicant has primary control over consideration and implementation of pollution prevention options, while NJDEP retains control over allowable release limits based on treatment and control requirements. This division of responsibility is designed to encourage the applicant to implement pollution prevention measures before exploring treatment and control options under Department review.

Only after pollution prevention options are determined to be infeasible should control options be considered. Therefore, it is the Department's policy that "state-of-the-art" reflects a demonstration of the applicant's having sequentially considered the environmental management hierarchy.

NJDEP welcomes suggestions for improving its technical manuals. Please direct your comments to Jeanne Mroczko, Office of Pollution Prevention and Permit Coordination, NJDEP, P.O. Box 423, Trenton, NJ 08625-0423.

You may request additional copies of this manual by sending a check or money order, made payable to the Treasurer, State of New Jersey for $7.50 (includes first class mailing by the U.S. Postal Service) to:

Maps and Publications
NJDEP
P.O. Box 438
Trenton, NJ 08625-0438

Also, for information about other technical manuals offered by the Department, contact either the Office of Pollution Prevention and Permit Coordination at (609) 292-3600 or the Maps and Publications Sales Office at (609) 777-1039.

As stated previously, these manuals may be updated every six months or whenever a regulatory change requires it. Therefore, if the publication date of the manual is more than six months old or if you are aware of a regulatory change, you should contact the Maps and Publications Sales Office for a copy of the appropriate revision.

Notice: This manual contains forms and applications that are provided as a convenience to the applicant. These forms are included for illustrative purposes only, are not subject to the limitation of N.J.S.A. 13:1D-112(b), and may be updated as often as necessary. Prior to submitting any forms to NJDEP, an applicant should contact the appropriate Bureau or make certain that he or she is using the most up-to-date version.

TABLE OF CONTENTS

I. Introduction

This document describes the procedural and substantive requirements for the completion of applications for each permit or approval related to Sanitary Landfills and administered by the Bureau of Landfill and Recycling Management (BLRM).

This manual, together with the New Jersey Division of Solid and Hazardous Waste Regulations found at N.J.A.C. 7:26-1 et seq. and the applicable Administrative Completeness Checklists, provides the applicant with the technical guidance necessary to prepare a complete application. The manual includes information on how to submit the required information, how the Department will review the submittal, clarification of the Department's interpretation of applicable regulations, and a description of pertinent Department policies that are not defined by the regulations. This manual was developed pursuant to N.J.S.A. 13:1D-111 to 113.

Questions concerning this technical manual or the applicable regulations should be directed to the Bureau of Landfill and Recycling Management, Division of Solid and Hazardous Waste, NJDEP, 401 East State Street, P.O. Box 414, Trenton, New Jersey 08625, telephone 609-984-6650. Office hours are 8:00 a.m. thru 4:30 p.m. Monday thru Friday. Copies of the regulations may be obtained by contacting West Group, 610 Opperman Drive, P.O. Box 64526, St. Paul, Minnesota 55164-0526, telephone 800-808-9378. A nonjudicial version of the regulations may be viewed by visting the Division's web site at www.state.nj.us/dep/dshw.

II. Application Submission

The application for each permit or approval should be submitted in accordance with the instructions, guidance and Administrative Completeness Checklist for each permit or approval (detailed in each specific section of Item VI. below), the EHIS Review Checklist, if applicable (Appendix A), the GIS Mapping and Digital Data Standards (Appendix B) and the regulations at N.J.A.C. 7:26-1 et seq.

III. Application Review

A Department staff engineer will perform an administrative review of the information submitted using the attached Administrative Completeness Checklist as a general guide and, within 30 days of receipt of the application, will determine whether the application is administratively complete. If the application fails to meet the criteria for administrative completeness, the Department will so advise the applicant and will specify in writing what additional information is required. The applicant shall submit the requested additional information within 30 days of receipt of the notice of incompleteness. Failure of the applicant to submit the requested additional information in a timely manner may result in termination of review of the application.

Once the application has been determined to be administratively complete, our engineer will perform a detailed technical review of the information submitted (including a site visit to verify field conditions) using the regulations as a general guide and, within 15 to 480 days of issuance of the letter of administrative completeness (depending upon the type of permit or approval), the Department will issue the final permit or approval.

IV. Interpretation of Regulations

In addition to the regulatory interpretations detailed in each specific section of Item VI. of this manual, the Department's interpretation of pertinent specific regulatory requirements for Sanitary Landfill permits or approvals are as follows:

GIS Mapping Standards [N.J.A.C. 7:26-2.10(b)1]

The Department considers "All maps of the proposed facility" to mean any mapping containing geographic data which must be submitted as part of an application for a new Sanitary Landfill permit or as part of an application for a modification to an existing Sanitary Landfill permit.

The Department considers "in a manner and format consistent with N.J.A.C. 7:1, Appendix A" to mean in accordance with the NJDEP GIS Mapping and Digital Data Standards, attached as Appendix B to this manual. These standards require that (1) all maps meet or exceed National Map Accuracy Standards or be of survey quality, (2) data shown on the maps is tied to the New Jersey State Plane Coordinate System, and (3) all maps are submitted in digital format.

V. Explanation Of Policies

The Department's policies related to Sanitary Landfill permits or approvals which are not directly addressed in the regulations are detailed in each specific section of Item VI. of this manual.

VI. Specific Sections Applicable to Each Permit or Approval

The numbered sections below include specific instructions, technical guidance and an Administrative Completeness Checklist for each specific permit or approval related to Sanitary Landfills.

Section 1

Solid Waste Facility Permits for New Landfills

I. Introduction

This section discusses application and design requirements for new sanitary landfill permits. The applicant is required to arrange a pre-application meeting with the Division of Solid and Hazardous Waste to obtain information on the components of an application, the application review process, design requirements and other critical issues. The Solid Waste Facility Permit Application Form can be obtained from the Division of Solid and Hazardous Waste, Bureau of Landfill and Recycling Management at the address or telephone number listed below. A checklist highlighting the requirements for the submission of a new solid waste facility application is appended at the end of this section.

II. Applicable Regulations

Title 7, Chapter 26, the rules of the Division of Solid and Hazardous Waste, should be consulted in preparing a permit application. Where applicable, these regulations will be discussed in greater detail below.

7:26-1.4	Definitions
7:26-2.4	Application procedures for a solid waste facility permit
7:26-2.5	Public hearing procedures
7:26-2.9	Environmental and Health Impact Statement requirements
7:26-2.10	General engineering design submission requirements
7:26-2A.1	Scope and applicability
7:26-2A.2	Construction
7:26-2A.3	Purpose
7:26-2A.4	General prohibitions and requirements
7:26-2A.5	Additional engineering design submittal requirements for sanitary landfills
7:26-2A.6	Sanitary landfill environmental performance standards
7:26-2A.7	Sanitary landfill engineering standards and construction requirements
7:26-2A.9	Closure and post-closure care of sanitary landfills

The applicant should be familiar with the regulations prior to preparing an application. A copy of the regulations found at N.J.A.C. Title 7, Chapter 26 can be obtained by contacting West Publishing, 610 Opperman Dr., P.O. Box 64526, St. Paul, MN 55164-0526 or phone 1-800-808-WEST. A nonjudicial version of the regulations may be viewed by visiting our web site at www.state.nj.us/dep/dshw.

III. Application Procedures

The requirements set forth at N.J.A.C. 7:26-2.4 and 2.5 establish the Department's procedures and associated time frames to review a complete application. Subchapters 2.4 and 2.5 describe

the requirements for a complete application, the application review procedures, the public notice procedures, the public comment period procedures and the permit decision procedures.

As a lead agency for the review of a solid waste facility application, the Division will transmit copies of the application to other agencies for review and comment. During this review process, other State and Federal approvals and/or permits are identified. These may include, but are not limited to, the following:

* New Jersey Pollutant Discharge Elimination System (NJPDES) Permit
* Waterfront Development Permit
* Stream Encroachment Permit
* Air Quality Permit
* Soil Erosion and Sediment Control Certification
* Army Corps of Engineers 404 Permit
* Tidelands Grant
* Coastal Area Facility Review Act (CAFRA) Permit
* Freshwater Wetlands Permit
* Pinelands Commission Approval
* Water Quality Management Plan Certification
* Road Access (Dept. of Transportation)
* A-901 Approval (except for landfills owned and operated by a public entity)

The number of copies of bound application documents and appurtenant drawings required for review is project specific. The actual number will depend on factors such as the location of the proposed facility, neighboring municipalities and participating government jurisdictions (i.e. Army Corps of Engineers, Delaware River Basin Commission). Initially, one copy of the complete application shall be submitted for the Division to conduct a preliminary review to determine whether the application is administratively complete to begin a technical review. Within thirty days of receiving the application, the Division shall notify the applicant that the application is complete or incomplete. If complete, the Division will determine the number of copies that shall be submitted for distribution.

The application documents should be submitted to the following address:

Chief, Bureau of Landfill and Recycling Management
Division of Solid and Hazardous Waste
New Jersey Department of Environmental Protection
P.O. Box 414
Trenton, New Jersey 08625-0414

Telephone No. (609) 984-6650

The Department assesses a fee for new solid waste facility applications in accordance with N.J.A.C. 7:26-4.3. This fee is subject to change on an annual basis.

IV. Engineering Design (Performance) Standards, Policy and Technical Guidance

A. Performance Standards

Sanitary landfill environmental performance standards are found at N.J.A.C 7:26-2A.6 (a) through (j). These regulations establish the minimum performance standards for sanitary landfills. The location of the proposed sanitary landfill within specific geologic areas will dictate the design and construction of the facility. The design and construction of the facility must in turn meet the performance standards established by N.J.A.C. 7:26-2A.6(c).

In order to evaluate the performance of the proposed sanitary landfill, three-dimensional mass transport modeling of the proposed discharges of the sanitary landfill design within the existing hydro-geological features is utilized. In accordance with N.J.A.C. 7:26-2A.6(f), a two-dimensional mass transport model may be used provided that the applicant demonstrates that the configuration of the site specific geology of vertical versus horizontal extent is equivalent to that of an evaluation resulting from a 3-D model. As an aid to the applicant, the following models have been accepted by the Department in previous application reviews: SWIFT III developed by GeoTrans, MODFLOW developed by USGS, MOC developed by USGS, GWFL3D/GWTR3D developed by W. Walton and AT123D developed by Oak Ridge National Laboratory. Other models may be used with the Department's approval. Sanitary landfills designed with a double composite liner system are exempt from the requirements of this paragraph.

B. Design Standards and Construction Requirements

N.J.A.C. 7:26-2A.7 (a) through (i) establish minimum design standards and construction requirements for sanitary landfills. These standards establish a performance level for landfill environmental control systems and codify current construction practices.

The regulations pertaining to design and construction standards are cited corresponding to the major components of a landfill. Where the Division has established a specific policy regarding a construction or design standard that is not implicitly stated in the regulations, an explanatory statement is provided.

1. 7:26-2A.7(a) - general requirements

2. 7:26-2A.7(b) - landfill foundation

   2A.7(b)4xii(1): For landfills located within a perched groundwater table, a french drain system shall be installed around the cut-off wall. Water accumulated in the french drain system shall drain to an outlet by gravity flow. The use of pumps is prohibited.

3. 7:26-2A.7(c) - containment systems

   2A.7(c)4xi(3): Cap strips are not required for HDPE liners.

4. 7:26-2A.7(d) - leachate collection systems

   2A.7(d) 2iii: The Division recommends using the Hydrologic Evaluation of Landfill Performance (HELP) model to design and evaluate liquids management systems. The HELP model was developed at the US Army Engineer Waterfront Experiment Station for the USEPA Office of Solid Waste in 1984. Upgraded versions of the HELP model are available directly from the USEPA.

   The Division recommends that leachate collection systems be designed so that the leachate sumps are placed within the landfill. This is to eliminate liner penetrations by the leachate collection pipes.

5. 7:26-2A.7(e) - leachate treatment and disposal systems.

6. 7:26-2A.7(f) - landfill gas collection and venting systems.

   For further guidance on methane gas venting systems, refer to a separate technical manual, Section 14, prepared for these systems.

7. 7:26-2A.7(g) - surface drainage systems.

8. 7:26-2A.7(h) - monitoring systems.

9. 7:26-2A.7(i) - final cover system.

C. Policies, Regulatory Interpretations and Technical Guidance

The following sets forth the Department's policies and regulatory interpretations of N.J.A.C. 7:26-2A.7(b)3i, landfill stability analysis:

1. A landfill must be designed to be stable enough under static conditions so that the containment system will remain intact and functioning during the operational, closure and post-closure period. It must be designed to be stable enough under seismic conditions to remain intact and functioning during the post-closure period.

2. There are different evaluation processes for seismic events. The lowest acceptable value for the maximum horizontal acceleration in lithified earth material is established by RCRA Subtitle D Regulations (40 CFR Part 258).

3. Subtitle D Regulations state that the containment structures should resist the maximum horizontal acceleration. In reality, the landfill as a whole must be

designed so as not to irreparably damage these containment structures during the anticipated seismic event.

4. EPA considers "landfill containment structures" to be liners, leachate collections systems and surface water control systems. This Division adds capping systems and gas extraction systems to the list.

5. All landfills should be designed to be statically stable with a minimum factor of safety of about 1.5 (although 1.4 may be allowed for the cap due to the inherent characteristics of geosynthetics) after construction (i.e., filling and capping) and 1.25 during construction (i.e., filling). This must include the cap as well as the liner/foundation.

6. The degree of stability needed to protect each of the landfill containment structures (or systems) differs. This Division has decided that the repairability of a system is the determining consideration for establishing the appropriate factor of safety (or allowable deformation) for a landfill during the selected seismic event. For example, the liner system (leachate containment system) and the leachate collection system are non repairable systems in a landfill since they are buried under the waste and are therefore inaccessible. The landfill failure mechanisms which can damage these two systems must be evaluated by the applicant. The most likely stability failure to affect a liner system or leachate collection system is a block surface failure along the geosynthetic liner's interface with another material (e.g., a geosynthetic liner vs. a GCL-geosynthetic clay liner, a compacted clay liner or another geosynthetic material). [Traditional circular failure surfaces are largely irrelevant and need not be pursued except in unusual cases, for instance, where foundation soils are suspect.] This Division has concluded that for any seismic analysis whose pseudo-static factor of safety is less than 1.0, that the subsequent deformation analysis will have a maximum allowable deformation of 6 inches for non-repairable systems. For the systems that are repairable, the maximum deformation should be 6 to 12 inches. These systems are the surface water control, capping and gas extraction systems. For any seismic analysis whose pseudo-static factor of safety is 1.0 or greater, no further analysis is necessary.

7. The Division recommends that there be no leachate pipe penetrations through the liner material. This is to minimize or eliminate damage to the liner due to tearing and to the leachate collection pipes due to shearing should a seismic event take place. It also represents sound design for normal landfill operations by eliminating potential weaknesses in the leachate containment system.

8. The stability analysis must be based on actual material parameters developed in a lab (with the possible exception of municipal waste). For instance, the geosynthetic membrane liner and clay, in the case of a composite liner, are tested for their interfacial friction angle. The clay is tested with a worst case scenario water content and the resulting parameters are plugged into the analysis. If the stability analysis is acceptable, the subsequent design and

construction must use that particular clay which can be placed no wetter than the maximum water content used in the lab.

9. Finally, the stability analysis must examine the foundation soils. Possible problems may arise if the landfill is located over a fault or unstable area where differential settlement may be significant, including areas with poor foundation conditions, areas susceptible to mass movements and Karst terranes. These problems are eliminated by the siting criteria within the regulations which forbids construction of a landfill in such areas. The only other difficulty that might arise, especially in a seismic event, is liquefaction of the underlying soils due to the ground motion. It is therefore required that an analysis be performed to ensure that liquefaction will not be a problem during the seismic event used in the analysis.

10. Because the stability analysis is dependent on the parameters used to define material properties, the sensitivity of each parameter should be tested in the model. If the result of the analysis shows a significant dependence on a single parameter, then additional lab or field testing may be required to more clearly define that parameter.

11. Types of Stability Analyses

    a. Universal/Global - Traditional circular failure surfaces are examined.

    b. Interfacial – Interface strengths for stability analyses are examined.

        (1) Use most critical interface in analysis (lowest interface strength).
        (2) Where post-construction movement is anticipated sideslopes of cap) use residual shear strengths.
        (3) Where post-construction movement is not anticipated (leachate containment system) peak shear strengths may be used.
        (4) Use block surface analysis when studying stability along critical interfaces. Circular surface failure is inappropriate for this type of analysis.

12. "RCRA Subtitle D (258), Seismic Design Guidance for Municipal Solid Waste Landfill Facilities" (EPA/600/R-95/051), April 1995 provides a very conservative methodology for conducting seismic analyses.

V. Environmental Health and Impact Statement Requirements

A. An Environmental Health Impact Statement (EHIS) shall be submitted with the application. EHIS requirements for sanitary landfills are found at N.J.A.C. 7:26-2.9 (a) through (g), excluding supplementary chapter (d) which applies to small scale thermal destruction facilities, small-scale materials recovery facilities and other types of small scale solid waste disposal operations.

B. The regulations require the applicant to assess the environmental impacts stemming from the construction and operation of a proposed sanitary landfill facility. The most comprehensive EHIS requirements are reserved for Class I sanitary landfills. The analysis and review of an EHIS are performed on a case-by-case basis. For example, Class III sanitary landfills are not required to undergo the same degree of EHIS review as Class I sanitary landfills. Likewise, a proposed facility located on a 50 foot thick impermeable geologic formation will not require the same magnitude EHIS as a proposed facility located within a permeable critical public water supply area. The intent of the regulations is that an EHIS be custom-tailored to the particular facility, depending primarily on its type, location and size.

Accordingly, the distinction between an environmental impact statement (EIS) and a health risk assessment is manifest in the regulations. In accordance with N.J.A.C. 7:26-2.9(c)9, health impact assessments are required for Class I and II sanitary landfills (please note that there is a typographical error appearing at 7:26-2.9(c)9; Class III was inadvertently substituted for Class II).

For example, in the case of a Class I sanitary landfill, the public health risks associated with a potential leak in the landfill liner system should be presented in an application. This health assessment should evaluate the toxicity of the particular waste types being disposed of at the landfill and define the routes of exposure to the toxic components of the waste. From this, a ground water model is conducted to predict the concentrations of contaminants being transported in ground water to the nearest water supply wells. The predicted concentrations are then compared with drinking water standards.

A complete EHIS submission for a Class I or Class II sanitary landfill, enumerated at 7:26-2.9 (c), includes the following (consult the solid waste regulations and the EHIS Review Checklist in Appendix A to this manual for specific requirements):

1. An executive summary.

2. A detailed written description, including district solid waste management plan certification.

3. An environmental inventory based on:

    a. Category I utilizing physical/chemical parameters,
    b. Category II utilizing biological/ecological parameters,
    c. Category III utilizing cultural parameters; and,
    d. Category IV utilizing socioeconomic parameters.

4. A description of proposed facility operations.

5. A discussion of regulatory land-use plans, policies, controls and environmental regulations.

6. A description of the district solid waste management plan.

7. A status report and list of all Federal, State, county and local licenses, permits and certifications necessary for the project.

8. An assessment of potential environmental impacts from the proposed facility, including but not limited to the categories listed in 3. above.

9. A health impact assessment.

10. A summary discussion of any potential adverse impacts identified in (h) and (i) above.

11. A comparison of reasonable design alternatives to the proposed facility.

12. A discussion of the relationship between local, short term uses of the environment (i.e. construction phase) and the effect of the facility for subsequent future uses.

13. A discussion of irreversible and irretrievable commitments of resources resulting from the construction and operation of the proposed facility.

C. The minimum requirements for a limited EHIS pertaining to Class III sanitary landfills generally include the following:

1. Description of facility operations.

2. Copies of the vicinity map and site plan showing the location of the proposed facility.

3. A discussion of the impacts the proposed facility will have on local transportation patterns, geological and hydrogeological site conditions, surface and ground water quality and other environmental factors.

4. A discussion of the proposed facility's consistency with existing solid waste management policies.

5. A description of how the facility will conform or conflict with applicable Federal, State or local land use and environmental regulations.

VI. Additional Engineering Design Submittal Requirements

A. A closure plan shall be submitted with a solid waste facility permit application in accordance with N.J.A.C. 7:26-2A.9. Please refer to the technical guidance document for closure plans and accompanying checklist, Section 4, for submittal requirements.

B. N.J.A.C. 7:26-2A.5 should be consulted for additional engineering design submittal requirements for sanitary landfills. A summary is provided as follows:

1. 7:26-2A.5(a)1- A regional map prepared in accordance with N.J.A.C. 7:26-2.10(b)4.

2. 7:26-2A.5(a)2 - A site plan delineating the existing contours of the proposed landfill prepared in accordance with N.J.A.C. 7:26-2.10(b)6.

3. 7:26-2A.5(a)3 - Additional site plan maps containing plan views and cross-sectional views.

4. 7:26-2A.5(a)4 - Additional engineering drawings, designs or maps, which describe in sufficient detail, the construction specifications of the environmental control systems utilized in the sanitary landfill.

5. 7:26-2A.5(a)5 - Engineering Design Report.

6. 7:26-2A.5(a)6 - Geotechnical Report.

7. 7:26-2A.5(a)7 - Quality Assurance (QA) and Quality Control (QC) plan for the construction phase meeting the requirements set forth at N.J.A.C. 7:26-2A.7(a)7 through 24. See Section 15 of this manual for QA/QC Certification Reports requirements.

8. 7:26-2A.5(a)8 - Operations and Maintenance (O&M) Manual with additional requirements set forth at N.J.A.C. 7:26-2.10(b)9.

9. Summary - This Division would like a brief summary of how the landfill was designed and is proposed to operate in order to maximize the space available for filling. The summary is to include the following:

   a. The use of 3:1 sideslopes - This is the maximum allowable slope steepness for a sanitary landfill. However, any slopes less steep are generally wasting space. By incorporating a 3:1 sideslope, the design has maximized the space and should be so stated.

   b. The use of maximized landfill geometry - This is the design of the landfill to incorporate the maximum available height. It also involves the maximizing of the corner geometry to make them as tight and steep as possible (3:1). By designing with this geometry, the design has maximized the space and should be so stated.

   c. The use of alternate cover material - Plastic film, foam, or other material are an important way to optimize the available space in a

landfill. Incorporation of these materials should be part of any efficient use of landfill space. By planning on using alternate cover material, the design has been maximized and should be so stated.

d. The use of leachate recirculation - This technique is important in optimizing settlement rates during the operational phases of the landfill which in turn creates more volume for filling. Settlement that occurs after closure of a cell provides no additional filling capacity and can be a maintenance problem in the post-closure phase. By planning to incorporate leachate recirculation, the design has been maximized and should be so stated.

e. The use of good operational procedures - This is less specific than the other issues in this section, but in general, operational procedures are important. This involves compaction techniques, the compactive effort of the chosen equipment (vs. other equipment available on the market) and other issues that affect the usage of space at the landfill.

1

CHECKLIST FOR A NEW SOLID WASTE FACILITY PERMIT

Reference NJAC 7:26-2.4

1. Solid Waste Facility Permit Application Form
2. Disclosure statement (A-901) pursuant to NJAC 7:26-16.1 et seq.
3. Documentation establishing that the facility has been included in the applicable district solid waste management plan
4. Closure Plan submitted in accordance with NJAC 7:26-2A.9
5. EHIS meeting the requirements of NJAC 7:26-2.9 (health impact assessment not required for Class III landfills)
6. Engineering design meeting the requirements of NJAC 7:26-2.10
7. For a small-scale Class III landfill, reference NJAC 7:26-2.4(c) 4.

The applicant will be billed the appropriate fee once the application has been received. The completed application should be mailed to the following address:

Chief, Bureau of Landfill and Recycling Management
Division of Solid and Hazardous Waste
New Jersey Department of Environmental Protection
P.O. Box 414
Trenton, New Jersey 08625-0414
Telephone Number: (609) 984-6650

Section 2

Modification to a SWF Permit

I. Introduction

This manual presents the requirements for the preparation and submission of an application for a modification to a solid waste facility permit.

II. Applicable Regulations

The regulations governing modifications can be found in the Division of Solid and Hazardous Waste rules at New Jersey Administrative Code (N.J.A.C.) 7:26-2.6. In addition, public hearing procedures shall be followed in accordance with N.J.A.C. 7:26-2.5.

A copy of N.J.A.C. Title 7, Chapter 26 can be obtained by contacting West Publishing, 610 Opperman Dr., P.O. Box 64526, St. Paul, MN 55164-0526 or phone 1-800-808-WEST. A nonjudicial version of the regulations may be viewed by visiting our web site at www.state.nj.us/dep/dshw.

III. Application Procedures

The requirements set forth at N.J.A.C. 7:26-2.5 and 2.6 establish the Department's procedures and the associated time frames involved for review of an application for a modification.

All design modifications shall be indicated on the facility's approved engineering designs.

The number of bound application documents and appurtenant drawings, signed and sealed by a New Jersey licensed Professional Engineer, required for review is site specific. Accordingly, the applicant should consult the Bureau of Landfill and Recycling Management prior to the submission of the application to determine the exact number of copies required. The actual number of copies will depend on factors such as the nature of the proposed modification and the location of the sanitary landfill. These documents should be forwarded to the following address:

Chief, Bureau of Landfill and Recycling Management
Division of Solid and Hazardous Waste
New Jersey Department of Environmental Protection
P.O. Box 414
Trenton, New Jersey 08625-0414

Telephone number: (609) 984-6650

The Department assesses a fee for the review of modifications in accordance with N.J.A.C. 7:26-4.3. This fee is subject to change on an annual basis. If the fee is not submitted with the application, please provide a name and address for the Department to send a bill for the fee.

IV. Policies and Regulatory Interpretations

The following sets forth the Department's policies and regulatory interpretations of N.J.A.C. 7:26-2.6 with respect to modifications:

A. In general, any proposed change to an approved design or operating procedures that does not fall under the category of minor modification (examples of minor modifications are more frequent monitoring, compliance date changes, deleting a solid waste type from acceptance at the facility or changes that will upgrade environmental performance) shall result in a modification of the sanitary landfill's solid waste facility permit. Examples of modifications include a reduction in the thickness of a liner material and the inclusion of certain I.D. waste types not previously approved for disposal.

B. The applicant must demonstrate that the proposed modification meets all applicable regulations of the Division. For design changes, this demonstration should be made through the submission of engineering designs, calculations, material specifications, modeling, etc., in addition to the application narrative.

C. Contrary to the wording of N.J.A.C. 7:26-2.6(a)4.i.(2), this does not include an increase in the approved volume of a landfill. This citation was intended for transfer stations and material recovery facilities. Refer to N.J.A.C. 7:26-2.7(a)2 for volumetric increases which are considered new facilities.

2

CHECKLIST FOR MODIFICATION TO A SOLID WASTE FACILITY PERMIT

Reference NJAC 7:26-2.6[(e)]

1. Written description of the proposed change(s) containing relevant factors and rationale supporting the request

2. Engineering drawings (if necessary) signed and sealed by a licensed NJ professional engineer

3. Schedule for implementation of proposed change(s)

The applicant will be billed the appropriate fee once the application has been received. The completed application should be mailed to the following address:

Chief, Bureau of Landfill and Recycling Management
Division of Solid and Hazardous Waste
New Jersey Department of Environmental Protection
P.O. Box 414
Trenton, New Jersey 08625-0414
Telephone Number: (609) 984-6650

Section 3

Minor Modification to a SWF Permit

I. Introduction

This manual presents the requirements for the preparation and submission of a request for a minor modification to a solid waste facility permit.

II. Applicable Regulations

The regulations governing minor modifications can be found in the Division of Solid and Hazardous Waste rules at New Jersey Administrative Code (N.J.A.C.) 7:26-2.6(d).

A copy of N.J.A.C. Title 7, Chapter 26 can be obtained by contacting West Publishing, 610 Opperman Dr., P.O. Box 64526, St. Paul, MN 55164-0526 or phone 1-800-808-WEST. A nonjudicial version of the regulations may be viewed by visiting our web site at www.state.nj.us/dep/dshw.

III. Application Procedures

A checklist is enclosed in this manual to assist the applicant in submitting a complete application. The number of copies of application documents required for review is dependent on the nature of the proposed minor modification. Accordingly, the applicant should consult the Bureau of Landfill and Recycling Management for a determination of the exact number of copies required. The completed application should be mailed to the following address:

Chief, Bureau of Landfill and Recycling Management
Division of Solid and Hazardous Waste
New Jersey Department of Environmental Protection
P.O. Box 414
Trenton, New Jersey 08625-0414

Telephone number: (609) 984-6650

The Department assesses a fee for the review of minor modifications in accordance with N.J.A.C. 7:26-4.3. This fee is subject to change on an annual basis. If the fee is not submitted with the application, please provide a name and address for the Department to send a bill for the fee.

All design modifications shall be indicated on the facility's approved engineering designs.

IV. Policies and Regulatory Interpretations

The following sets forth the Department's policies and regulatory interpretations of N.J.A.C. 7:26-2.6(d) with respect to minor modifications:

A. 7:26-2.6(d)1: Requests for minor modifications listed at 7:26-2.6(d)1 i through vii can usually be submitted in the form of a letter containing a description of the proposed change. However, given that minor modifications involving design or operational changes referenced at 7:26-2.6(d)1vii are project specific and that the distinction between minor modification and modification is not always clear, the applicant is advised to contact the Bureau for clarification prior to making a formal submission.

B. 7:26-2.6(d)1vii: A minor design modification is a change to the approved design of the facility which will result in an equivalent standard, an upgrade of the environmental performance or a reduction in adverse environmental or health impact without increasing the design capacity of the facility. The applicant must demonstrate through calculations and/or modeling that the proposed modification is at least equivalent to the environmental performance of the approved design. Based on the Division's past review of minor modifications, examples of minor modifications include, but are not limited to, a change to the configuration of a leachate collection piping layout, an increase in the thickness of a liner material, an upgrade of a passive gas venting system to an active gas venting system and the equivalent substitution or upgrade of construction materials due to material availability. A change in the handling or disposal practices for a permitted waste type can also be processed as a minor modification.

C. 7:26-2.6(d): As long as the modification meets the requirement(s) set forth in this subsection then the minor modification is not subject to the public comment requirements of 7:26-2.4(g)17.

3

CHECKLIST FOR MINOR MODIFICATION TO A SOLID WASTE FACILITY PERMIT

Reference NJAC 7:26-2.6(d)

1. Written description of the proposed change(s) containing relevant factors and rationale supporting the request

2. Engineering drawings (if necessary) signed and sealed by a licensed NJ professional engineer

3. Schedule for implementation of proposed change(s)

The applicant will be billed the appropriate fee once the application has been received. The completed application should be mailed to the following address:

Chief, Bureau of Landfill and Recycling Management
Division of Solid and Hazardous Waste
New Jersey Department of Environmental Protection
P.O. Box 414
Trenton, New Jersey 08625-0414
Telephone Number: (609) 984-6650

Section 4

Closure and Post-Closure Care and Financial Plans

I. Introduction

This manual presents the requirements for the preparation and submission of closure and post-closure care and financial plans for sanitary landfills. In accordance with the solid waste regulations cited below, those sanitary landfills that operated on or after January 1, 1982 must submit a financial plan in addition to a closure and post-closure care plan.

II. Applicable Regulations

The following regulations from New Jersey Administrative Code (N.J.A.C.) Title 7, Chapter 26, the rules of the Division of Solid and Hazardous Waste and statutes from New Jersey Statutes Annotated (N.J.S.A.) Title 13, Chapter 1E, the Solid Waste Management Act, should be consulted in preparing a closure and post-closure plan. Where applicable, these regulations will be discussed in greater detail in this manual.

N.J.A.C. 7:26-2A.9	Closure and Post-closure Care of Sanitary Landfills
N.J.S.A. 13:1E-1	Solid Waste Management Act
N.J.S.A. 13:1E-100	Sanitary Landfill Facility Closure and Contingency Fund Act

A copy of N.J.A.C. Title 7, Chapter 26 can be obtained by contacting West Publishing, 610 Opperman Dr., P.O. Box 64526, St. Paul, MN 55164-0526 or phone 1-800-808-WEST. A nonjudicial version of the regulations may be viewed by visiting our web site at www.state.nj.us/dep/dshw.

III. Application Procedures

A checklist is enclosed in this manual to assist the applicant in submitting a complete closure plan application. Six copies of the closure plan are normally required for the review of closure plans. The Division may request additional copies if necessary. The closure plan should be mailed to the following address:

Chief, Bureau of Landfill and Recycling Management
Division of Solid and Hazardous Waste
New Jersey Department of Environmental Protection
P.O. Box 414
Trenton, New Jersey 08625-0414

Telephone number: (609) 984-6650

The Department assesses a fee for the review of closure plans in accordance with N.J.A.C. 7:26-4.3. This fee is subject to change on an annual basis. If the fee is not submitted with the application, please provide a name and address for the Department to send a bill for the fee.

IV. Policies and Regulatory Interpretations

In order to assist the applicant in preparing a Closure and Post-Closure Care and Financial Plan, the Division has established specific policies and technical guidance for the design, construction and maintenance of the environmental safeguards necessary to close the sanitary landfill in an environmentally sound manner. The following sets forth the Department's policies and regulatory interpretations of N.J.A.C. 7:26-2A.9 governing closure provisions:

A. Closure and Post-Closure Care Plan

N.J.A.C. 7:26-2A.9(e)2 lists the closure and post-closure care provisions that the plan must include. If the applicant believes that a specific provision is not applicable to the landfill under consideration, the technical reason for omitting that provision should be presented. For example, while the post-closure period extends for 30 years, each provision of the closure plan may not require 30 years of post-closure care. In this case, the applicant should provide sound technical reasoning for any proposed reduction in the care period.

Specific guidance on each provision of the closure and post-closure care plan as listed in the regulations follows:

1. Soil Erosion and Sediment Control (SESC) Plan - A SESC plan approved by the regional soil conservation district or a copy of the SESC plan application must be included in the closure plan. If a plan application is submitted, the approved SESC plan shall be transmitted to the Division upon certification.

2. Final Cover - The Division’s requirements for final cover systems can be found at N.J.A.C. 7:26-2A.7(i). A QA/QC plan for the installation, inspection and testing of the final cover should be included. A third party QA inspector is not required for final cover construction.

3. Final Cover Vegetation - The type of vegetation should be selected in accordance with the Standards for Soil Erosion and Sediment Control in New Jersey.

4. Maintenance of Final Cover and Final Cover Vegetation - Details of the maintenance activities in the form of estimated manpower, equipment and materials required on an annual basis should be provided. This should include the application of fertilizer and lime, mowing, reseeding, repair of eroded areas and settlement repair.

   For landfills with an impermeable cap, the final cover vegetation should be mowed at a minimum of three times per year to discourage the establishment of woody vegetation that could damage the cap. As an alternative, the thickness of the vegetative layer can be increased to accommodate root growth. In this case, the frequency of annual inspections should be increased in order to monitor the integrity of the final cover.

5. Maintenance of Side Slopes - This should be addressed in a similar manner as item 4. above, with particular attention to the special needs of side slopes.

6. Run-on and Run-off Controls - The surface drainage system shall be designed and constructed to protect the sanitary landfill from run-on and run-off from, at a minimum, the peak discharge of a 24-hour, 25-year storm. The design standards and construction requirements for surface drainage systems shall be in accordance with N.J.A.C. 7:26-2A.7(g).

7. Maintenance of Run-on and Run-off Control Programs - Details of the maintenance activities in the form of estimated manpower, equipment and materials required on an annual basis should be provided. The details shall include periodic cleaning of sedimentation basins and repair of drainage structures such as downchutes.

8. Groundwater Monitoring Wells - A groundwater monitoring system shall be designed and constructed in accordance with the New Jersey Pollutant Discharge Elimination System (NJPDES) regulations, N.J.A.C. 7:14A-6.

9. Maintenance of Groundwater Monitoring Wells - The applicant should provide estimates of when the monitoring wells may need to be redeveloped or replaced due to siltation. Periodic inspection and repair of the wells should also be provided.

10. Monitoring of Groundwater - The monitoring of groundwater shall be performed in accordance with NJPDES regulations, N.J.A.C. 7:14A-1 and/or as specified and directed by the Division of Solid and Hazardous Waste pursuant to the closure plan approval.

11. Landfill Gas Venting or Evacuation System - A landfill gas control system must be designed to prevent the buildup of gas beneath the cap as well as off-site migration of landfill gas. Gas venting systems are required for all landfills upon closure and must be designed and constructed in accordance with the requirements set forth at N.J.A.C 7:26-2A.7(f). An Air Quality permit must be applied for.

12. Maintenance of Landfill Gas Venting or Evacuation System - The applicant shall provide details in the form of estimated manpower and materials that are required to operate, maintain and repair the venting system. Such items including blower replacement, settlement repair of collection headers, and condensate testing and disposal.

    Testing for gas migration shall be conducted in accordance with N.J.A.C. 7:26-A.8(h)9.

13. Leachate Collection and Control System - The leachate collection system shall be designed and constructed in accordance with N.J.A.C. 7:26-2A.7(d).

    Leachate recirculation is an emerging technology that the Department is willing to assess on a case-by-case basis.

14. Operation and Maintenance of Leachate Collection System - Details of all aspects of the O&M of the leachate collection system shall be provided. Estimates of operational costs such as electricity, treatment chemicals, residuals disposal, monitoring, manpower and fees for leachate disposal shall be provided (leachate generation estimates shall be presented through the use of the HELP model). Maintenance estimates should include such items as pump replacement and collection line cleaning.

15. Facility Access Control - Facility access control shall be designed and constructed in accordance with N.J.A.C. 7:26-2A.8(b)25. Environmental controls such as an on-site leachate pretreatment facility, a lagoon, a leachate storage tank or gas flare shall be individually fenced if a perimeter fence does not exist.

16. Maintenance of Facility Access Control - Provide estimates of manpower, equipment and materials required for facility access control maintenance purposes.

17. Conformance of the Site To the Surrounding Area - Provide a program for such items as landscaping, scale house removal, construction entrance removal, etc., that will make the closed landfill aesthetically compatible with the surrounding area.

18. Maintenance of Site Conformance To the Surrounding Area - Manpower, equipment and material estimates for maintenance purposes shall be provided.

19. Inspections – The plan should provide for periodic inspections of the facility on a quarterly basis.

B. Closure and Post-Closure Financial Plan

To prepare a financial plan, the owner or operator shall use the "Financial Schedules" contained herein to identify the projected costs associated with closure and post-closure activities. Three financial schedules (Schedules A, B and C) are used to itemize the annual costs for the closure and post-closure care provisions reflected in the closure plan. The schedules are designed to clearly identify the sources of funding used to pay for the cost of closure and post-closure care activities. Acceptable funding sources include DEP Statutory Escrow Account, Letter of Credit/Standby Trust Agreement (LOC/STA), Administrative Consent Order (ACO) and Alternative Funds.

When Alternative Funds are identified as a source of funding, these funds must be in the form of cash which is on deposit in an accredited financial institution and must be escrowed in an account under the terms of an Alternative Funds Escrow Agreement.

Sample copies of the wording for LOC/STA's and ACO's are available on request.

The financial plan shall contain the estimated cost for implementing each provision listed in the closure and post-closure care plan. These estimates shall be presented in tabular form listing the item, description, estimated quantity, unit price and total cost. Supporting documentation shall be provided for all quantity estimates and unit costs. The unit prices may be obtained from construction cost estimating guides or quotes from vendors. The exact source of unit prices should be included in the supporting documentation. Estimates for all closure/post-closure costs shall be based on the assumption that all work will be performed by outside contractors.

The following general and administrative costs shall be included in the financial plan, subject to approval by the Department, as required by N.J.A.C. 7:26-2A.9(f)3:

1. Engineering Fees - Expenditures required for the services of a New Jersey licensed Professional Engineer to perform the necessary inspections and certifications. These expenditures also include all engineering services, studies, designs and on-site management.

2. Auditing/Accounting/Banking fees - Expenditures required to pay for financial services.

3. Other Costs - Miscellaneous expenditures such as environmental impairment and general liability insurance, administration, taxes, permit fees and legal fees.

4. Inflation Rate – The most current 10-year moving average inflation rate for use in the financial plan may be obtained from the Department by contacting the Bureau of Solid Waste Regulation at (609) 984-2080.

5. Contingencies - Where appropriate, contingencies for cost overruns, reworks, emergencies, or unforeseen costs should be provided.

The above-listed costs shall be itemized individually.

INSTRUCTIONS: FINANCIAL SCHEDULES
SANITARY LANDFILL CLOSURE PLAN

Pursuant to NJAC 7:26-2A.9 owners/operators of sanitary landfills operating on or after January 1, 1982 are required to have an approved DEP closure/post-closure plan. The sanitary landfill closure "Financial Schedules" contained herein provide standard forms for summarizing closure and post-closure activities planned for landfills. The purpose of Schedules "A" and "B" is to summarize and present the total projected costs (adjusted for inflation) of landfill closure and post-closure and to identify all proposed "sources of funds" in the facility's closure and post-closure plan. Schedule "C" is designed to reflect the year-to-year projections of beginning and ending balances, contributions, interest and planned expenditures (current and inflated). The data on Financial Schedules A, B and C should be reconciled.

Financial Schedule "A" Closure Plan

Line(s):

1 **Facility Name/Number** - Enter the official name of the landfill facility and the facility registration number assigned by DEP.

2-4 Self-explanatory

5 **Years** - Enter the calendar year(s) in which the landfill Closure and Post-Closure will take place.

6-23 **"Total Closure Costs" Column** - Enter the total costs projected to implement each closure provision in the Closure Plan. The total closure costs should include the annual effects of inflation, projected from the base year to their expected year(s) of occurrence, using the most current 10-year average inflation, as described in the Rule, Sec. (f)4.

"Total Post-Closure Costs" Column - Enter from Schedule B, when it is completed, the total costs (adjusted for inflation) projected to implement each post-closure provision in the Closure Plan Rule, Sec. (f)4.

"Total Closure/Post-Closure Costs" Column - Enter the total Closure and Post-Closure costs (adjusted for inflation) from the two previous columns.

24-26 Blank Spaces - Can be used for additional provisions, if approved by DEP.

27 **Total Costs** - Enter the total of each column.

28 Self-explanatory.

29-31 **Funding Sources** - Specify in lines 29 and 30 each alternative source of funds and each dollar amount.

32 **Total Funding Sources** - Add lines 29, 30, 31 and enter the total on line 32 (which should equal line 27 and reconcile with Schedule C).

Financial Schedule "B" Post-Closure Plan

NOTE: Follow the same procedure as in Financial Schedule "A" for lines 1-5 and 24-32.

6-23 **"Total Post-Closure Costs" Column** - Enter the sum of the annual post-closure maintenance costs (Years 1-30) for each provision applicable. The cost projections should include the annual effects of inflation as stated in Financial Schedule "A" for "Total Post-Closure Costs."

Financial Schedule "C" Change in Fund Balance Schedule

Facility Name/Number - Self-explanatory

Source of Funds - A schedule should be completed for each source of funds dedicated for closure and post-closure purposes (eg., DEP $1.00/ton Statutory Escrow Account, DEP Alternative Funds Escrow Account, Local Government Appropriation, Private Entity Funds, etc.). If more than one "source of funds" is used, an additional combined schedule must be completed.

Column 1 **"Year"** - Enter the calendar year applicable to the 'Year No." in Column 2.

Column 2 **"Year No."** - No entry required. The numbers in this column represent closure year(s) (-2,-1) and post-closure years (1 through 30).

Column 3 **"Beginning Balance"** - Enter the projected amount in the fund at the beginning of each calendar year. One year's beginning balance is the previous year's ending balance.

Column 4 **"Contributions to Fund"** - Enter the anticipated amount of annual contributions (deposits) to the fund.

Column 5 **"Interest"** - Enter the anticipated amount of annual interest earned (specify interest rate).

Column 6 **"Planned Expenditures (Current $)"** - Enter the anticipated amount of annual expenditures from the fund. These amounts should not be included in the calculation of the ending balance.

Column 7 **"Inflated Expenditures"** - Enter the amount from Column 6 adjusted for the effects of annual inflation (specify inflation rate).

Column 8 **"Ending Balance"** - Enter the amount in the fund at the end of each calendar year. Calculate the ending balance by adding the entries in Columns 3, 4 and 5 and subtracting Column 7. One year's ending balance is the subsequent year's beginning balance.

Total Columns 4, 5, 6 and 7 should be totalled at the bottom.

_____

(Facility Name and Number)

SANITARY LANDFILL CLOSURE PLAN

FINANCIAL SCHEDULE "A"

($000)

PROVISIONS NJAC 7:26-2A.9(e)&(f)		**TOTAL CLOSURE COSTS** Yrs.(-)	**TOTAL POST-CLOSURE COSTS** Yrs.(-)	**TOTAL CLOSURE/POST-CLOSURE COSTS** Yrs.(-)
i	Soil Erosion and Sediment Control Plan		N/A	
ii	Final Cover		N/A	
iii	Final Cover Vegetation		N/A	
iv	Maintenance Program for Final Cover and Final Cover Vegetation	N/A		
v	Maintenance Program for Side Slopes	N/A		
vi	Run On/Run Off Control Program		N/A	
vii	Maintenance Program for Run On/ Run Off Control System	N/A		
viii	Groundwater Monitoring Wells		N/A	
ix	Maintenance Program for Ground-water Monitoring Wells	N/A		
x	Groundwater Monitoring In Accord-ance With NJAC 7:14A-1	N/A		
xi	Methane Gas Venting or Evacuation System		N/A	
xii	Maintenance Program for Methane Gas Venting or Evacuation System	N/A		
xiii	Leachate Collection and/or Control System		N/A	
xiv	Maintenance Program for Leachate Collection and/or Control System	N/A		
xv	Facility Access Control System		N/A	
xvi	Maintenance Program for Facility Access Control System	N/A		
xvii	Measures to Conform the Site to Surrounding Area		N/A	
xviii	Maintenance Program for Site Conformance Measures	N/A		

TOTAL COSTS	_____	_____	_____
FUNDING SOURCES:			
1.	_____	_____	_____
2.	_____	_____	_____
3. DEP ($1.00/ton) Escrow Account	_____	_____	_____
TOTAL FUNDING SOURCES	_____	_____	_____

_____

(Facility Name and Number)

SANITARY LANDFILL POST-CLOSURE PLAN

FINANCIAL SCHEDULE "B"

($000)

PROVISIONS NJAC 7:26-2A.9(e)&(f)	TOTAL POST-CLOSURE COSTS	YEAR #1	YEAR #2	YEAR #3	YEAR #4	YEAR #5	YEAR #6
i Soil Erosion and Sediment Control Plan	N/A						
ii Final Cover	N/A						
iii Final Cover Vegetation	N/A						
iv Maintenance Program for Final Cover and Final Cover Vegetation							
v Maintenance Program for Side Slopes							
vi Run On/Run Off Control Program	N/A						
vii Maintenance Program for Run On/ Run Off Control System							
viii Groundwater Monitoring Wells	N/A						
ix Maintenance Program for Ground-water Monitoring Wells							
x Groundwater Monitoring In Accord-ance With NJAC 7:14A-1							
xi Methane Gas Venting or Evacuation System	N/A						
xii Maintenance Program for Methane Gas Venting or Evacuation System							
xiii Leachate Collection and/or Control System	N/A						
xiv Maintenance Program for Leachate Collection and/or Control System							
xv Facility Access Control System	N/A						
xvi Maintenance Program for Facility Access Control System							
xvii Measures to Conform the Site to Surrounding Area	N/A						
xviii Maintenance Program for Site Conformance Measures							

TOTAL COSTS _____ _____ _____ _____ _____ _____ _____

FUNDING SOURCES:

1. _____ _____ _____ _____ _____ _____ _____

2. _____ _____ _____ _____ _____ _____ _____

3. DEP ($1.00/ton) Escrow Account _____ _____ _____ _____ _____ _____ _____

TOTAL FUNDING SOURCES _____ _____ _____ _____ _____ _____ _____

FINANCIAL SCHEDULE "B"

($000)

	YEAR #7	YEAR #8	YEAR #9	YEAR #10	YEAR #11	YEAR #12	YEAR #13	YEAR #14	YEAR #15	YEAR #16	YEAR #17	YEAR #18
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27 _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

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29 _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

30 _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

31 _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

32 _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

FINANCIAL SCHEDULE "B"

($000)

5	YEAR #19	YEAR #20	YEAR #21	YEAR #22	YEAR #23	YEAR #24	YEAR #25	YEAR #26	YEAR #27	YEAR #28	YEAR #29	YEAR #30
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28

29 _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

30 _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

31 _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

32 _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

_____ _____

Facility Name and Number *Source of Funds*

SANITARY LANDFILL CLOSURE/POST-CLOSURE PLAN

CHANGE IN FUND BALANCE -- SCHEDULE "C"

($000)

1	2	3	4	5	6	7	8
YEAR	YEAR NO.	BEGINNING BALANCE	CONTRIBUTIONS TO FUND	INTEREST (Rate _____ %)	PLANNED EXPENDITURES (Current $)	INFLATED EXPENDITURES (Rate _____ %)	ENDING BALANCE
	-2						
	-1						
	1						
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
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	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

TOTAL _____ _____ _____ _____

CHECKLIST FOR A CLOSURE PLAN FOR A SOLID WASTE FACILITY

Reference NJAC 7:26-2A.9

1. Solid Waste Facility Permit Application Form
2. Soil Erosion and Sediment Control Plan (certified)
3. Final cover
4. Final cover vegetation
5. Maintenance of final cover and final vegetation
6. Maintenance of side slopes
7. Run-on/Run-off control programs
8. Maintenance of run-on/run-off control program
9. Ground water monitoring wells
10. Program for well maintenance
11. Program for monitoring in accordance with NJPDES

12. Methane venting or evacuation system

13. Methane system maintenance

14. Leachate collection and/or control system

15. Leachate collection and/or control system operation and maintenance

16. Installation of facility access control

17. Maintenance of facility access control

18. Measures to conform the site to surrounding area

19. Maintenance of measures to conform the site to surrounding area

20. Schedule for implementation of closure and post-closure maintenance activities and inspections

21. Closure and post-closure financial plan for post-1982 landfills

22. NJ licenced professional engineer to prepare, sign and seal the closure plan

The applicant will be billed the appropriate fee once the application has been received. The completed application should be mailed to the following address:

Chief, Bureau of Landfill and Recycling Management
Division of Solid and Hazardous Waste
New Jersey Department of Environmental Protection
P.O. Box 414
Trenton, New Jersey 08625-0414
Telephone Number: (609) 984-6650

Section 5

Permit Renewals

I. Introduction

This manual presents the requirements for preparation and submission of a permit renewal application for an existing permitted sanitary landfill. A permit is effective for a period of five years. When a permit renewal application is accepted for technical review, the existing permit may be extended so that the conditions of the expired permit are continued pursuant to the Administrative Procedure Act, N.J.S.A. 52:14B-11, until the effective date of any renewed permit. In this manner, the Department can ensure the environmentally sound operation of a facility by requiring amendments to upgrade the environmental performance of the sanitary landfill at the time of renewal.

II. Applicable Regulations

The regulations for a permit renewal can be found in the Division of Solid and Hazardous Waste rules at New Jersey Administrative Code (N.J.A.C.) 7:26-2.7(b)1 through 8. The rules allow for the renewal of an existing permit provided that remaining design capacity is available and the sanitary landfill is included in the approved District Solid Waste Management Plan.

As with an application for a new solid waste facility, public participation will be required during the Department's review of a permit renewal application (refer to N.J.A.C. 7:26-2.7(b)3, 5, 6 and 7).

A copy of N.J.A.C. Title 7, Chapter 26 can be obtained by contacting West Publishing, 610 Opperman Dr., P.O. Box 64526, St. Paul, MN 55164-0526 or phone 1-800-808-WEST. A nonjudicial version of the regulations may be viewed by visiting our web site at www.state.nj.us/dep/dshw.

III. Application Procedures

A checklist is enclosed in this manual to assist the applicant in submitting a complete permit renewal application. A Solid Waste Facility Permit Application Form must be updated and included in the application. This form can be obtained by contacting the Bureau of Landfill and Recycling Management at the address and phone number listed below. The number of copies of bound application documents and appurtenant drawings required for review is project specific. Accordingly, the applicant should consult the Bureau of Landfill and Recycling Management prior to the submission of a permit renewal application for a determination of the exact number of copies required. Copies of the completed application and accompanying drawings should be mailed to the following address:

Chief, Bureau of Landfill and Recycling Management
Division of Solid and Hazardous Waste
New Jersey Department of Environmental Protection
P.O. Box 414
Trenton, New Jersey 08625-0414

Telephone number: (609) 984-6650

The Department assesses a fee for the review of a permit renewal application in accordance with N.J.A.C. 7:26-4.3. This fee is subject to change on an annual basis. If the fee is not submitted with the application, please provide a name and address for the Department to send a bill for the fee.

IV. Policy and Technical Guidance

An application to renew a solid waste facility permit must address the following:

A. The application shall demonstrate that the facility's construction and operation have been undertaken in compliance with the terms and conditions of the expiring permit.

B. The application shall describe in detail any proposed changes to the approved engineering design and demonstrate that these changes will not impact the compliance of the facility in terms of the design, construction, operation, closure or post-closure monitoring of the sanitary landfill.

C. The application shall list any environmental impacts resulting from the operation of the facility. The Environmental and Health Impact Statement, on file with the facility's initial solid waste facility permit application, shall be reviewed to ascertain whether any new measurable impacts beyond that described in the EHIS have resulted from the construction and operation of the facility.

D. Updated engineering designs should be submitted with the application. The designs should reflect all modifications to the facility's design since issuance of the initial permit. **All design modifications shall be indicated on the facility's approved engineering designs**.

E. An updated O&M Manual shall also be submitted. The update should include all past and any proposed modifications.

1

CHECKLIST FOR THE RENEWAL OF A SOLID WASTE FACILITY PERMIT

Reference NJAC 7:26-2.7(b)

1. Solid Waste Facility Permit Application Form

2. Updated engineering design

3. Updated Operations and Maintenance Manual

4. Amended disclosure statement (A-901) pursuant to NJAC 7:26-16.1 et seq.

5. List of changes in environmental impacts due to operation of facility

The applicant will be billed the appropriate fee once the application has been received. The completed application should be mailed to the following address:

Chief, Bureau of Landfill and Recycling Management
Division of Solid and Hazardous Waste
New Jersey Department of Environmental Protection
P.O. Box 414
Trenton, New Jersey 08625-0414
Telephone Number: (609) 984-6650

Section 6

Transfer of Ownership

I. Introduction

This manual presents the requirements for the transfer of solid waste facility (sanitary landfill) permit to a new owner or operator.

II. Applicable Regulations

The regulations for the transfer of a solid waste facility permit can be found in the Division of Solid and Hazardous Waste rules at New Jersey Administrative Code 7:26-2.7(e). In addition, N.J.A.C. 7:26-2A.9 should be consulted for financial closure requirements of sanitary landfills that must be met by the applicant.

A copy of N.J.A.C. Title 7, Chapter 26 can be obtained by contacting West Publishing, 610 Opperman Dr., P.O. Box 64526, St. Paul, MN 55164-0526 or phone 1-800-808-WEST. A nonjudicial version of the regulations may be viewed by visiting our web site at www.state.nj.us/dep/dshw.

III. Application Procedures

A checklist is enclosed in this manual to assist the applicant in submitting a complete application. Two copies of the completed application should be mailed to the following address:

Chief, Bureau of Landfill and Recycling Management
Division of Solid and Hazardous Waste
New Jersey Department of Environmental Protection
P.O. Box 414
Trenton, New Jersey 08625-0414
Telephone number: (609) 984-6650

The Department assesses a fee for the transfer of a solid waste facility permit (sanitary landfill) to a new owner or operator in accordance with N.J.A.C. 7:26-4.3. This fee is subject to change on an annual basis. If the fee is not submitted with the application, please provide a name and address for the Department to send a bill for the fee.

IV. Policies and Regulatory Interpretations

In accordance with N.J.A.C. 7:26-2.7(e)1iii, the applicant must demonstrate that the financial (the regulations contain the misprint "final" instead of "financial") responsibility requirements of N.J.A.C. 7:26-2A.9, closure and post-closure care of sanitary landfills, will be satisfied.

An updated Operations and Maintenance Manual should be prepared, indicating any staffing changes or operational modifications proposed by the new owner.

2

CHECKLIST FOR A TRANSFER OF OWNERSHIP OF A SOLID WASTE FACILITY PERMIT

Reference NJAC 7:26-2.7(e)

1. Solid Waste Facility Permit Application Form

2. Disclosure statement (A-901) pursuant to NJAC 7:26-16.1 et seq.

3. Demonstration that responsibility according to NJAC 7:26-2A.9 will be met by applicant (closure and post-closure plan)

4. Written agreement between existing and proposed permittee with date for transfer of ownership

5. Notice of transfer to others as required by all other regulations or statutes

6. Updated Operations and Maintenance Manual

The applicant will be billed the appropriate fee once the application has been received. The completed application should be mailed to the following address:

Chief, Bureau of Landfill and Recycling Management
Division of Solid and Hazardous Waste
New Jersey Department of Environmental Protection
P.O. Box 414
Trenton, New Jersey 08625-0414
Telephone Number: (609) 984-6650

Section 7

Minor Technical Reviews

I. Introduction

Minor technical reviews are those reviews that do not fall under the major permit and/or approval review activities. Ordinarily, minor technical reviews in themselves do not require a permit modification. An example of a minor technical review is a new, developing technology that an applicant is considering using at a landfill facility and wants to solicit input from the Department prior to a formal permitting process. Another example is a design change requested by an applicant during a formal application review process prior to the issuance of a permit for a new solid waste facility.

II. Applicable Regulations

The regulations governing minor technical reviews are varied and can be found in the Division of Solid and Hazardous Waste rules at New Jersey Administrative Code (N.J.A.C.) Title 7, Chapter 26.

A copy of N.J.A.C. Title 7, Chapter 26 can be obtained by contacting West Publishing, 610 Opperman Dr., P.O. Box 64526, St. Paul, MN 55164-0526 or phone 1-800-808-WEST. A nonjudicial version of the regulations may be viewed by visiting our web site at www.state.nj.us/dep/dshw.

III. Application Procedures

A checklist is enclosed in this manual to assist the applicant in submitting a complete application. The number of copies of application documents required for review is dependent on the nature of the minor technical review. Accordingly, the applicant should consult the Bureau of Landfill and Recycling Management for a determination of the exact number of copies required. The completed application should be mailed to the following address:

Chief, Bureau of Landfill and Recycling Management
Division of Solid and Hazardous Waste
New Jersey Department of Environmental Protection
P.O. Box 414
Trenton, New Jersey 08625-0414

Telephone number: (609) 984-6650

The Department assesses a fee for the review of minor technical reviews in accordance with New Jersey Administrative Code (N.J.A.C.) 7:26-4.3. This fee is subject to change on an annual basis.

3

CHECKLIST FOR A MINOR TECHNICAL REVIEW

1. Written description of the proposed change(s) containing relevant factors and rationale supporting the request

2. Engineering drawings (if necessary) signed and sealed by a licensed NJ professional engineer

3. Schedule for implementation of proposed change(s)

The applicant will be billed the appropriate fee once the application has been received. The completed application should be mailed to the following address:

Chief, Bureau of Landfill and Recycling Management
Division of Solid and Hazardous Waste
New Jersey Department of Environmental Protection
P.O. Box 414
Trenton, New Jersey 08625-0414
Telephone Number: (609) 984-6650

Section 8

Annual Topographic Survey of a Sanitary Landfill

I. Introduction

This manual presents the requirements for the preparation and submission of an annual topographic survey of a sanitary landfill. Only operating landfills are required to submit an annual topographic survey. Closed landfills are not subject to these rules, except in the case where a landfill has been closed for less than one year.

II. Applicable Regulations

The regulations for annual topographic surveys can be found in the Division of Solid and Hazardous Waste rules at New Jersey Administrative Code (N.J.A.C.) 7:26-2A.8(i).

A copy of N.J.A.C. Title 7, Chapter 26 can be obtained by contacting West Publishing, 610 Opperman Dr., P.O. Box 64526, St. Paul, MN 55164-0526 or phone 1-800-808-WEST. A nonjudicial version of the regulations may be viewed by visiting our web site at www.state.nj.us/dep/dshw.

III. Application Procedures

A checklist is enclosed in this manual to assist the applicant in submitting a complete application. Two copies of the completed topographic survey and accompanying report should be mailed to the following address:

Chief, Bureau of Landfill and Recycling Management
Division of Solid and Hazardous Waste
New Jersey Department of Environmental Protection
P.O. Box 414
Trenton, New Jersey 08625-0414

Telephone Number: (609) 984-6650

The Department assesses a fee for the review of annual topographic surveys in accordance with N.J.A.C. 7:26-4.3. This fee is subject to change on an annual basis. If the fee is not submitted with the application, please provide a name and address for the Department to send a bill for the fee.

4

CHECKLIST FOR A TOPOGRAPHIC SURVEY REVIEW FOR A SOLID WASTE FACILITY

Reference NJAC 7:26-2A.8 (i)

1. Topographic survey prepared in accordance with NJSA 46:23-9.9 et seq.

2. Survey depicted at same scale and contour intervals as approved engineering design

3. Survey delineating those items listed at NJAC 7:26-2A.8(i)3

4. Accompanying report including those items listed at NJAC 7:26-2A.8(i)3

The applicant will be billed the appropriate fee once the application has been received. The completed application should be mailed to the following address:

Chief, Bureau of Landfill and Recycling Management
Division of Solid and Hazardous Waste
New Jersey Department of Environmental Protection
P.O. Box 414
Trenton, New Jersey 08625-0414
Telephone Number: (609) 984-6650

Section 9

Sanitary Landfill Disruption Approvals

I. Introduction

This manual presents the requirements for the preparation and submission of a sanitary landfill disruption application. In accordance with Departmental regulations, written approval from the Division of Solid and Hazardous Waste is required prior to any excavation, disruption or removal of any deposited material from an active, terminated or closed sanitary landfill.

In cases where the landfill owner/operator has submitted documentation and received prior approval from the Department in the form of a revised or renewed solid waste facility permit, closure and post-closure plan approval or other approval for specific construction activities, a separate disruption approval shall not be required. See N.J.A.C. 7:26-2A.8(j)1iii.

II. Applicable Regulations

The regulations for disruptions can be found in the Division of Solid and Hazardous Waste rules at New Jersey Administrative Code (N.J.A.C.) 7:26-2A.8(j). Where construction of buildings on top of landfills is proposed, the rules at N.J.A.C 7:26-2A.7(f)13 also apply.

A copy of N.J.A.C. Title 7, Chapter 26 can be obtained by contacting West Publishing, 610 Opperman Dr., P.O. Box 64526, St. Paul, MN 55164-0526 or phone 1-800-808-WEST. A nonjudicial version of the regulations may be viewed by visiting our web site at www.state.nj.us/dep/dshw.

III. Application Procedures

A checklist is enclosed in this manual to assist the applicant in submitting a complete application. The Division issues two types of disruption approvals:

A. Minor Disruption Approval - Issuance of this approval is limited to the performance of site investigations and similar activities at a landfill. Site investigations include, but are not limited to, performance of soil borings and/or test pits, methane gas surveys, installation of piezometers and observation wells and the delineation of lateral and vertical limits of previously filled areas. An application for a minor disruption approval shall address items B, D, E, H, I, M, N, O, P, Q, and V listed in Paragraph IV. of this section.

B. Major Disruption Approval - Major disruption approvals are issued for the construction of, but are not limited to, buildings, roadways, parking areas, storage areas and other site improvements involving some manner of construction on top of a landfill. An application for a major disruption approval shall address all of the items listed in Part 4 of this manual.

When an application for a minor disruption approval is submitted, the applicant shall include a minimum of three copies, including the original, of documents and drawings. The exact number of copies of the application and sets of drawings for a major disruption application depends on the magnitude, location and potential impact of the proposed project. The applicant should consult the Bureau of Landfill and Recycling Management prior to submitting the application to determine the exact number of copies required. The completed application and copies should be mailed to the following address:

Chief, Bureau of Landfill and Recycling Management
Division of Solid and Hazardous Waste
New Jersey Department of Environmental Protection
P.O. Box 414
Trenton, New Jersey 08625-0414

Telephone number: (609) 984-6650

The Department assesses a fee for the review of landfill disruption applications in accordance with N.J.A.C. 7:26-4.3. The fee is calculated by multiplying the number of hours required by the Department to conduct the review by the current hourly review rate. The estimated number of review hours is determined during the initial review of the submission.

IV. Policies and Technical Guidance

In order to assist the applicant in preparing a landfill disruption application for a proposed project, the Division has developed specific policies and technical guidance for design and construction standards to ensure the environmentally sound disruption of the landfill. The following guidelines set forth the Department's policies and regulatory interpretations of N.J.A.C. 7:26-2A.8(j) governing disruptions of sanitary landfills.

A. Pre-Application Meetings - A pre-application meeting between the Division and the applicant for a major disruption approval is encouraged. A pre-application meeting for a minor disruption approval is optional. The focus of the meeting is to address the development of a complete application pertaining to the project and to discuss review procedures. At least two weeks prior to the scheduled pre-application meeting, the applicant shall submit a conceptual design comprising reports, maps and other relevant project documentation which will provide sufficient basis for Departmental review. To arrange a pre-application meeting, the applicant may contact the Bureau of Landfill and Recycling Management at the address or telephone number indicated above.

B. Application Forms - A Solid Waste facility Permit Application Form must be completed for both major and minor disruption applications. These application forms can be obtained from the Bureau of Landfill and Recycling Management or from our web site identified in paragraph II. above.

C. Topographic Map - A topographic map, which clearly shows the area to be excavated, as well as any areas where waste will be redeposited, is required. Existing and final

contour lines shall be shown at two foot intervals. Elevations shall be based on the National Geodetic Vertical Datum of 1929. Boundary lines and numbers of property lots and blocks shall be shown.

D. Extent of Operations - The applicant shall include a statement of the size area involved, the depth of excavation, volume of fill to be removed, and the lot and block numbers on which the disruption is to occur.

E. Purpose of Disruption - The applicant shall provide the reasons for the proposed disruption and a brief statement describing the proposed construction (if any) activity.

F. Elevation Drawings - Cross-sections showing depths of excavation, redeposition, required final cover, and final grades shall be submitted.

G. Property Deed - The applicant shall provide a copy of the deed of record or other document proving ownership of the landfill property. If the property is leased by the applicant, a copy of the lease shall be provided.

H. Cover - The application shall include a description of the means by which all opened surfaces will be covered when excavation procedures are halted. Any exposed waste materials shall be covered with six (6) inches of clean soil or approved alternative cover material at the end of each working day (or more frequently if odors or vectors are a problem). A minimum of twelve (12) inches of clean soil shall be applied to all wastes exposed for any period exceeding 24 hours and extending up to six months. Thereafter, a minumum of two (2) feet of final cover shall be applied and maintained over the waste material.

I. Removal of Waste - In the absence of site-specific characterization information, a statement is required confirming that no waste material will be stored on-site. In most cases, it shall be removed off-site immediately to a licensed disposal facility. However, if only a small area is disrupted and the material can be immediately deposited (i.e. soil boring cuttings and test pits), permission may be granted for on-site disposal. The application shall address the off-site disposal destination or the methods used for on-site disposal.

Due to the declining disposal capacity for waste in New Jersey, on-site disposal of significant quantities of waste (beyond that which is generated from soil borings and test pits as described above) can be approved based on appropriate classification. A site characterization assessment shall be performed to ascertain the feasibility of redepositing large amounts of waste material on-site. A soil sampling plan, subject to the approval of the Department, shall be conducted to obtain a site characterization of on-site soils prior to any redeposition of large quantities of waste materials.

J. Soil Erosion and Sediment Control Plan - A copy of the certified Soil and Erosion Sediment Control Plan shall be included in the application for any project subject to the requirements of the Soil Erosion and Sediment Control Act.

K. Water Control - The application shall include a description of measures to provide drainage of surface water and subsurface water to minimize contact with fill. This shall include providing calculations for estimating flow quantities and sizing water control appurtenances. Landfill drainage structures shall be designed to convey, at a minimum, the peak discharge of a 24-hour, 25-year storm.

L. Leachate Control - A description and design shall be submitted showing how leachate in the excavated area will be collected and treated.

M. Odor Control - A description of procedures to be used shall be submitted.

N. Gas Control - The application shall include details of the methane gas intercept system to protect workers during excavation and construction and to protect any building facility when completed. For further information on Methane Venting System requirements, see Section 14 of this manual.

O. Rodent, Insect, Fire, Dust and Litter Controls - A description of measures to be taken shall be submitted.

P. Health and Safety Plan - A Health and Safety Plan for all disruption activities shall be submitted as an addendum to the sanitary landfill disruption application package. The Health and Safety Plan shall describe monitoring procedures, protective equipment, safety program, emergency routes to hospital(s) and decontamination procedures.

Q. Discovery of Hazardous Waste - In the event that chemical or hazardous waste materials are encountered during the disruption, operations shall cease immediately. A contingency plan shall be developed in concert with this Division outlining necessary precautions for the safe removal and disposal of the waste to an approved facility.

R. Utility Lines - A design drawing shall be submitted indicating paved areas and areas for underground utility lines such as water, sanitary sewer, storm drainage, gas, electric and telephone.

S. Soil Borings - Soil borings of the property shall be provided in accordance with the following table:

ACREAGE OF DISRUPTED AREA	MINIMUM NUMBER OF BORINGS
1-10	3
10-50	6
50-100	12
100-200	18
over 200	minimum 24

1. The borings should employ a grid pattern, wherever possible, such that there is, a boring in each major geomorphic feature. The boring pattern should enable

the development of detailed cross sections through the sanitary landfill in order to sufficiently define the geology, hydrology and nature of the fill.

2. Subsurface data obtained by borings shall be collected by standard undisturbed soil sampling techniques for engineering indexes and classification. Diamond bit coring shall be used for rock boring. Samples shall not be composited. The sampling interval for the borings shall be determined by a geologist or geotechnical engineer and be representative of the stratigraphy of the site. It is recommended that sampling be performed on a continuous basis for the first 20 feet below the lowest elevation of the sanitary landfill.

3. All borings shall be to a minimum depth of 20 feet below the lowest elevation of the sanitary landfill. The Department reserves the right to require a deeper minimum depth in areas in which 20 feet is not sufficient to describe the geological formation and the groundwater flow patterns below the proposed sanitary landfill disruption in regard to potential contaminant migration paths.

4. Excavations, test pits and geophysical methods may be employed to supplement the soil boring investigation.

5. Field and final boring logs shall be submitted for each boring, recording soils or rock conditions encountered. Each log shall include a soil or rock description in accordance with the Unified Soil Classification System, the depth of soil or rock, the water levels encountered, the blow counts, the soil tests and date of work conducted. All depths of soil and rock as described within the boring log shall be corrected to the National Geodetic Vertical Datum.

6. All borings, not to be utilized as permanent monitoring wells, and wells within the disposal area shall be sealed in accordance with N.J.A.C. 7:9-9, "Sealing of Abandoned Wells", and excavations and test pits shall be backfilled and properly compacted to prevent possible paths of leachate migration.

T. Departmental Permits - Copies of all Departmental permits as may be required or written proof of application for such permits due to flood plain involvement, stream encroachment, discharge to groundwater or discharge to surface water, and copies of all titles for lands involved in riparian lands or wetlands (together with Land use permits) shall be submitted. For more information, please contact the Bureau Of Landfill and Recycling Management Staff at the above phone number for specific contacts regarding this matter.

U. All drawings and other documents prepared for a major disruption must be signed and sealed by a New Jersey licensed Professional Engineer.

V. Schedule of Activities – The application should include a schedule of activities including an estimated starting date and the duration of the disruption activities.

CHECKLIST FOR A SANITARY LANDFILL DISRUPTION APPLICATION

Reference NJAC 7:26-2A.8(j)

1. Solid Waste Facility Permit Application Form.

2. Topographic map depicting disrupted area and elevation drawings.

3. Written description of extent of operations, schedule of activities, purpose of disruption and other pertinent factors such as removal of the waste (see NJAC 7:26-2.11), control measures for odors, gases, leachate, surface water, dust, litter, fire, insects and rodents.

4. Health and safety plan.

5. Soil boring information.

6. List of all Departmental permits.

7. Soil erosion and sediment control plan.

The applicant will be billed the appropriate fee once the application has been received. The completed application should be mailed to the following address:

Chief, Bureau of Landfill and Recycling Management
Division of Solid and Hazardous Waste
New Jersey Department of Environmental Protection
P.O. Box 414
Trenton, New Jersey 08625-0414
Telephone Number: (609) 984-6650

Section 10

Preliminary Environmental Health and Impact Statement Requirements

I. Introduction

This manual presents the requirements for the preparation and submission of a Preliminary Environmental Health and Impact Statement for a proposed sanitary landfill.

II. Applicable Regulations

The regulations for a Preliminary Environmental Health and Impact Statement can be found in the Division of Solid and Hazardous Waste rules at N.J.A.C. 7:26-2.9(f) and (g).

A copy of N.J.A.C. Title 7, Chapter 26 can be obtained by contacting West Publishing, 610 Opperman Dr., P.O. Box 64526, St. Paul, MN 55164-0526 or phone 1-800-808-WEST. A nonjudicial version of the regulations may be viewed by visiting our web site at www.state.nj.us/dep/dshw.

III. Application Procedures

A checklist is enclosed in this manual to assist the applicant in submitting a complete application. The applicant should consult the Bureau of Landfill and Recycling Management prior to submitting a PEHIS to determine the exact number of copies required. Copies of the completed PEHIS and accompanying drawings should be mailed to the following address:

Chief, Bureau of Landfill and Recycling Management
Division of Solid and Hazardous Waste
New Jersey Department of Environmental Protection
P.O. Box 414
Trenton, New Jersey 08625-0414

Telephone number: (609) 984-6650

The Department assesses a fee for the review of a Preliminary Environmental Health and Impact Statement in accordance with N.J.A.C. 7:26-4.3. This fee is subject to change on an annual basis. If the fee is not submitted with the application, please provide a name and address for the Department to send a bill for the fee.

1

CHECKLIST FOR A PRELIMINARY ENVIRONMENTAL HEALTH AND IMPACT STATEMENT

Reference NJAC 7:26-2.9 (f)

1. Provide all information required pursuant to NJAC 7:26-2.9(f)

2. Documentation that the proposed facility is consistent with the adopted and approved objectives and strategies of the applicable district solid waste management plan

3. Number of copies of PEHIS will be project specific, therefore, contact this Division for details

4. Drawings exceeding 8 1/2 X 11 inches must be folded and placed within the PEHIS

The applicant will be billed the appropriate fee once the application has been received. The completed application should be mailed to the following address:

Chief, Bureau of Landfill and Recycling Management
Division of Solid and Hazardous Waste
New Jersey Department of Environmental Protection
P.O. Box 414
Trenton, New Jersey 08625-0414
Telephone Number: (609) 984-6650

Section 11

Cover Material Requests

I. Introduction

This manual presents the requirements for the preparation of an application requesting approval of materials other than clean soil for use as cover material at a sanitary landfill. The application can be used for daily, intermediate or final cover. Application requirements for the use of contaminated soil for daily cover is addressed in Section 12 of this manual.

II. Applicable Regulations

The regulations governing cover material can be found at the following sections of the Division of Solid and Hazardous Waste rules, New Jersey Administrative Code (N.J.A.C.):

7:26-1.4	(Definitions)
7:26-2A.8(b)7-19	(Sanitary Landfill Operational and Maintenance Requirements)

A copy of N.J.A.C. Title 7, Chapter 26 can be obtained by contacting West Publishing, 610 Opperman Dr., P.O. Box 64526, St. Paul, MN 55164-0526 or phone 1-800-808-WEST. A nonjudicial version of the regulations may be viewed by visiting our web site at www.state.nj.us/dep/dshw.

III. Application Procedures

A checklist is enclosed in this manual to assist the applicant in submitting a complete application. The completed application should be mailed to the following address:

Chief, Bureau of Landfill and Recycling Management
Division of Solid and Hazardous Waste
New Jersey Department of Environmental Protection
P.O Box 414
Trenton, New Jersey 08625-0414

Telephone number: (609) 984-6650

The number of copies of the application that must be submitted will be determined on a case-by-case basis. Normally, one copy is sufficient.

The Department assesses a fee for the review of cover material requests in accordance with N.J.A.C. 7:26-4.3. The fee is calculated by multiplying the number of hours required by the Department to conduct the review by the current hourly review rate. The estimated number of review hours is determined during the initial review of the submission and the applicant is billed accordingly.

IV. Policies and Regulatory Interpretations

Requests for the use of alternative materials for landfill cover encompass a diverse range of materials that include manufacturing by-products and other waste materials as well as synthetic covers such as foams and geotextiles. New covers will continue to emerge as cover soil becomes scarce and cost prohibitive to use. Accordingly, it is not possible to list every possible material that falls under the guidelines of this manual. However, the following guidelines have been established for the preparation of cover material requests.

A. Cover material requests will only be accepted for review if they are submitted directly by a sanitary landfill owner/operator. The landfill owner/operator must be familiar with the cover material in question by having reviewed all technical data regarding the cover material and cite sources (if any) where the material has been successfully used.

1. The purpose of a good landfill cover material is to:

    a. Impede rodents and vectors from entering the waste fill
    b. Control malodorous emissions
    c. Provide a fire break
    d. Provide control of windblown litter
    e. Minimize moisture entering the fill
    f. Have limited erosion potential
    g. Not be easily windblown

2. The department will review applications for cover material requests based on the above listed criteria.

B. The following requirements apply to soil-like or admixture alternative cover materials:

1. Analytical test results conducted by a New Jersey Department of Environmental Protection certified laboratory is required. The material should be tested for the Target Compound List. In addition, waste products intended for use as cover material must be classified as a non-hazardous waste by the Department's Bureau of Resource Recovery and Technical Programs, Division of Solid and Hazardous Waste. The Bureau of Resource Recovery and Technical Programs can be contacted at the following address for information and procedures concerning waste classification:

Department of Environmental Protection
Division of Solid and Hazardous Waste
Bureau of Resource Recovery and Technical Programs
P.O. Box 414
Trenton, New Jersey 08625-0414

Telephone No. (609) 292-8341

2. In accordance with N.J.A.C. 7:26-2A.8(b)17.i and ii , laboratory testing for physical properties shall be performed. Intermediate and daily cover materials shall be tested for solids content, percent volatile solids, grain size analyses and moisture content. Final and temporary final cover materials shall also be tested for atterburg limits and permeability. Materials intended for use in the topsoil layer should be tested for nutrient content including nitrogen, ammonia-n, nitrate-n, total kjeldahl nitrogen, phosphorus, calcium magnesium and potassium. Materials intended for use as cover must meet the performance standards at N.J.A.C.7:26-2A.8(b)18i-iv.

   The analytical test results should be compared to the Department's Soil Cleanup Criteria. Materials exceeding the residential direct contact soil cleanup criteria may be restricted to use as daily cover only. Stockpiling of the material at the landfill in a manner that will not impact surface or ground water quality must be addressed in the application.

C. The following requirements apply to non-traditional cover materials such as foam or geotextiles:

   N.J.A.C. 7:26-2A.8(b) 19 requires an evaluation program in accordance with the requirements for Research, Development and Demonstration (RD&D) projects as set forth at N.J.A.C. 7:26-1.7(f). The program shall evaluate the material in actual use at a landfill. The evaluation program must be conducted under the direction of a New Jersey licensed Professional Engineer. The program should address how the material will be evaluated against the performance requirements for daily cover. Any restrictions or guidelines in the use of the material shall be included. A schedule for field monitoring, testing and reporting shall also be included.

CHECKLIST FOR COVER MATERIAL REQUESTS

1. Letter requesting approval to use proposed material as cover at a permitted landfill. The letter should specifically state the source and quantity of material.

2. Letter denoting the classification of the proposed cover material from the Bureau of Resource Recovery and Technical Programs, Division of Solid and Hazardous Waste.

3. Letter from the landfill owner/operator indicating acceptance of the material. The landfill owner/operator shall state that he has reviewed all technical data pertaining to the proposed cover material.

4. Analytical soil test results conducted by a NJDEP certified laboratory.

5. Application for an RD&D Approval (if applicable).

The applicant will be billed the appropriate fee once the application has been received. The completed application should be mailed to the following address:

Chief, Bureau of Landfill and Recycling Management
Division of Solid and Hazardous Waste
New Jersey Department of Environmental Protection
P.O. Box 414
Trenton, New Jersey 08625-0414
Telephone Number: (609) 984-6650

Section 12

I.D. 27 Soils as Daily Cover

I. Introduction

This manual presents the requirements for the preparation of an application requesting I.D. 27 soils for use as daily cover material.

II. Applicable Regulations

The regulations governing daily cover can be found in the Division of Solid and Hazardous Waste rules at New Jersey Administrative Code (N.J.A.C.) 7:26-2A.8(b)12.

A copy of N.J.A.C. Title 7, Chapter 26 can be obtained by contacting West Publishing, 610 Opperman Dr., P.O. Box 64526, St. Paul, MN 55164-0526 or phone 1-800-808-WEST. A nonjudicial version of the regulations may be viewed by visiting our web site at www.state.nj.us/dep/dshw.

III. Application Procedures

A checklist is enclosed in this manual to assist the applicant in submitting a complete application. The completed application should be mailed to the following address:

Chief, Bureau of Landfill and Recycling Management
Division of Solid and Hazardous Waste
New Jersey Department of Environmental Protection
P.O. Box 414
Trenton, New Jersey 08625-0414

Telephone No. (609) 984-6650

The Department assesses a fee for the review of I.D. 27 soils as daily cover in accordance with N.J.A.C. 7:26-4.3. The fee is calculated by multiplying the number of hours required by the Department to conduct the review by the current hourly review rate. The estimated number of review hours is determined during the initial review of the submission.

IV. Policies and Regulatory Interpretations

The following sets forth the Department's policies and regulatory interpretations of N.J.A.C. 7:26-2A.8(b) governing daily cover material requirements and the use I.D. 27 soils as daily cover:

A. Soils requiring individual review and approval for use as daily cover by the Bureau of Landfill and Recycling Management shall follow the following procedures:

1. Soils in question shall be classified as an I.D. 27 waste by the Department's Bureau of Resource Recovery and Technical Programs, Division of Solid and Hazardous Waste. The Bureau of Resource Recovery and Technical Programs can be contacted at the following address for information and procedures concerning waste classification:

Department of Environmental Protection
Division of Solid and Hazardous Waste
Bureau of Resource Recovery and Technical Programs
P.O. Box 414
Trenton, New Jersey 08625-0414

Telephone No. (609) 292-8341

2. Any I.D. 27 soil material or soil-like material generated from a process (i.e. sludge-derived product, crushed demolition material, waste by-products blended with soil) that will be used on a landfill as a cover material on an on-going or intermittent basis shall not be covered by this section. To obtain this type of approval, see Section 11 above on Cover Material Requests.

3. The landfill accepting the soils must be approved to receive I.D. 27 waste material as per the conditions in their Solid Waste Facility Permit. The landfill must have environmental controls consisting of a liner system and/or a leachate collection system. The landfill's O&M manual must also contain standards for daily cover requirements.

4. The application must be submitted, or accompanied with a letter, signed by the landfill owner/operator indicating the landfill's willingness to accept the I.D. 27 soils as cover material. The landfill owner/operator must be familiar with the I.D. 27 soils in question by having reviewed all technical and laboratory data and able to cite the source and quantity of this material.

5. Fine grained soils which may create erosion problems, are easily windblown or are relatively impermeable (less than 1×10^{-5}) are prohibited for use as daily cover.

B. Operating landfills may, at their discretion, establish a protocol for the acceptance of certain I.D. 27 soils without the need to obtain approval from the Bureau of Landfill and Recycling Management for each source of soil. The acceptance protocol must be incorporated in the landfill's Operation and Maintenance Manual and be approved by the Bureau. All other sources of contaminated soil require approval by the Bureau of Landfill and Recycling Management.

The acceptance of I.D. 27 soils for use as daily cover at operating landfills shall meet the following criteria:

1. The soil may only be contaminated from a known source of virgin petroleum product such as diesel fuel, gasoline, kerosene, etc. and may not contain more than 5,000 ppm of total petroleum hydrocarbons (TPH).

2. The soil may not be contaminated from contact with a hazardous waste.

3. The soil shall be classified as an I.D. 27 waste by the Bureau of Resource Recovery and Technical Programs.

4. The particle size distribution of the soil shall conform with the landfill's daily cover soil specifications.

5. The landfill shall establish the maximum contaminant level in the soil to be accepted. In establishing this limit, the landfill shall consider the impact the soil will have on leachate treatability.

6. The soil may only be stockpiled at the landfill on active areas of the landfill where all storm water run-off is directed into the leachate collection system.

7. Records shall be kept for a minimum of three years for soil used for daily cover. The records shall include an identification of the source of soil, analytical results and the Department's waste classification letter.

CHECKLIST FOR AN ID-27 SOIL REQUEST

1. Cover letter to the Bureau of Landfill and Recycling Management requesting approval to use contaminated soil as daily cover material at a permitted landfill. The letter should specifically state the source and quantity of material.

2. Letter denoting the classification of soil sample(s) from the Bureau of Resource Recovery and Technical Programs, Division of Solid and Hazardous Waste.

3. Letter from the landfill owner/operator indicating acceptance of the material. The landfill owner/operator shall state that he has reviewed all technical data pertaining to the contaminated soil.

4. A summary of the soil test results submitted per item #2 (above) shall be submitted to the Bureau of Landfill and Recycling Management.

The applicant will be billed the appropriate fee once the application has been received. The completed application should be mailed to the following address:

Chief, Bureau of Landfill and Recycling Management
Division of Solid and Hazardous Waste
New Jersey Department of Environmental Protection
P.O. Box 414
Trenton, New Jersey 08625-0414
Telephone Number: (609) 984-6650

Section 13

Miscellaneous Technical Reviews

I. Introduction

This manual presents the requirements for applications involving miscellaneous technical reviews. Miscellaneous technical reviews includes construction certifications, O&M manual revisions, data collection from environmental system monitoring, etc.

II. Applicable Regulations

The regulations governing miscellaneous technical reviews are varied and can be found in the Division of Solid and Hazardous Waste rules at New Jersey Administrative Code (N.J.A.C.) Title 7, Chapter 26.

A copy of N.J.A.C. Title 7, Chapter 26 can be obtained by contacting West Publishing, 610 Opperman Dr., P.O. Box 64526, St. Paul, MN 55164-0526 or phone 1-800-808-WEST. A nonjudicial version of the regulations may be viewed by visiting our web site at www.state.nj.us/dep/dshw.

III. Application Procedures

A checklist is enclosed in this manual to assist the applicant in submitting a complete application. The completed application should be mailed to the following address:

Chief, Bureau of Landfill and Recycling Management
Division of Solid and Hazardous Waste
New Jersey Department of Environmental Protection
P.O. Box 414
Trenton, New Jersey 08625-0414

Telephone number: (609) 984-6650

The Department assesses a fee for miscellaneous technical reviews in accordance with N.J.A.C. 7:26-4.3. The fee is calculated by multiplying the number of hours required by the Department to conduct the review by the current hourly review rate. The estimated number of review hours is determined during the initial review of the submission.

1

CHECKLIST FOR A MISCELLANEOUS TECHNICAL REVIEW

Includes O&M manual revisions, environmental system monitoring reviews, etc.

1. Written description of the proposed change(s) containing relevant factors and rationale supporting the request

2. Engineering drawings (if necessary) signed and sealed by a licensed NJ professional engineer

3. Schedule for implementation of proposed change(s)

The applicant will be billed the appropriate fee once the application has been received. The completed application should be mailed to the following address:

Chief, Bureau of Landfill and Recycling Management
Division of Solid and Hazardous Waste
New Jersey Department of Environmental Protection
P.O. Box 414
Trenton, New Jersey 08625-0414
Telephone Number: (609) 984-6650

Section 14

Landfill Gas Collection and Control Systems

I. Introduction

This manual presents the requirements for the preparation and submission of a design for a sanitary landfill gas collection and control system (GCCS).

II. Applicable Regulations

The regulations governing sanitary landfill gas collection and venting systems can be found in the Division of Solid and Hazardous Waste rules at New Jersey Administrative Code (N.J.A.C.) 7:26-2A.7(f).

A copy of N.J.A.C. Title 7, Chapter 26 can be obtained by contacting West Publishing, 610 Opperman Dr., P.O. Box 64526, St. Paul, MN 55164-0526 or phone 1-800-808-WEST. A nonjudicial version of the regulations may be viewed by visiting our web site at www.state.nj.us/dep/dshw. In addition, the Federal regulations found at 40 CFR Parts 51, 52 and 60, specifically the March 12, 1996 New Source Performance Standards and Emission Guidelines (NSPS/EG) rule and June 16, 1998 direct final rule, should be referred to since those regulations set forth standards of performance for New Stationary Sources and guidelines for control of existing sources (Municipal Solid Waste Landfills).

III. Application Procedures

A checklist is enclosed in this manual to assist the applicant in submitting a complete application. The number of copies of application documents required for review is dependent on the nature of the proposed project involving a gas collection and venting system. Accordingly, the applicant should consult the Bureau of Landfill and Recycling Management for a determination of the exact number of copies required. The completed application should be mailed to the following address:

Chief, Bureau of Landfill and Recycling Management
Division of Solid and Hazardous Waste
New Jersey Department of Environmental Protection
PO Box 414
Trenton, New Jersey 08625-0414

Telephone number: (609) 984-6650

The Department assesses a fee for the review of gas venting systems in accordance with N.J.A.C. 7:26-4.3. The fee is calculated by multiplying the number of hours required by the Department to conduct the review by the current hourly rate. The estimated number of review hours is determined during the initial review of the submission.

IV. Policies and Regulatory Interpretations

This paragraph is divided into two parts, A and B. Part A covers those items appearing in N.J.A.C. 7:26-7(f), entitled "design standards and construction requirements for sanitary landfill gas and collection systems". Part A is largely unchanged since the development of the original technical manual in August 1993. Subsequent to 1993, however, the USEPA promulgated the New Source Performance Standards (NSPS) on March 12, 1996. These New Source Performance Standards were adopted and/or recodified at 40 CFR Parts 51, 52 and 60 which sets forth "Standards of Performance for New Stationary Sources and Guidelines for Control of Existing Sources: Municipal Solid Waste Landfills". Part B of this paragraph refers to New Source Performance Standards and Emission Guidelines for sanitary landfills. Determining factors that subject sanitary landfills to comply with New Source Performance Standards and Emission Guidelines are outlined in part B below.

A. The following sets forth the Department's policies and regulatory interpretations of N.J.A.C. 7:26-2A.7(f) governing gas collection and venting systems.

1. Buildings at sanitary landfill sites where all waste is deposited in lined cells that will prohibit gas migration need not comply with the requirements set forth at N.J.A.C. 7:26-2A.7(f)14.

2. Buildings constructed on piles on top of landfilled areas shall utilize the open space (crawl space) between the final ground surface elevation and the building floor as an area for the installation and operation of an active methane gas venting system in lieu of the requirements set forth at 7:26-2A.7(f)14. The requirements established at 7:27-2A.7(f)14vi and vii shall be complied with at all times.

   An active methane gas venting system shall be capable of preventing the accumulation of gas at or greater than 25 percent of the lower explosive limit in the crawl space.

   The construction of residential dwellings on top of landfills is prohibited.

3. Calculations supporting the basis for the layout of passive or active gas venting systems shall be provided. For example, the design of an active venting system shall be accompanied by engineering calculations computing the gas volume influenced (by using an appropriate LFG generation model, such as the USEPA Landfill Gas Emissions Model, see Part IV.B.2.b of this Section), extraction flow rates and blower sizing requirements. In addition, the amount of landfill gas condensate generated as a function of time shall also be computed. Disposal methods for gas condensate must be described.

4. The following clarifications are provided for 7:26-2A.7:

   a. f(4): the gas collection system shall also be connected to the leachate collection system to control odors.

b. All gas venting systems require air pollution control permits in accordance with the regulations of the Air Quality Regulation Program, N.J.A.C. 7:27. This permitting process has its own requirements for gas analysis as required by N.J.A.C. 7:26-2A.7(f)6, which shall be followed.

c. For those active gas venting systems that are employed as odor control systems, an auto-dialer system shall be installed to alert responsible persons in the event of an extinguished flare.

d. For active methane gas venting systems constructed underneath buildings, a draft Operation and Maintenance (O&M) Manual shall be prepared and included in the application. The O&M Manual should include, but not be limited to, the following:

(1) Complete operation instructions and maintenance procedures for all equipment in the system;

(2) A complete monthly maintenance and monitoring program to ensure the system's integrity;

(3) Details of an extensive preventative maintenance program tailored to prevent system failure or downtime;

(4) Test procedures and methods of verification to confirm that the system is functioning prior to occupancy;

(5) Development of calibration procedures to ensure that the system gives an automatic warning at 1% methane by volume in air and sounds an alarm at 2% methane by volume in air; and

(6) Emergency procedures for evacuation of the building(s) in the event that an alarm is triggered.

B. The following sets forth the Department's policies and regulatory interpretations of the federal New Source Performance Standards and Emission Guidelines (NSPS/EG). This portion of the technical manual is intended to serve as a guide, and not as a replacement to, the federal rules governing NSPS/EG. Therefore, the reader should be familiar with 40 CFR Parts 51, 52 and 60 when using this manual.

In accordance with 40 CFR 60, the New Source Performance Standards applies to municipal solid waste landfills that commenced construction, modification, or reconstruction on or after May 30, 1991. The Emission Guidelines apply to MSW landfills that commenced construction, modification, or reconstruction before May 30, 1991. MSW landfills that closed prior to November 8, 1987 are exempt from these rules. Based on these definitions, no distinction is being made as to when the

initial receipt of waste occurred. Therefore, pursuant to this applicability, a landfill that commenced construction before May 30, 1991 but began accepting waste after this date will be subject to the Emission Guidelines.

In accordance with NSPS/EG, municipal solid waste landfills with design capacities equal to or greater than 2.5 million megagrams (Mg) or 2.5 million cubic meters (3.270 million cubic yards), and that emit 50 Mg/yr or more of Non-Methane Organic Compound (NMOC) emissions, are required to install gas collection and control systems (1 megagram = 1.1023 tons so that 2.5 million megagrams = 2.76 million tons). The design capacity is exclusive of the final cover system. If the owner/operator chooses to convert the design capacity from volume to mass or from mass to volume to demonstrate that its design capacity is less than 2.5 million Mg or 2.5 million cubic meters, the calculations must include a site specific density which must be recalculated annually.

1. Scheduling issues (as mandated by federal rules): A Gas Collection and Control System (GCCS) design shall be developed and submitted for review within 12 months following the first reportable event (known as the "trigger date") of NMOC emissions equal to or greater than 50 Mg/yr. The GCCS shall be operational no later than 30 months following the trigger date. The GGCS must be operational in each cell or area within 5 years of initial placement of waste (if still open) or 2 years if at final grade or closed. Once operational, the GCCS shall be operational for a minimum of fifteen years.

2. General Landfill GCCS Design submittal and design considerations:

    a. Design plans must address depth of refuse, refuse gas generation rates and flow characteristics, cover properties, gas system expandability, leachate and condensate management, accessibility, compatibility with filling operations, integration with closure end use, air intrusion control (i.e. timely construction of final cover and routine well monitoring and balancing operations), corrosion resistance, fill settlement, resistance to the refuse decomposition heat.

    b. Landfill gas generation rates shall be estimated by using an appropriate LFG generation model, such as the USEPA Landfill Gas Emissions Model that uses AP-42 emission factors. Copies of computer printouts, including input/output summaries, of the landfill in question shall be submitted as an appendix in the design report. The software and accompanying user's manual are available on the EPA website at http://www.epa.gov/ttn/catc/products.html#software.

    c. Areas documented as containing asbestos or other nondegradable material may be excluded from coverage by the landfill GCCS.

d. Areas considered to be non-productive (contributing to less than 1 percent of the total non-methane organic compounds from the landfill) may be excluded from coverage by the landfill GCCS.

e. Landfill GCCS system components shall be constructed of PVC, HDPE, or other nonporous corrosion resistant material.

3. Specific Landfill GCCS Design submittal and design considerations:

a. The landfill gas collection and control system design must be certified, sealed and signed by a licensed professional engineer.

b. The design must be submitted within 12 months of the first report of the site exceeding 50 Mg/yr of NMOC's.

c. The GCCS must be planned to be operational within 30 months of the first report of the site exceeding 50 Mg/yr of NMOC's.

d. The site must comply with the 2 year/5 year rule: Landfill gas collection shall occur in active cells with waste in place for five years or more, or in closed cells with waste at final grade for two years or more.

e. The design life of the GCCS must be at least 15 years.

f. The GCCS shall be designed for the maximum expected flow rates during its design life.

g. The GCCS must be able to minimize lateral LFG migration.

h. An adequate density of collectors shall be planned: Landfill gas collection devices shall be installed at a sufficient density to control surface emissions and subsurface migration of landfill gas.

Spacing of the LFG collection wells is highly dependent on site specific variables, including waste density, waste moisture, waste thickness, well design, purpose of LFG collection system (for control, recovery or both), and type of cap. Several methods are available to calculate the spacing of LFG wells, including, but not limited to, cylinder method (the most popular approach, also used by the EPA), empirical method (based on field observation), fluid flow (based on Darcy's Law), and field pump tests (to determine site specific zones of influence of the wells). One rule of thumb in practice is to use a maximum of 150-foot radius of influence unless a pump test is conducted.

i. The GCCS must limit surface emissions to 500 ppm (see section 4 of this manual for surface emissions testing requirements).

j. The LFG conveyance system shall be properly sized: Landfill gas collection and control system components shall have suitable dimensions to convey the maximum landfill gas flow rate and withstand future settlement, overburden and traffic loads.

k. The collected LFG shall be routed to a control device.

l. If used, a description of flare type (i.e. utility, enclosed flare or other) shall be given. The Department requires permanent flares to be the enclosed type.

m. If the control device is a flare, it shall include temperature monitoring, flow measurement and automatic re-light devices.

n. If used, flare-sizing calculations shall be provided. The size of the flare, tip diameter and height is controlled by the landfill gas flow rate and the heat content, in Btu, of the gas. Refer to 40 CFR 60.18, which establish the maximum exit velocity for utility flares.

o. If a control device other than a flare is planned, confirm the duration of anticipated downtime for maintenance on an annual basis. The Department typically requires a back-up flare for alternate control devices.

p. Operational requirements:

(1) The GCCS shall be operated with a vacuum at each well and must exclude excessive amounts of air - show calculations. Vertical well and horizontal collector perforations will control head loss and air infiltration throughout the system. Vertical wells must not endanger the landfill base liner;

(2) The interior wellheads in the collection system shall be operated with a landfill gas temperature of less than 55 degrees C. and with either a nitrogen level less than 20 percent or an oxygen level less than 5 percent;

(3) Monitoring shall be done monthly to confirm optimum operational conditions;

(4) Surface monitoring shall be conducted to confirm efficiency of GCCS; and

(5) Provide provisions for automatic shutdown of blower if control device is inoperable.

q. The design of GCCS shall include fittings to allow connection of additional collectors if necessary in future: Expansion of the landfill GCCS will occur as needed to satisfy landfill gas emission and migration standards.

r. The wellhead for all collectors shall include at least one sampling port and one thermometer port (known as a monitoring port). The collection device connections may be above or below ground, and must include a positive-closing throttling valve, necessary seals and access couplings.

s. Gravel backfill in the extraction wells and trenches shall not obstruct pipe perforations

4. NSPS/EG Quarterly Surface Emissions Monitoring Protocol

The following test methods and procedures for surface emissions testing satisfy 40 CFR Part 60:

a. A portable hydrocarbon analyzer that satisfies 40CFR60, Appendix A, method 21, will be used to determine the methane concentration at each sampling point. The instrument must be calibrated, according to manufacturer's specifications for methane, diluted to a nominal concentration of 500 ppm in air.

b. Monitoring shall be performed during typical meteorological conditions. Average wind speed will be measured and recorded throughout the test. Monitoring will be terminated at average wind speeds in excess of 5 miles per hour or wind speed gusts greater than 10 miles per hour. Monitoring will be conducted when the solid waste disposal area is dry and no rain has fallen for the preceding 72 hours.

c. The background concentration will be determined by moving the probe inlet upwind and downwind outsid e the landfill property boundary lines at a distance of at least 98 feet.

d. The detector probe shall be positioned within 2 to 4 inches of the ground.

e. A grid pattern consisting of parallel lines approximately 98 feet (30 meters) apart shall form the basis for sampling locations. Per 40 CFR Part 60, Section 60.53 (c)(d), areas with steep slopes or dangerous areas will not be monitored. In addition to the grid pattern, sampling

locations for surface emissions shall also include leachate collection manholes and clean-out risers.

f. A surface concentration below 500 parts per million (ppm) methane above background indicates proper operation of the GCCS.

g. Any detection of 500 ppm or more above background shall be recorded as an exceedance. The location of the exceedance will be marked and recorded. Cover maintenance or adjustments to the GCCS will be made and the location will be re-monitored within 10 calendar days of the initial exceedance. If the re-monitoring of the location shows a second exceedance, additional corrective action will be taken and the location will be re-monitored within 10 days of the second exceedance. A proposed corrective action plan and corresponding timeline shall be submitted to the Department for approval for any location where monitored methane concentration equals or exceeds 500 ppm above background three times within a quarterly period.

h. Any location that initially showed and exceedance but has a methane concentration less than 500 ppm above background at the 10 day re-monitoring will be re-monitored 1 month from the initial exceedance. If the 1-month re-monitoring shows a concentration less than 500 ppm above background, no further monitoring of that location will be performed until the next quarterly monitoring period. If the 1-month remonitoring shows an exceedance, the location will be re-monitored within 10 calendar days of the second exceedance. A proposed corrective action plan and corresponding timeline shall be submitted to the Department for approval for any location where monitored methane concentration equals or exceeds 500 ppm above background three times within a quarterly period.

i. Surface emissions testing for the entire landfill shall be performed quarterly. If no exceedances are detected for a period of one year (4 quarterly monitoring episodes), the operator may petition to the Department for a reduction in surface monitoring frequency, to twice a year.

j. The location and concentration of each exceedance recorded during the surface emission tests shall be reported in an annual report to the Department. The concentration recorded at each location for which an exceedance was recorded in the previous month shall also be included in the annual report. Reports and monitoring records shall be maintained by the landfill owner/operator at the landfill for a period of five years. The annual report shall be submitted along with the topographic survey on May 1st of each year as required at N.J.A.C. 7:26-2A.8(i).

Note: The Department would like to acknowledge that portions of this technical manual, specifically section IV.B., was excerpted from a telecourse guide entitled “Municipal Solid Waste Landfill Gas Design Plan Review” for APTI Workshop T018 prepared under the auspices of the USEPA, North Carolina State University and EMCON (Kiel, Wisconsin office).

2

CHECKLIST FOR A LANDFILL GAS COLLECTION AND CONTROL SYSTEM REVIEW

1. Written description of the proposed change(s) containing relevant factors and rationale supporting the request.

2. Engineering drawings signed and sealed by a licensed NJ professional engineer.

3. Schedule for implementation of proposed change(s).

4. Include a copy of any air quality permit applications required to implement the proposed changes.

The applicant will be billed the appropriate fee once the application has been received. The completed application should be mailed to the following address:

Chief, Bureau of Landfill and Recycling Management
Division of Solid and Hazardous Waste
New Jersey Department of Environmental Protection
P.O. Box 414
Trenton, New Jersey 08625-0414
Telephone Number: (609) 984-6650

Section 15

Quality Assurance and Quality Control Certification Reports

I. Introduction

This manual presents the requirements for the preparation and submission of quality assurance and quality control (QA/QC) certification reports. These reports concern the construction of landfills, particularly the liner and its associated features. They may be used for the final capping of the landfill as well.

II. Applicable Regulations

The regulations governing QA/QC reporting can be found in the Division of Solid and Hazardous Waste rules at New Jersey Administrative Code N.J.A.C. 7:26-2A.5(a) and 7:26-2A.7(a).

A copy of N.J.A.C. Title 7, Chapter 26 can be obtained by contacting West Publishing, 610 Opperman Dr., P.O. Box 64526, St. Paul, MN 55164-0526 or phone 1-800-808-WEST. A nonjudicial version of the regulations may be viewed by visiting our web site at www.state.nj.us/dep/dshw.

III. Application Procedures

A checklist is enclosed in this manual to assist the applicant in submitting a complete report. Normally, two copies of the report are required to be submitted. The completed report should be mailed to the following address:

Chief, Bureau of Landfill and Recycling Management
Division of Solid and Hazardous Waste
New Jersey Department of Environmental Protection
P.O. Box 414
Trenton, New Jersey 08625-0414

Telephone Number: (609) 984-6650

The Department assesses a fee for the review of QA/QC certification reports in accordance with N.J.A.C. 7:26-4.3. The fee is calculated by multiplying the number of hours required by the Department to conduct the review by the current hourly rate. The estimated number of review hours is determined during the initial review of the submission and the applicant is billed accordingly.

IV. Policies and Regulatory Interpretations

The following sets forth the Department's policies and regulatory interpretations of N.J.A.C. 7:26-2A.5(a) and N.J.A.C. 7:26-2A.7(a) quality assurance and quality control reporting:

A. Pre-construction Reporting Activities

1. The QC personnel in association with the testing laboratory shall establish an acceptable zone (AZ) for the testing of each type of clay used in the liner system. The AZ is an area within the moisture-density curve which is indicative of moisture-density values associated with a hydraulic conductivity of $1x10^{-7}$ cm/s or less. This AZ will be developed based on the compactive effort needed to achieve the required hydraulic conductivity for the clay as well as other considerations such as shear strength, interfacial friction with a geomembrane in compressive contact with the clay, shrink/swell considerations, settlement, constructability and local conditions.

   The engineering design of a composite liner system specifies certain physical properties of clay. This relates to shear strength, moisture content, hydraulic conductivity, etc. The landfill is designed with these parameters in mind. For instance, the geosynthetic membrane liner and clay are tested for their interfacial friction angle. The clay is tested with a certain water content which results in an friction angle of sufficient value so that the slope of the landfill proves stable. Therefore, the clay can not be placed wetter than the original design. If the clay source changes, the new clay must be tested for interfacial friction angle and strength. Based on the outcome of the testing, the slope stability analysis may need to be rerun and the results may dictate the need to reject that clay or alter the construction parameters. Therefore, as part of the technical guidance provided by this document, we alert the writer of the bid documents that he/she place the appropriate language within the specifications so that the appropriate clay is used and the design is consistent with what is constructed.

   In the case of the AZ, it must be developed within the parameters of the design. The following tests are appropriate in establishing the initial AZ:

   a. High compactive effort associated with compaction equipment weighing 50,000 lbs. or more - use the Modified Proctor Test (ASTM D-1557)

   b. Moderate compactive effort associated with compaction equipment weighing 20,000 to 40,000 lbs. - use the Standard Proctor Test (ASTM D-698)

   c. Low compactive effort (probably not relevant to clay liner construction) - use the Reduced Proctor Test [U.S. Army Corps of Engineers (1970, p. VI-13)]. This is like the Standard Proctor Test except it uses 15 drops of the hammer per lift instead of the usual 25 drops.

   Please note that clays classified as CH or OH should not be compacted with vibratory rollers.

The moisture-density curve(s) with the depicted AZ will be submitted to this Division for approval prior to the construction of the clay liner. Upper and lower bounds must be established. The rationale for the choice of the AZ must be included. As a guideline, 95% of the maximum dry density from the Standard Proctor compaction or 90% from the Modified Proctor should be used as a lower boundary for most clays. The range of water content values might range from about 0 to 4 percentage points wet of Standard or Modified Proctor optimum.

Please note that passing moisture-density tests are those that fall within the AZ. The only possible exceptions are those tests that may plot above the AZ and the zero air voids line. Outliers are considered failed tests and require reworking and retesting. Retesting alone is not an acceptable alternative.

2. EPA Test Method 9100 testing for clay/leachate compatibility may be waived by this Division if these tests have previously been done and approved for the proposed clay. Waivers will be done on a case-by-case basis.

   Likewise, EPA Test Method 9090 testing for synthetic membrane liner/leachate compatibility may be waived by this Division if these tests have previously been done and approved for the proposed synthetic membrane liner. Waivers will be done on a case-by-case basis.

3. Physical properties of the clay which shall be tested for including the following:

   a. Atterberg Limits - ASTM D4318
   b. Grain Size Distribution - ASTM D422
   c. Unified Soil Classification - ASTM D2487
   d. Specific Gravity - ASTM D854
   e. As-received Water Content - ASTM D2216
   f. pH - ASTM D4972

4. Resumes of all personnel involved in the QA/QC shall be submitted to this Division and approved prior to their involvement in construction. All nuclear density operators should have appropriate certification for use of the meter. Geosynthetic liner installers shall have appropriate NICET (National Institute for Certification in Engineering Technologies) certification.

5. A detailed explanation of how the holes in the clay liner will be filled after testing (Shelby tubes and certain moisture-density tests) shall be provided and approved by this Division prior to construction.

6. All nuclear density meters to be used on the project must have a certificate of calibration submitted with the QC Certification Report.

B. Construction

1. General

a. The duties and functions of the QA/QC personnel are itemized in the regulations at N.J.A.C. 7:26-2A.5(a) and N.J.A.C. 7:26-2A.7(a). This includes the preparation of reports.

b. Grade stakes are to be avoided in the construction of a clay and/or geosynthetic liner. Lasers are to be used for grading purposes.

c. The major liner system components (subgrade, secondary liner, primary liner) should be constructed to within 0.1 ft. of the elevations depicted on the design drawings.

2. Geosynthetic Membrane Liners

a. The Division requires that liner seaming be conducted at a maximum ambient temperature of 100 degrees F and at a minimum ambient temperature of 40 degrees F (where ambient temperature is measured at 2 feet above the liner). Under no circumstances shall seaming be allowed when the sheet temperature falls below 32 degrees F. This is due to material concerns. If the soil beneath the geomembrane is frozen, the heat from the seaming device can thaw the frost which would allow water to be condensed onto the unbonded region ahead of the seam being fabricated. The formation of ice crystals in seams has been proven to be detrimental to seam quality. In the event that the contractor has been approved by the Division to conduct cold weather (ambient temperature less than 40 degrees F) seaming, the quality control plan shall address potential moisture problems. Additional destructive tests on the production seams shall be performed. Presently, one destructive sample per 500 feet of seam is required for ambient temperatures above 40 degrees F. In the case of cold weather seaming at temperatures between 40 degrees F ambient temperature and 32 degrees F sheet temperature, one destructive sample per 400 feet of seam shall be required.

b. Although they may be used, this Division does not believe that tents are the answer to seaming in extreme conditions.

3. Compacted Clay Liners

a. The maximum acceptable hydraulic conductivity for any compacted clay liner is 1×10^{-7} cm/sec.

b. Clay left exposed to freeze-thaw cycles will have permanent structural changes causing an increase in the hydraulic conductivity. Any such clay must be thoroughly retested for changes in hydraulic conductivity. This includes areas of the liner which may have been covered with other layers of geosynthetics or natural materials. The number of additional tests and the type of additional tests will be established by this Division. Please note that the retesting will be extensive and any necessary reconstruction costs will be high.

c. Previously, N.J.A.C. 7:26-2A.7(c)2x(7) required that field infiltration tests (e.g. sealed double ring infiltrometer, Boutwell permeameter) be performed on the final graded compacted clay liner. Based on past experience, this Division recognizes that certain field infiltrometer tests are time consuming and expensive to conduct. Consequently, N.J.A.C. 7:26-2A.7(c)2x(7) is now codified to indicate that field infiltrometer tests are recommended, not required, as a means to verify laboratory permeability tests. An alternative to field permeability testing may now be pursued as an option. A second quality control laboratory may be used to verify the permeability results against the primary results obtained in the quality control testing as required in N.J.A.C. 7:26-2A.7(c)2x(6). Should this alternate method of verifying laboratory results be pursued, it is recommended that three additional hydraulic conductivity tests be conducted for every 10 acres of the final graded compacted clay liner. These additional hydraulic tests shall be performed in accordance with ASTM-D5084 by a qualified laboratory other than the quality control laboratory. Specific QC procedures and identification of testing laboratories shall be outlined in the QA/QC Plan.

C. Post-Construction

1. QC Certification Report

a. The QC Certification Report shall use the following certification language pursuant to NJAC 7:26 -2A.7(c)24:

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals under my supervision, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. I understand that, in addition to criminal penalties, I may be liable for a civil administrative penalty pursuant to NJAC 7:26-5 and that submitting false information may be grounds for denial, revocation or termination of any solid waste facility permit or vehicle registration for which I may be seeking approval or now hold."

b. The QC Certification Report shall include as-built drawings signed and sealed by a New Jersey licensed Professional Engineer or Land Surveyor. It shall include spot elevations on a 50 foot grid for each major component of the liner system (e.g. subgrade, secondary clay liner, primary clay liner, sand drainage layer, etc.). It is recommended that the construction plans be used for the as-built drawings.

c. Manufacturing QC information including resin QC documents must be included. Material certifications from all geosynthetic material manufacturers should be included.

d. Data presentation in the QC Certification Report should be as follows:

(1) Certification Statement by the Project's QC Engineer

(2) Table of Contents

(3) Laboratory analysis of clay including hydraulic conductivity of field samples and clearly marked location maps.

(4) Moisture-density Tests that include a map with testing grid locations and a table of results for the subgrade and each lift presented as follows:

(a) grid number
(b) date of test
(c) density (both wet and dry)
(d) lab Proctor
(e) % compaction
(f) % moisture
(g) pass/fail indication for the test
(h) testing meter number
(i) meter operator's name(initials)
(j) QC inspector's name(initials)
(k) Comments-for retests of a previously failed area indicate what was done to make the area pass the test, i.e., the area was rewetted, rerolled, dried, etc.

(5) Geosynthetic Materials

(a) Physical property tests
(b) Liner seaming data including destructive and non-destructive tests
(c) Liner as-built drawings (panel information)
(d) Needle punched geotextiles shall be checked for broken needles.

(6) Drainage Material

(a) gradation analysis
(b) density in-place
(c) hydraulic conductivity in-place

(7) Leachate collection system

(a) leachate piping tests
(b) gravel envelope gradation analysis
(c) manhole testing for water tightness and for leak detection system operation
(d) leachate holding tank testing

3

CHECKLIST FOR A QUALITY ASSURANCE AND QUALITY CONTROL CERTIFICATION REPORT REVIEW

1. Written report of the construction of the landfill containing required field data, data tables and laboratory data

2. As-built engineering drawings (if necessary) signed and sealed by a licensed NJ professional engineer

3. Certification of a licensed New Jersey Professional Engineer

The applicant will be billed the appropriate fee once the application has been received. The completed application should be mailed to the following address:

Chief, Bureau of Landfill and Recycling Management
Division of Solid and Hazardous Waste
New Jersey Department of Environmental Protection
P.O. Box 414
Trenton, New Jersey 08625-0414
Telephone Number: (609) 984-6650

APPENDIX A

		COMPLETE (Y/N)	TECHNICALLY ADEQUATE (Y/N)		COMMENTS	N.J.A.C. 7:26 CITE
6.	EHIS Provide an Environmental and Health Impact Statement, which has been prepared using a systematic interdisciplinary approach in order to ensure the integrated assessment of technical, economic, environmental and social parameters potentially affected by the proposed facility. The EHIS shall address each category listed in 6.3 below. The magnitude and detail of the environmental inventory, the environmental assessment, the health impact assessment and the overall EHIS shall reflect the type, size and location of the proposed facility. Where the information addressing a requirement in the inventory is supplied in the engineering designs or reports, reference to such designs or reports may be noted in the inventory, provided that the appropriate section and page number of the design or report is cross-referenced and indexed. If any category listed at 6.3 below presents no impact relative to the facility, a notation of non-applicability shall be entered in the environmental inventory for that category. These categories shall be discussed with Department representatives at the Pre-Application Conference, prior to preparation of the EHIS. The Department may allow variances to these requirements for any category, or to reduce the size of the general area to be described in the inventory relative to site-specific impacts, if the applicant demonstrates during the pre-application conference that specific categories are not applicable or the area is not appropriately subject to EHIS requirements based on the type, size and location of the facility. The EHIS shall include the following:					2.9
6.1	Executive Summary An executive summary, including:					2.9(c)
6.1.1	Description of Proposed Facility					2.9(c)1
6.1.2	Positive Impacts Briefly describe any significant associated positive environmental impacts.					
6.1.3	Negative Impacts Briefly describe any significant associated negative environmental impacts.					
6.1.4	Mitigative Measures Describe any mitigative measures which will be taken to minimize or eliminate any negative impacts listed at 6.1.3 above					
6.2	Site Description Provide a description of the site location, including the following:					2.9(c)2
6.2.1	Setting Describe the municipal and neighborhood setting of the proposed facility.					
6.2.2	Site Plans Provide site maps as follows:					
6.2.2.1	Key Map An 8 ½ x 11 inch copy of the key map prepared in accordance with N.J.A.C. 7:26-2.10(b)4 and submitted as part of the engineering design per 7.4 below.					2.9(c)2i

		COMPLETE (Y/N)	TECHNICALLY ADEQUATE (Y/N)		COMMENTS	N.J.A.C. 7:26 CITE
6.2.2.2	Vicinity Map An 8 ½ x 11 inch copy of the vicinity map prepared in accordance with N.J.A.C. 7:26-2.10(b)5 and submitted as part of the engineering design per 7.5 below.					2.9(c)2ii
6.3	Environmental Inventory Provide a detailed site-specific inventory and general description of conditions within one mile of the proposed facility for each of the following categories.					2.9(c)3
6.3.1	Category I (Physical/Chemical) Describe the following parameters:					2.9(c)3i
6.3.1.1	Physical Geology Describe the following:					2.9(c)3i(1)
6.3.1.1.1	Formations Present Identify the major characteristics of the geologic formations, including:					
6.3.1.1.1.1	Thickness					
6.3.1.1.1.2	Lithology					
6.3.1.1.1.3	Structural Features					
6.3.1.1.1.4	Degree of Weathering					
6.3.1.1.1.5	Amount of Overburden					
6.3.1.1.1.6	Engineering Properties					
6.3.1.1.1.7	Indexes					
6.3.1.1.1.8	Subsurface Soils Quality					
6.3.1.1.2	Geologic Map Provide a copy of the geologic map prepared per N.J.A.C. 7:26-2.10(b)7ii.					
6.3.1.2	Soils Describe the soils present as follows: Note: Information shall be based on U.S. Soil Conservation Service surveys.					2.9(c)3i(2)
6.3.1.2.1	Identification Identify the major soil types present.					
6.3.1.2.2	Characteristics Describe the soil characteristics, including the following:					
6.3.1.2.2.1	Drainage					
6.3.1.2.2.2	Erosion Potential					
6.3.1.2.2.3	Sedimentation Potential					
6.3.1.2.2.4	Texture of Each Horizon					

		COMPLETE (Y/N)	TECHNICALLY ADEQUATE (Y/N)		COMMENTS	N.J.A.C. 7:26 CITE
6.3.1.2.2.5	Thickness of Each Horizon					2.9(c)3i(2)
6.3.1.2.2.6	Mottling					
6.3.1.2.2.7	Taxonomic Classification					
6.3.1.2.2.8	Surface Soils Quality					
6.3.1.2.3	Soils Map Provide a copy of the soils map prepared in accordance with N.J.A.C. 7:26-2.10(b)7i.					
6.3.1.3	Subsurface Hydrology Describe the subsurface hydrology by presenting groundwater quantity and quality data for aquifers located beneath the site, as follows:					2.9(c)3i(3)
6.3.1.3.1	Depth to Groundwater Provide depth to water table during seasonal high and low flow conditions.					
6.3.1.3.2	Groundwater Flow Direction					
6.3.1.3.3	Existing Uses					
6.3.1.3.4	Future Supply Capabilities					
6.3.1.4	On-Site Water Bodies For water bodies which abut the site, exist on the site, or drain directly onto or off the site, provide water quantity and quality data as follows:					2.9(c)3i(4)
6.3.1.4.1	Flow Rates					
6.3.1.4.2	Current Uses					
6.3.1.4.3	Supply Capabilities					
6.3.1.4.4.	Dissolved Oxygen (DO)					
6.3.1.4.5	Biochemical Oxygen Demand (BOD)					
6.3.1.4.6	Total Organic Carbon (TOC)	`				
6.3.1.4.7	Total Suspended Solids (TSS)					
6.3.1.4.8	Temperature Regime					
6.3.1.4.9	Classifications All existing water classifications per N.J.A.C. 7:9B					
6.3.1.4.10	Designated Uses Designated uses per N.J.A.C. 7:9B.					
6.3.1.4.11	Limitations Limitations per N.J.A.C. 7:9B					
6.3.1.5	Tributaries For upstream or downstream tributaries of water bodies which flow onto or from the site, provide the following:					2.9(c)3i5)

		COMPLETE (Y/N)	TECHNICALLY ADEQUATE (Y/N)		COMMENTS	N.J.A.C. 7:26 CITE
6.3.1..5.1	Classifications All existing water classifications per N.J.A.C. 7:9-4.					2.9(c)3i5)
6.3.1.1.5.2	Designated Uses Designated uses per N.J.A.C. 7:9-4.					
6.3.1.5.3	Limitations Limitations per N.J.A.C. 7:9-4					
6.3.1.5.4	Water Quality Factors A narrative description of factors influencing water quality, including but not limited to the following:					
6.3.1.5.4.1	Major Permitted Discharges					
6.3.1.5.4.2	Tributaries					
6.3.1.5.4.3	Confluences with Other Water Bodies					
6.3.1.5.5	One-Mile Radius Information required by 6.3.1.5.1 through 6.3.1.5.4 above shall be provided for a distance of one mile from the site boundary.					
6.3.1.6	Other Water Bodies For all water bodies not covered by 6.3.1.4 and 6.3.1.5 above, provide the following information:					2.9(c)3I(6)
6.3.1.6.1	Classifications All existing water classifications per N.J.A.C. 7:9-4					
6.3.1.6.2	Designated Uses Designated uses per N.J.A.C. 7:9-4					
6.3.1.6.3	Limitations Limitations per N.J.A.C. 7:9-4					
6.3.1.7	Consistency with Water Quality Planning Act Document that the proposed facility will not be inconsistent with any facility or area-wide Water Quality Management Plan developed per N.J.S.A. 58:11A-1 et seq.					2.9(c)3i(7)
6.3.1.8	Topography Provide topographic information as follows:					2.9(c)3i(8)
6.3.1.8.1	Contours					
6.3.1.8.2	Drainage Patterns					
6.3.1.8.3	Floodways Delineation of any floodways developed pursuant to the Flood Hazard Area Control Act (N.J.S.A. 58:16A-50) and/or shown on the current effective F.E.M.A. flood map.					

		COMPLETE (Y/N)	TECHNICALLY ADEQUATE (Y/N)		COMMENTS	N.J.A.C. 7:26 CITE
6.3.1.8.4	Flood Hazard Areas Delineation of any flood hazard areas (100-year flood) developed pursuant to the Flood Hazard Area Control Act (N.J.S.A. 58-16A-50) and/or shown on the current effective F.E.M.A. flood map.					2.9(c)3i(8)
6.3.1.9	Climate Provide site-specific data as follows: Note: Meteorological data may be obtained from the nearest NOAA-sanctioned weather station, unless otherwise required by the Department.					2.9(c)3i(9)
6.3.1.9.1	Wind Direction					
6.3.1.9.2	Wind Velocity and Frequency					
6.3.1.9.3	Average Annual Precipitation					
6.3.1.9.4	Average Monthly Precipitation					
6.3.1.9.5	Average Annual Temperature					
6.3.1.9.6	Average Monthly Temperature					
6.3.1.10	Ambient Air Quality Provide the following information: Note: Data may be obtained from the nearest State-operated monitoring station, unless otherwise required by the Department.					2.9(c)3i(10
6.3.1.10.1	Pollutant Concentrations Existing concentrations of the National Ambient Air Quality Standard pollutants as identified in 42 USC 7401 et seq.					
6.3.1.10.2	Consistency with State Plan A demonstration that the proposed facility will be consistent with the New Jersey State Implementation Plan and related air quality requirements established by the Division of Environmental Quality.					
6.3.1.11	Acoustical Conditions Describe ambient acoustical conditions by providing the following:					2.9(c)3i(11)
6.3.1.11.1	Day and Night Noise Levels Noise levels measured at the boundaries of the site.					
6.3.1.11.2	Impulsive and Continuous Sources Identify sources of impulsive and continuous noise.					
6.3.2	Category II (Biological/Ecological) Describe the following parameters:					2.9(c)3ii
6.3.2.1	Major Plants Provide the following information:	`				2.9(c)3ii(1)

		COMPLETE (Y/N)	TECHNICALLY ADEQUATE (Y/N)		COMMENTS	N.J.A.C. 7:26 CITE
6.3.2.1.1	Delineation of Associations Delineate the different major plant associations present in a mapped format.					2.9(c)3ii(1)
6.3.2.1.2	Major and Minor Species Identify major dominant and minor species present in each plant association.					
6.3.2.1.3	Proportions Estimate the proportions of each species identified in 6.3.2.1.2 above.					
6.3.2.1.4	One-Mile Radius Information required by 6.3.2.1.1. through 6.3.2.1.3 above shall be provided for a distance of one mile from the site boundary.					
6.3.2.2	Game and Non-Game Mammals Utilization Provide the following information:					2.9(c)3ii(2)
6.3.2.2.1	Species Identify species utilizing the site for year-round, breeding, wintering and migratory purposes.					
6.3.2.2.2	Populations Estimate populations utilizing the site for year-round, breeding, wintering and migratory purposes.					
6.3.2.2.3	Relation to Major Plants Relate utilization of the site by mammals to the plant associations described in 6.3.2.1 above.					2.9(c)3ii(2)
6.3.2.2.4	One-Mile Radius Information required by 6.3.2.2.1 through 6.3.2.2.3 above shall be provided for a distance of one mile from the site boundary.					
6.3.2.3	Game and Non-Game Birds Utilization Provide the following information:					2.9(c)3ii(3)
6.3.2.3.1	Species Identify species utilizing the site for year-round, breeding, wintering and migratory purposes.					
6.3.2.3.2	Populations Estimate populations utilizing the site for year-round, breeding, wintering and migratory purposes.					
6.3.2.3.3	Relation to Major Plants Relate utilization of the site by birds to the plant associations described in 6.3.2.1 above.					
6.3.2.3.4	One-Mile Radius Information required by 6.3.2.3.1through 6.3.2.3.3 above shall be provided for a distance of one mile from the site boundary.					

		COMPLETE (Y/N)	TECHNICALLY ADEQUATE (Y/N)		COMMENTS	N.J.A.C. 7:26 CITE
6.3.2.4	Reptiles and Amphibians Utilization Provide the following information:					2.9(c)3ii(4)
6.3.2.4.1	Species Identify species utilizing the site for year-round, breeding, wintering and migratory purposes.					
6.3.2.4.2	Populations Estimate populations utilizing the site for year-round, breeding, wintering and migratory purposes.					
6.3.2.4.3	Relation to Major Plants Relate utilization of the site by reptiles and amphibians to the plant associations described in 6.3.2.1 above.					
6.3.2.4.4	Quarter-Mile Radius Information required by 6.3.2.4.1 through 6.3.2.4.3 above shall be provided for a distance of one-quarter mile from the site boundary.					
6.3.2.4.5	Water Bodies Information required by 6.3.2.4.1 through 6.3.2.4.3 above shall be provided for those water bodies listed in 6.3.1.4 and 6.3.1.5 above.					
6.3.2.5	Fish Utilization Provide the following information:					3.9(c)3ii(5)
6.3.2.5.1	Species Identify species utilizing the site for year-round, breeding, wintering and migratory purposes.					
6.3.2.5.2	Populations Estimate populations utilizing the site for year-round, breeding, wintering and migratory purposes.					
6.3.2.5.3	Quarter-Mile Radius Information required by 6.3.2.5.1 and 6.3.2.5.2 above shall be provided for a distance of one-quarter mile from the site boundary.					
6.3.2.5.4	Water Bodies Information required by 6.3.2.5.1 and 6.3.2.5.2 above shall be provided for those water bodies listed in 6.3.1.4 and 6.3.1.5 above.					
6.3.2.6	Endangered Species Describe plant or animal species on the Federal and State endangered, threatened or rare species lists as follows:					2.9(c)3ii(6)
6.3.2.6.1	Species Identify plant or animal species on the list(s)					

		COMPLETE (Y/N)	TECHNICALLY ADEQUATE (Y/N)		COMMENTS	N.J.A.C. 7:26 CITE
6.3.2.6.2	Utilization Identify, in a mapped format, present species listed in 6.3.2.6.1 above.					2.9(c)3ii(6)
6.3.2.6.3	Habitat Quantify the amount of habitat and corresponding carrying capacity at the site for each species identified in 6.3.2.6.1 above.	`				
6.3.2.6.4	Patterns Evaluate applicable breeding, wintering and migratory patterns.					
6.3.2.7	Identification of Unique Habitat Map any unique, critical or unusual habitats, including the following:					2.9(c)3ii(7)
6.3.2.7.1	Wetlands					
6.3.2.7.2	Prime Agricultural Lands					
6.3.2.7.3	Steep Slopes Slopes greater than 15 percent.					
6.3.2.7.4	Riparian Lands					
6.3.2.7.5	Coastal Zones					
6.3.2.7.6	Other Areas Other unique, critical or unusual habitats as specified by the Department.					
6.3.2.8	Description of Site Visits Provide a description of site visits undertaken to evaluate the site ecosystem, including the following:					2.9(c)3ii(8)
6.3.2.8.1	Date					
6.3.2.8.2	Duration					
6.3.2.8.3	Weather Conditions					
6.3.2.8.4	Individuals Present					
6.3.2.8.5	Study Parameters					
6.3.2.8.6	Copy of Studies Provide a copy of studies prepared in connection with preparation of the environmental inventory.					
6.3.2.9	Description of Methodologies Provide a description of the methodologies used to evaluate the biotic community. The description shall meet the following requirements:					2.9(c)3ii(9)
6.3.2.9.1	Sufficiently Detailed The description shall be sufficient to permit an independent expert to form an opinion as to the scientific justification and integrity of the selected methodology.					2.9(c)3ii(9)

		COMPLETE (Y/N)	TECHNICALLY ADEQUATE (Y/N)		COMMENTS	N.J.A.C. 7:26 CITE
6.3.29.2	Bibliography The description shall include a bibliography of all research materials utilized in the preparation of the environmental inventory.					
6.3.3	Category III (Cultural) Describe the following parameters:					2.9(c)3iii
6.3.3.1	Recreational Activities Identify those areas used for or designated as the following:					2.9(c)3iii(1)
6.3.3.1.1	Hunting					
6.3.3.1.2	Fishing					
6.3.3.1.3	Trapping					
6.3.3.1.4	Boating					
6.3.3.1.5	Swimming					
6.3.3.1.6	Tourism					
6.3.3.1.7	Camping					
6.3.3.1.8	Nature Photography					
6.3.3.1.9	Bird Watching					
6.3.3.1.10	Parks					
6.3.3.1.11	Forests					
6.3.3.1.12	Wildlife Management Areas					
6.3.3.1.13	Natural Areas					
6.3.3.1.14	Other Recreational Lands Other publicly or privately owned lands designated for open space or recreational activities.					
6.3.3.2	Aesthetics Identify and describe the following:					2.9(c)3iii(2)
6.3.3.2.1	Surrounding Architecture					
6.3.3.2.3	Open Space Areas					
6.3.3.2.3	Scenic Areas					
6.3.3.3	Historical Areas Describe areas of historical or archeological importance.					2.9(c)3iii(3)
6.3.4	Category IV (Socioeconomic) Describe the following parameters:					2.9(c)3iv
6.3.4.1	Transportation Facilities Identify the following:					2.9(c)3iv(1)
6.3.4.1.1	Network The transportation network which will service the facility.					

		COMPLETE (Y/N)	TECHNICALLY ADEQUATE (Y/N)		COMMENTS	N.J.A.C. 7:26 CITE
6.3.4.1.2	Site Access Capability					2.9(c)3iv(1)
6.3.4.1.3	Traffic Flow Existing traffic flow patterns, expressed as follows:					
6.3.4.1.3.1	Daily Peak Hour Volumes					
6.3.4.1.3.2	Off Peak Hour Volumes					
6.3.4.1.3.3	Levels of Service					
6.3.4.1.3.4	Average Daily Number of Trips					
6.3.4.1.4	Future Plans Any proposed local, county or NJDOT traffic engineering plans for the network identified in 6.3.4.1.1 above.	`				
6.3.4.2	Sewage Facilities Identify the following:					2.9(c)3iv(2)
6.3.4.2.1	Treatment System Type					
6.3.4.2.2	Treatment Capacity					
6.3.4.2.3	Collection System Capacity					
6.3.4.2.4	Average Flow Data					
6.3.4.2.5	Peak Flow Data					
6.3.4.2.6	Committed Capacity Current committed capacity for the treatment and collection system.					
6.3.4.3	Stormwater Management System Identify the following:					2.9(c)3iv(3)
6.3.4.3.1	System Type					
6.3.4.3.2	System Capacity Describe the system's current collection and treatment capacity and utilization.					
6.3.4.4	Water Supply System, Identify the following					2.9(c)3iv(4)
6.3.4.4.1	System Type					
6.3.4.4.2	Water Sources					
6.3.4.4.3	Pre-Treatment Describe the level and type of existing pre-treatment.					
6.3.4.4.4	System Capacity					
6.3.4.4.5	Committed Capacity					2.9(c)3iv(4)
6.3.4.4.6	Available Additional Supply					
6.3.4.4.7	Peak Demand					
6.3.4.4.8	Average Demand					

		COMPLETE (Y/N)	TECHNICALLY ADEQUATE (Y/N)		COMMENTS	N.J.A.C. 7:26 CITE
6.3.4.5	Energy Supply System Identify the following:					2.9(c)3iv(5)
6.3.4.5.1	Existing Power or Pipelines					
6.3.4.5.2	Committed Capacity					
6.3.4.5.3	Supply Capability					
6.3.4.5.4	Conveyance Capability If applicable, capability of conveyance from the site of energy generated by the facility.					
6.3.4.6	Demography Provide the following information: Note: Sate, county or local government sources may be used for all demographic data.					2.9(c(3iv(6)
6.3.4.6.1	Present Population					
6.3.4.6.2	Future Population					
6.3.4.6.3	Population Trends					
6.3.4.6.4	Facility District Information required by 6.3.4.6.1 through 6.3.4.6.3 above shall be provided for the district within which the facility will be located.					
6.3.4.6.5	Other Districts Information required by 6.3.4.6.1 through 6.3.4.6.3 above shall also be provided for all districts, which will utilize the proposed facility.					
6.3.4.7	Property Values Describe property values as follows:					2.9(c)3iv(7)
6.3.4.7.1	Immediate Vicinity The description of property values within the immediate neighborhood of the proposed facility shall include a discussion of the following:					
6.3.4.7.1.1	Prices and Trends Median sales prices and recent (1-2 year) trends.					
6.3.4.7.1.2	Zoning Changes					
6.3.4.7.1.3	Development Patterns					
6.3.4.7.1.4	Development Approvals					
6.3.4.7.1.5	Sufficiently Detailed Information required by 6.3.4.7.1.1 through 6.3.4.7.1.4 above shall be sufficiently detailed to allow assessment of the effect that construction and operation of the facility may have on property values in the immediate vicinity.					2.9(c)3iv(7)

		COMPLETE (Y/N)	TECHNICALLY ADEQUATE (Y/N)		COMMENTS	N.J.A.C. 7:26 CITE
6.3.4.7.2	Other Areas Information required by 6.3.4.7.1.1 through 6.3.4.7.1.4 above shall also be provided for other areas within the municipality where the facility will be located.					
6.3.4.7.3	Other Municipalities Information required by 6.3.4.7.1.1 through 6.3.4.7.1.4 above shall also be provided for all other municipalities within one-half mile of the facility.					
6.3.4.8	Public Services Describe public services available in the municipality in which the facility will be located by identifying the following:					2.9(c)3iv(8)
6.3.4.8.1	Law Enforcement Services					
6.3.4.8.2	Fire Protection Services					
6.3.4.8.3	Health Protection Capabilities					
6.3.4.9	Community Facilities Describe and map the location of community facilities, including but not limited to the following:					2.9(c)3iv(9)
6.3.4.9.1	Hospitals					
6.3.4.9.2	Nursing Homes					
6.3.4.9.3	Food Processing Centers					
6.3.4.9.4	Playgrounds					
6.3.4.9.5	Parks					
6.3.4.9.6	Schools					
6.3.4.9.7	Residences					
6.4	Operations Description Provide a detailed description of the proposed facility operations, including the following:					2.9(c)4
6.4.1	Project Sponsor Identify the project sponsor by providing the following information:					2.9(c)4i
6.4.1.1	Name					
6.4.1.2	Address					
6.4.1.3	Telephone Number					
6.4.1.4	Associations with Other Waste Management Projects If the sponsor is presently, or was previously, associated with any other waste disposal or collection project or operation, provide the following:					2.9(c)4i
6.4.1.4.1	Project Name Identify the project or operation.					

		COMPLETE (Y/N)	TECHNICALLY ADEQUATE (Y/N)		COMMENTS	N.J.A.C. 7:26 CITE
6.4.1.4.2	Responsibilities Describe the sponsor's responsibilities during any project identified in 6.4.1.4.1 above.					
6.4.2	Purpose Explain the purpose of the proposed facility by providing the following:					2.9(c)4ii
6.4.2.1	Description of Services Describe the products or services being provided.					
6.4.2.2	List of Benefits List the benefits to be realized by the owner, the community in which the facility is to be located, and the surrounding communities.					
6.4.3	Existing or Potential Markets Describe the existing or potential markets for each of the products to be recovered by the solid waste facility operation by providing the following:					2.9(c)4iii
6.4.3.1	Identification of Products Describe the types, quality and daily quantities of products to be recovered.					
6.4.3.2	Quality Control Provide the elements of a quality control plan for the recovered products.					
6.4.3.3	Contracts Provide a copy of any long-term contracts for the sale of the recovered products, **OR**					
6.4.3.4	Letter of Intent If long-term contracts have not yet been finalized, provide a detailed letter of intent, describing the areas of agreement and disagreement.					
6.4.3.5	Description of End Use Describe the purchaser's end use of the recovered products.					
6.4.4	Economic Analysis Provide an economic analysis of the proposed facility, including:					2.9(c)4iv
6.4.4.1	Revenue Projection Approximate and project any revenues to be realized from the sale of recovered products.					2.9(c)4iv
6.4.4.2	Expenditures Projection Approximate and project capital, operating and maintenance expenditures.					

		COMPLETE (Y/N)	TECHNICALLY ADEQUATE (Y/N)		COMMENTS	N.J.A.C. 7:26 CITE
6.4.4.3	Waste Processing Charges Project maximum and minimum charges to be assessed for the various waste types to be handled, including an estimate of the initial tipping charges.					
6.4.5	Waste Streams Identification and Guarantee					2.9(c)4v
6.4.5.1	Identification Describe the waste streams, which will be accepted by the facility.					
6.4.5.2	Guarantee Provide copies of any agreements, which will guarantee a steady flow of the wastes identified in 6.4.5.1 above to the facility.					
6.4.6	Time Schedule Provide a time schedule for the development and startup of the proposed facility, including anticipated completion dates for major phases of the construction.					2.9(c)4vi
6.4.7	Description of Processes Provide a narrative description of the disposal processes to be used, including the following information:					2.9(c)4vii
6.4.7.1	Process Types					2.9(c)4vii(1)
6.4.7.2	Number of Units					
6.4.7.3	Process Capacities					
6.4.7.4	Daily Handling Capacity					2.9(c)4vii(2)
6.4.7.5	Hourly Handling Capacity					
6.4.7.6	Anticipated Operating Times Provide anticipated operating times in hours per day and days per week. Provide schedules of operating hours dedicated for waste acceptance and waste processing. Note: If weekly averaging is proposed, provide the number of days of operation per week, tons of waste to be accepted per week and daily maximums.					
6.4.7.7	Process Control Measures					2.9(c)4vii
6.4.7.8	Process Monitoring Instrumentation					
6.4.8	Process Residues Management Describe any process residues and side-stream wastes resulting from facility operations, including the following information:					2.9(c)4viii
6.4.8.1	Quantity					
6.4.8.2	Physical/Chemical Characteristics					
6.4.8.3	Methods of Disposal Discuss appropriate methods of disposal of process residues, including the following information, where applicable:					

		COMPLETE (Y/N)	TECHNICALLY ADEQUATE (Y/N)		COMMENTS	N.J.A.C. 7:26 CITE
6.4.8.3.1	Disposal Contracts					
6.4.8.3.2	District Plan Inclusion					
6.4.8.3.3	Primary Disposal Sites					
6.4.8.3.4	Alternate Disposal Sites					
6.4.8.3.5	Methods of Storage & Handling					
6.4.8.3.6	Methods of Reuse or Recycling					
6.5	Conformance with Plans, Policies and Regulations Provide a discussion of the relationship of the proposed action to federal, State, county and local land-use plans, policies, controls and environmental regulations, including the following:					2.9(c)5
6.5.1	Present Land Use Describe present land use as follows:					2.9(c)5i
6.5.1.1	Facility Site					
6.5.1.2	Adjacent Areas Areas within 2 miles of the property line.					
6.5.1.3	Zoning Maps					
6.5.1.4	Use Restrictions Chart					
6.5.1.5	Landfill Data If any portion of the facility site or areas adjacent to the site was previously used for the landfilling of wastes, provide the following information:					
6.5.1.5.1	Depth					
6.5.1.5.2	Area of Deposition					
6.5.1.5.3	Waste Types					
6.5.1.5.4	Gas Concentration					
6.5.1.5.5	Gas Migration					
6.5.1.5.6	Settlement					
6.5.1.5.7	Other Factors Discuss any other factors, which may affect construction or operation of the proposed facility.					2.9(c)5i
6.5.2	Conformance with Requirements Describe how the project will conform or conflict with the objectives of any federal, state or local land use or environmental requirements, including:					2.9(c)5ii

		COMPLETE (Y/N)	TECHNICALLY ADEQUATE (Y/N)		COMMENTS	N.J.A.C. 7:26 CITE
6.5.2.1	Flood Hazard Requirements Floodway, flood fringe or flood hazard areas identified by the New Jersey Flood Hazard Area Control Act or by flood insurance studies prepared by the Federal Emergency Management Agency.					2.9(c)5ii(1)
6.5.2.2	Wild & Scenic Areas Areas designated as wild, scenic, recreational or developed recreational rivers pursuant to the National Wild and Scenic Rivers Act or the New Jersey Wild and Scenic River Act.					2.9(c)5ii(2)
6.5.2.3	Critical Habitat Critical habitat of endangered or threatened species of plants, fish or wildlife as defined by the Federal Endangered Species Act or the New Jersey Endangered and Non-Game Species Conservation Act.					2.9(c)5ii(3)
6.5.2.4	Wetlands, Tidelands & Coastal Zones Wetlands, tidelands and coastal zone areas as identified by the Department pursuant to the Wetlands and Coastal Resource and Development Policies and as identified on the U.S. Fish and Wildlife Services National Wetlands Inventory Maps.					2.9(c)5ii(4)
6.5.2.5	Pinelands Area Preservation and Protection Areas as established by the New Jersey Pinelands Protection Act.					2.9(c)5ii(5)
6.5.2.6	Nonattainment Areas Nonattainment areas as defined in N.J.A.C. 7:27-18					2.9(c)5ii(6)
6.5.2.7	PSD Areas Areas subject to the Prevention of Significant Deterioration criteria as defined at 40 CFR 52.21.					2.9(c)5ii(7)
6.5.2.8	Acoustical Impact Areas Areas which may impact the acoustical quality of residential and commercial properties pursuant to N.J.A.C. 7:29.					2.9(c)5ii(8)
6.5.2.9	Water Quality Impact Areas Areas which may significantly impact water quality pursuant to N.J.A.C. 7:15.					2.9(c)5ii(9)
6.5.2.10	Agricultural Development Areas Lands certified by the State Agriculture Development Committee as agricultural development areas pursuant to the New Jersey Agricultural Retention and Development Act.					2.9(c)5ii(10)
6.5.2.11	Watershed Areas Watershed areas for waters classified by the Department as FW-1 Waters or FW-2 Trout Production Waters pursuant to the New Jersey Surface Water Quality Standards.					2.9(c)5ii(11)

		COMPLETE (Y/N)	TECHNICALLY ADEQUATE (Y/N)		COMMENTS	N.J.A.C. 7:26 CITE
6.5.2.12	Aquifer Areas Areas overlying a sole source aquifer designated pursuant to section 1424(e) of the Safe Drinking Water Act.					2.9(c)5ii(12)
6.5.2.13	Critical Water Supply Areas Areas located within critical supply areas defined by the New Jersey Water Supply Management Act.					2.9(c)5ii(13)
6.5.2.14	Historic Areas Areas which will encroach upon, damage or destroy any area, site, structure or object included in the National or State Register of Historic Places.					2.9(c)5ii(14)
6.5.2.15	Airport Proximity Areas within 10,000 feet of any airport runway which is equal to or greater than 3,000 feet in length, or within 5,000 feet of any airport runway which is less than 3,000 feet in length.					2.9(c)5ii(15)
6.5.2.16	Recreational or Open Spaces Areas dedicated to recreational or open space use, such as national parks, national recreation areas, national forests, national wildlife refuges, State wildlife management areas, State parks, State forests, State designated natural areas and county or local parks, wildlife sanctuaries and recreational facilities.					2.9(c)5ii(16)
6.5.2.17	Cleanup Areas Areas subject to cleanup requirements pursuant to the New Jersey Industrial Site Remediation Act.					2.9(c)5ii(17)
6.5.3	Mitigation Efforts Where the potential for a land use or environmental conflict exists, describe the mitigation efforts to be undertaken to meet the intent of the applicable land use or environmental requirement.					2.9(c)5iii
6.6	Description of District Plans Provide a description of the District Solid Waste Management Plans and Sludge Management Plans for the following districts:					2.9(c)6
6.6.1	Facility District For the district in which the facility will be located, describe each plan as follows:					2.9(c)6
6.6.1.1	Solid Waste Management Plan The description of the District Solid Waste Management Plan shall contain the following:					
6.6.1.1.1	Municipalities Identify all municipalities within the district.					2.9(c)6i

		COMPLETE (Y/N)	TECHNICALLY ADEQUATE (Y/N)		COMMENTS	N.J.A.C. 7:26 CITE
6.6.1.1.2	Plan Strategy Describe the strategy of the plan as it pertains to the proposed facility.					
6.6.1.1.3	Waste Flow Agreements Describe inter-district waste flow agreements.		`			
6.6.1.1.4	Waste Flow Patterns Describe intra-district waste flow patterns					
6.6.1.1.5	Plan Duration					
6.6.1.1.6	Recycling Goals					
6.6.1.1.7	Waste Reduction Goals					
6.6.1.1.8	Implementation Schedules					
6.6.1.1.9	Plan Implementing Agencies					
6.6.1.1.10	Plan Conformance Describe how the proposed facility will conform with the content and strategy of the plan.					
6.6.1.1.11	Facility Need Discuss the elements of the plan which indicate a need for the facility.					2.9(c)6ii
6.6.1.1.12	Current Capacities Discuss the facility's relation to current solid waste disposal capacities.					
6.6.1.1.13	Guarantee Mechanisms Describe the established mechanisms that will guarantee the necessary waste flows to the proposed facility.					
6.6.1.2	Sludge Management Plan The description of the Sludge Management Plan shall contain the following:					2.9(c)6
6.6.1.2.1	Municipalities Identify all municipalities within the district.					2.9(c)6i
6.6.1.2.2	Plan Strategy Describe the strategy of the plan as it pertains to the proposed facility.					2.9(c)6i
6.6.1.2.3	Waste Flow Agreements Describe inter-district waste flow agreements.					
6.6.1.2.4	Waste Flow Patterns Describe intra-district waste flow patterns.					
6.6.1.2.5	Plan Duration					
6.6.1.2.6	Recycling Goals					

		COMPLETE (Y/N)	TECHNICALLY ADEQUATE (Y/N)		COMMENTS	N.J.A.C. 7:26 CITE
6.6.1.2.7	Sludge Reduction Goals					
6.6.1.2.8	Implementation Schedules					
6.6.1.2.9	Plan Implementing Agencies					
6.6.1.2.10	Plan Conformance Describe how the proposed facility will conform with the content and strategy of the plan.					
6.6.1.2.11	Facility Need Discuss the elements of the plan which indicate a need for the facility.					2.9(c)6ii
6.6.1.2.12	Current Capacities Discuss the facility's relation to current sludge disposal capacities.					
6.6.1.2.13	Guarantee Mechanisms Describe the established mechanisms that will guarantee the necessary sludge flows to the proposed facility.					
6.6.2	Sending Districts For the districts from which the solid wastes will be received, describe each plan as follows:					2.9(c)6
6.2.1	Solid Waste Management Plan The description of the District Solid Waste Management Plan shall contain the following:					
6.6.2.1.1	Municipalities Identify all municipalities within the district.					2.9(c)6i
6.6.2.1.2	Plan Strategy Describe the strategy of the plan as it pertains to the proposed facility.					
6.6.2.1.3	Waste Flow Agreements Describe inter-district waste flow agreements.					

		COMPLETE (Y/N)	TECHNICALLY ADEQUATE (Y/N)		COMMENTS	N.J.A.C. 7:26 CITE
6.6.2.1.5	Plan Duration					
6.6.2.1.6	Recycling Goals					
6.6.2.1.7	Waste Reduction Goals					
6.6.2.1.8	Implementation Schedules					
6.6.2.1.9	Plan Implementing Agencies					

		COMPLETE (Y/N)	TECHNICALLY ADEQUATE (Y/N)		COMMENTS	N.J.A.C. 7:26 CITE
6.6.2.1.10	Plan Conformance Describe how the proposed facility will conform with the content and strategy of the plan.					
6.6.2.1.11	Facility Need Discuss the elements of the plan which indicate a need for the facility.					2.9(c)6ii
6.6.2.1.12	Current Capabilities Discuss the facility's relation to current solid waste disposal capacities.					
6.6.2.1.13	Guarantee Mechanism Describe established mechanisms that will guarantee the necessary waste flows to the proposed facility.					
6.6.2.2	Sludge Management Plan The description of the Sludge Management Plan shall contain the following:					2.9(c)6
6.6.2.2.1	Municipalities Identify all municipalities within the district.					2.9(c)6i
6.6.2.2.2	Plan Strategy Describe the strategy of the plan as it pertains to the proposed facility.					
6.6.2.2.3	Waste Flow Agreements Describe inter-district waste flow agreements.					
6.6.2.2.4	Waste Flow Patterns Describe intra-district waste flow patterns.					
6.6.2.2.5	Plan Duration					
6.6.2.2.6	Recycling Goals					
6.6.2.2.7	Sludge Reduction Goals					
6.6.2.2.8	Implementation Schedules					
6.6.2.2.9	Plan Implementing Agencies					
6.6.2.2.10	Plan Conformance Describe how the proposed facility will conform with the content and strategy of the plan.					2.9(c)6i
6.6.2.2.11	Facility Need Discuss the elements of the plan which indicate a need for the facility.					2.9(c)6ii
6.6.2.2.12	Current Capacities Discuss the facility's relation to current sludge disposal capacities.					

		COMPLETE (Y/N)	TECHNICALLY ADEQUATE (Y/N)		COMMENTS	N.J.A.C. 7:26 CITE
6.6.2.2.13	Guarantee Mechanisms Describe established mechanisms that will guarantee the necessary sludge flows to the proposed facility.					
6.6.3	Receiving Districts For the districts where process residues from the proposed facility are to be sent for disposal, describe each plan as follows:					2.9(c)6
6.6.3.1	Solid Waste Management Plan The description of the District Solid Waste Management Plan shall contain the following:					
6.6.3.1.1	Municipalities Identify all municipalities within the district.					2.9(c)6i
6.6.3.1.2	Plan Strategy Describe the strategy of the plan as it pertains to the proposed facility.					
6.6.3.1.3	Waste Flow Agreements Describe inter-district waste flow agreements.					
6.6.3.1.4	Waste Flow Patterns Describe intra-district waste flow patterns.					
6.6.3.1.5	Plan Duration					
6.6.3.1.6	Recycling Goals					
6.6.3.1.7	Waste Reduction Goals					
6.6.3.1.8	Implementation Schedules					
6.6.3.1.9	Plan Implementing Agencies					
6.6.3.1.10	Plan Conformance Describe how the proposed facility will conform with the content and strategy of the plan.					
6.6.3.1.11	Facility Need Discuss the elements of the plan which indicate a need for the facility.					2.9(c)6ii
6.6.3.1.12	Current Capacities Discuss the facility's relation to current solid waste disposal capacities.					2.9(c)6ii
6.6.3.1.13	Guarantee Mechanism Describe established mechanisms that will guarantee the necessary waste flows to the proposed facility.					

		COMPLETE (Y/N)	TECHNICALLY ADEQUATE (Y/N)		COMMENTS	
6.6.3.2	Sludge Management Plan The description of the Sludge Management Plan shall contain the following:					2.9(c)6
6.6.3.2.1	Municipalities Identify all municipalities within the district.					2.9(c)6i
6.6.3.2.2	Plan Strategy Describe the strategy of the plan as it pertains to the proposed facility.					
6.6.3.2.3	Waste Flow Agreements Describe inter-district waste flow agreements.					
6.6.3.2.4	Waste Flow Patterns Describe intra-district waste flow patterns.					
6.6.3.2.5	Plan Duration					
6.6.3.2.6	Recycling Goals					
6.6.3.2.7	Sludge Reduction Goals					
6.6.3.2.8	Implementation Schedules					
6.6.3.2.9	Plan Implementing Agencies					
6.6.3.2.10	Plan Conformance					
6.6.3.2.11	Facility Need Discuss the elements of the plan which indicate a need for the facility.					2.9(c)6ii
6.6.3.2.12	Current Capacities Discuss the facility's relation to current sludge disposal capacities.					
6.6.3.2.13	Guarantee Mechanisms Describe established mechanisms that will guarantee the necessary sludge flows to the proposed facility.					
6.7	List of Permits Provide a list and status report of all federal, state, county and local licenses, permits and certifications necessary for the proposed facility.					2.9(c)7
6.8	Environmental Assessment Provide a detailed evaluation of the potential impacts of the proposed facility on the environment, including all parameters identified in 6.3 above. The assessment shall include:					2.9(c)8
6.8.1	Impacts Evaluation An evaluation of the impacts on each parameter, including the following:					2.9(c)8i

		COMPLETE (Y/N)	TECHNICALLY ADEQUATE (Y/N)		COMMENTS	
6.8.1.1	Primary Impacts Direct or immediate impacts, both positive and negative.					2.9(c)8i
6.8.1.2	Secondary Impacts Indirect or long range impacts, both positive and negative.					
6.8.1.3	Maximum Usage The evaluation shall assume conditions of maximum usage of the facility.					
6.8.1.4	Site Usage Correlation Correlate the impacts above with the various stages listed below:					
6.8.1.4.1	Site Preparation					
6.8.1.4.2	Facility Construction					
6.8.1.4.3	Facility Operation					
6.8.1.4.4	Closure					
6.8.1.4.5	Post-Closure					
6.8.1.5	All Parameters Evaluated All parameters identified in the environmental inventory in 6.3 above shall be evaluated for impacts.					2.9(c)8
6.8.2	Modeling Techniques Describe the modeling techniques used to predict the impacts discussed in 6.8.1 above, as follows:					2.9(c)8ii
6.8.2.1	Identification of Techniques Identify and describe the modeling techniques used.					
6.8.2.2	Model Calibrated and Verified					
6.8.2.3	Copy Furnished A copy of the model(s) shall be provided to the Department.					
6.8.2.4	Best Judgment Where accepted modeling technique is not available and best professional judgment is used, provide a detailed description of the logical reasoning used and the assumptions made.					
6.8.3	Mapping Provide isopleths, grid maps or other maps to depict the following:					2.9(c)8iii
6.8.3.1	Contaminant Migration Potential zones of contaminant migration surrounding any and all sources of emissions or discharges.					
6.8.3.2	Sources Type and location of each source of contamination.					

		COMPLETE (Y/N)	TECHNICALLY ADEQUATE (Y/N)		COMMENTS	
6.8.4	Quantification of Impacts Provide a quantification of all impacts identified in 6.8.1 above. Note: Where quantification is not included, provide an explanation of the reason for the omission.					2.9(c)8iv
6.8.5	Qualitative Discussion of Impacts Provide a qualitative discussion of all impacts identified in 6.8.1 above.					2.9(c)8v
6.8.6	Mitigative Techniques Provide a detailed description of the mitigative techniques proposed to address any potential environmental impacts identified in 6.8.1 above.					2.9(c)8vi
6.9	Summary Discussion Provide a discussion of any potential adverse impacts identified in the environmental assessment in 6.8 above that cannot be avoided should the proposed facility be implemented. The discussion should include:					2.9(c)10
6.9.1	Impacts A discussion of the implications of any impacts that cannot be avoided.					
6.9.2	Reasons for Permitting Discuss the reasons why the proposed facility should be permitted.					
6.9.3	Mitigative Measures If mitigative measures are proposed to reduce the adverse impacts, discuss the costs and effectiveness of these measures.					
6.10	Design Alternatives Provide a comparison of reasonable design alternatives to the proposed facility in sufficient detail to permit independent and comparative evaluation of the benefits, costs and environmental impacts of the design of the proposed facility and each reasonable design alternative. The comparison shall include:					2.9(c)11
6.10.1	No Action A discussion of the no action or no project alternative, addressing the major foreseeable consequences.					2.9(c)11i
6.10.2	Alternative Designs A discussion of the feasibility of various alternative design or process changes, including those which could reduce or avoid some or all of the adverse impacts identified in 6.9 above.					2.9(c)11ii

		COMPLETE (Y/N)	TECHNICALLY ADEQUATE (Y/N)		COMMENTS	
6.10.3	Economic Analyses An economic analysis for both the chosen design and any design alternatives. Note: Cost-effectiveness analysis, cost-revenue analysis or other techniques approved by the Department may be employed.					2.9(c)11iii
6.10.4	Significant Differences An identification of any significant differences in environmental impact, which would result from use of the design/process changes, identified in 6.10.2 above, as compared to impacts resulting from the chosen alternative.					2.9(c)11iv
6.10.5	Comparison of Alternatives A comparison, in matrix or other format, of the degree of feasibility and economic and environmental impacts of both the chosen alternative and the set of feasible alternatives identified in 6.10.2 above.					2.9(c)11v
6.10.6	Reasons for Selection A discussion of the reasons why the proposed action was selected over the alternatives.					2.9(c)11vi
6.11	Future Effects Provide a discussion of the relationship between local, short-term (construction phase) uses of the environment and the effect of the proposed facility on available options for subsequent future uses. Describe the following:					2.9(c)12
6.11.1	Cumulative and Long-Term Effects Cumulative and long-term effects of the proposed facility which either negatively impact or enhance the environment for the future.					2.9(c)12i
6.11.2	Future Options The extent to which the proposed facility prohibits future options.					2.9(c)12ii
6.11.3	Protection During Construction Plans which provide for the protection and maintenance of the environment during construction of the proposed facility, including the following:					2.9(c)12iii
6.11.3.1	Archeological Resources					2.9(c)12iii(1)
6.11.3.2	Erosion and Sediment Control					2.9(c)12iii(2)
6.11.3.3	Control of Dusts					2.9(c)12iii(3)
6.11.3.4	Control of Odors					
6.11.3.5	Control of Noise					
6.11.3.6	Traffic Control					

		COMPLETE (Y/N)	TECHNICALLY ADEQUATE (Y/N)		COMMENTS	N.J.A.C. 7:26 CITE
6.11.3.7	Control of Soil Tracking					
6.11.4	Protection After Termination Plans which provide for the protection and maintenance of the environment after termination of facility operations.					2.9(c)12iv
6.12	Commitment of Resources Provide a discussion of irreversible and irretrievable commitments of resources resulting from the construction and operation of the proposed facility. Include the following:					2.9(c)13
6.12.1	Use During Construction An analysis of the use of renewable and nonrenewable resources during construction of the facility.					
6.12.2	Use During Operation An analysis of the use of renewable and nonrenewable resources throughout continued operation of the facility, including energy consumption.					
6.12.3	Alternative Energy Sources Compare alternative energy sources to the type selected and state the rationale for selection.					

APPENDIX B

New Jersey Department of Environmental Protection
Geographic Information System

Mapping the Present to Protect New Jersey's Future

Mapping and Digital Data Standards

Prepared by:

New Jersey Department of Environmental Protection
Office of Information Resources Management
Bureau of Geographic Information Analysis
P.O. Box 428
Trenton, NJ 08625-0428

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Index

SUMMARY

The New Jersey Department of Environmental Protection (DEP) has developed a Geographic Information System (GIS) for use by the Department for the storage and analysis of cartographic (mapped) and related environmental scientific and regulatory database information. A GIS is a computer mapping system used in the analysis of geographic data and databases. By Administrative Order, Commissioner Shinn has required that mapped information be submitted to the DEP according to the standards of this document such that the data can be input to the DEP/GIS. This document details three important GIS concepts regarding the creation, capture and delivery of mapped information. There are three basic standard concepts that must be followed.

First, all mapping regardless of scale must meet or reference a published standard, such as the United States National Map Accuracy Standard (NMAS), a GPS standard (state or federal), or a defined survey standard. This will guarantee true positional accuracy of the geographic data and, therefore, compatibility of digital information. GIS data must also be documented using the Federal Geographic Data Committee (FGDC) Metadata Standards or be FGDC metadata compliant.

Second, it is required that for all mapping, geographic data be mapped in New Jersey state plane coordinates (SPC) in North American Datum 1983 (NAD83). SPC means a geographic reference system in the horizontal plane describing the position of points or features with respect to other points in New Jersey. The official survey base of the state is known as the New Jersey State Plane Coordinate System whose geodetic positions have been adjusted on the NAD83 as per Chapter 218, Laws of New Jersey 1989.

Third, geographic data must be delivered according to standard media and digital formats. Accepted formats and media are presented in the body of this paper.

Resources: 1997 New Jersey GIS Resource Guide, NJDEP Maps and Publications, CD-ROM Series 2, #1, GIS Tools for Decision Making (609) 777-1039.

Mapping and Digital Data Standards, 1997, NJDEP, P.O. Box 428, Trenton, NJ 08625 (609) 777- 0672.

MAPPING AND DIGITAL DATA STANDARDS
NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
GEOGRAPHIC INFORMATION SYSTEM

1.0 INTRODUCTION

Geographic Information System (GIS) technology has become a state-of-the-art tool for innovative efforts nationally and within the State of New Jersey to protect the natural environment and protect the public health of citizens. To adequately address these and other issues, the NJDEP must make decisions based on sound, accurate spatial data. This document provides guidance for the basic standards for creating and distributing spatial data on a GIS. Basic standards will ensure consistent data quality and documentation, provide for compatibility between data sets, and facilitate interactive analysis and ensure the quality of results derived from the GIS.

2.0 STATE STANDARD MAP RESOURCES and MAPPING CRITERIA

2.1 National Map Accuracy Standards

The most common statement for accuracy for mapped information at common mapping scales for mapping is National Map Accuracy Standards (NMAS). These standards were established in 1947 and have formed the basis for mapping accuracy by the United States Geological Survey (USGS) for the past 50 years. Simply stated, NMAS requires that for horizontal accuracy, 90% of the well-defined points on a map must be within +/- 33.3 feet of their true position at 1:12000 (1/30th of an inch where an inch = 1000ft.); +/- 40 feet at 1:24000 (1/50th of an inch where 1 inch = 2000ft.). Refer to Appendix B for a table on scale horizontal accuracy. The NMAS then relies on a statement of accuracy based on the scale of the published map (data). Maps which are digital must be evaluated at the scale of production. The New Jersey Department of Environmental Protection (NJDEP) has created several source basemaps that are available for mapping initiatives that meet or exceed NMAS. The NMAS is reprinted below.

NATIONAL MAP ACCURACY STANDARDS

United States National Map Accuracy Standards

U.S. Bureau of the Budget, Revised June 17, 1947

With a view to the utmost economy and expedition in producing maps which fulfill not only the broad needs for standard or principal maps, but also the reasonable particular needs of individual agencies, standards of accuracy for published maps are defined as follows.

1. Horizontal accuracy. For maps on publication scales larger than 1:20,000, not more than 10% of the points tested shall be in error by more than 1/30 inch, measured on the publication scale; for maps on publication scales of 1:20,000 or smaller, 1/50th of an inch. These limits of accuracy shall apply in all cases to positions of well-defined points only. Well-defined points are those that are easily visible or recoverable on the ground, such as the following: monuments or markers, such as bench marks, property boundary monuments; intersections of roads, railroads, etc.; corners of large buildings or structures (or center points of small buildings); etc. In general what is well-defined will also be determined by what is plottable on the scale of the map within 1/100 inch. Thus, while the intersection of two road or property lines meeting at right angles would come within a sensible interpretation, identification of the intersection of such lines meeting at an acute angle would obviously not be practicable within 1/100 inch. Similarly, features not identifiable upon the ground within close limits are not to be considered as test points within the limits quoted, even though their positions may be scaled closely upon the map. In this class would come timber lines, soil boundaries, etc.

2. Vertical Accuracy, as applied to contour maps on all publication scales, shall be such that not more than 10 percent of the elevations tested shall be in error more than one-half the contour interval. In checking elevations taken from the map, the apparent vertical error may be decreased by assuming a horizontal displacement within the permissible horizontal error for a map of that scale.

3. The accuracy of any map may be tested by comparing the positions of points whose locations or elevations are shown upon it with corresponding positions as determined by surveys of a higher accuracy. Tests shall be made by the producing agency, which shall also determine which of its maps are to be tested, and the extent of such testing.

4. Published maps meeting these accuracy requirements shall note this fact on their legends, as follows: "This map complies with National Map Accuracy Standards."

5. Published maps whose errors exceed those aforestated shall omit from their legends all mention of standard accuracy.

6. When a published map is a considerable enlargement of a map drawing (manuscript) or of a published map, that fact shall be stated in the legend. For example, "This map is an enlargement of a 1:20000-scale map drawing," or "This map is an enlargement of a 1:24000-scale published map."

7. To facilitate ready interchange and use of basic information for map construction among all Federal mapmaking agencies, feasible and consistent with the uses to which the map is to be put, shall conform to latitude and longitude boundaries, being 15 minutes of latitude and

longitude, or 7.5 minutes, or 3-3/4 minutes in size. (from Thompson, 1987).

2.2 New Jersey Basemaps That Meet NMAS

Basemaps provide the foundation for many mapping projects and for the display of mapped information. As such, basemaps must meet uniform, rigorous standards for positional accuracy and cartographic integrity. Over the years, several series of quality basemaps that meet or exceed NMAS have been produced. Basemaps can be either hardcopy (mylar or acetate) or digital (softcopy). A statewide synoptic set of hardcopy basemaps for New Jersey were made from aerial overflights sponsored by the NJDEP in 1991 and 1986. In both cases, both quadrangle (1:24000) and quarter quadrangle (1:12000) hardcopy mylar basemaps were produced. Other basemaps cover specific areas only, such as the 1977-78 Tidelands photo basemaps. Two series of digital (softcopy) basemaps have also been produced, from the 1991 and 1995/97 overflights. The digital images were produced at quarterquad scale (1:12000).

2.2.1 Hardcopy (mylar) Basemaps

Listed below in order of general overall quality are available New Jersey basemap series that were produced on stable base mylar and meet a definable mapping standard (NMAS). The first four series listed are photo basemaps, derived from aerial photography. The 1991/92 and the 1986 wetlands series are both orthophoto basemaps compiled from a sophisticated aero-triangulation process. They should be used whenever possible to generate GIS compatible data and/or to use as a recompilation base.

All the hardcopy basemaps described herein with the exception of the 1991/92 products are referenced in NAD27. For this reason, the 1991/92 mylar basemap quads (1:24000) and quarterquads (1:12000) series, referenced in NAD83 are highly recommended by the NJDEP over all other sources listed for mapping at these scales. Stable base site maps of large scale meeting NMAS, produced by surveying, mapping or photogrammetric firms may qualify as GIS compatible if they contain a minimum of four registration tics in the New Jersey State Plane Coordinate System, North American Datum 1983 (NAD83), the official survey base of New Jersey. The USGS topoquad series are not recommended as a delineation source because they are generally available only on paper and are not synoptic data sources. Rather, they represent variable data sources and dates.

1991/92 Orthophoto Basemaps (Quadrangles and Quarter quadrangles)

The most recent statewide set of hardcopy chronoflex quarterquad (1:12000) and photoquad (1:24000) photo basemaps were produced from the 1991/92 aerial overflight of the state. These basemaps meet or exceed NMAS. This series of maps is referenced in SPC feet in NAD83, but also has NAD27 tics in the margin. This series is the most current, highest quality basemaps of their scale available statewide, that

are referenced in the new datum, NAD83. This basemap series is highly recommended by the NJDEP for mapping efforts at these scales.

1986 Freshwater Wetlands Orthophoto Quarterquad Basemaps (1:12000)

The passage of the Freshwater Wetlands Act of 1987 required the state to produce a composite map of the freshwater wetlands (FWW) for the state. Subsequently, a set of 635 chronoflex photo quarterquads for the entire state from the March 1986 overflight was produced. The maps represent an excellent source for both photo-interpretation and recompilation at a county, municipal or site level. However, these maps are dated and are referenced in the old datum (NAD27). The 1991/92 series now supercedes these maps. There is also a set of composite hardcopy FWW maps with the delineation superimposed on the image.

1986 Photoquad Basemaps (1:24000)

A statewide overflight in March 1986 produced a complete set of stable base photoquads at 1:24000. The control for the production of these basemaps was the mylar USGS 7.5-Minute topoquads. The photoquads have been widely used both to create data layers and to recompile other data sources from paper or non-planimetric sources. These basemaps did not follow rigorous orthophoto techniques and are referenced in the old datum. The 1991/92 basemaps supercedes these maps.

1977/78 Tidelands Basemaps (1:2400)

The tidelands maps are a series of 1:2400 base maps for the coastal zone that include all tidal areas in the state to delineate the State's claim to all tide-flowed lands. The series consists of 1628 photo basemaps. These maps are rectified products that meet NMAS below the ten foot contour. The photo-image is late summer of 1977 and 1978. These maps cover the entire coastal zone up to the head-of-tide.

USGS 7.5-Minute Series Topoquad Basemaps (1:24000)

The USGS has published an entire series of 172 topographic maps for the state at a scale of 1:24000. The base information ranged from the late 1940's to the 1980's with photo-updates into the mid 1990's. Because these maps vary in source date, and because more accurate and current basemaps (1991/92) are available, the USGS topoquads series *is not recommended* by the NJDEP as a mapping base. The topoquads do represent an excellent reference source, particularly for named places and features.

2.2.2 Hardcopy Basemap Resources

Mylar photo basemaps from 1991, 1986 and 1977/78 and the digital imagery from 1991 may be obtained from MARKHURD, Minneapolis, MN (1-800-MAP-HURD). There are several sets of the 1986 and 1991 chronoflex (mylar) basemaps in the Department. The GIS Unit has a set of each for reference.

Paper prints of 1986 and 1991 orthophoto basemap series, as well as paper prints of USGS topoquads, may be obtained from NJDEP Maps and Publications; (609) 777-1039. Paper prints from the 1977/78 series are available from the Tidelands Element; (609) 292-2573.

Topoquads and other USGS federal maps (and aerial photos) may be ordered from (1-800-USA-MAPS or (703) 648-5931.

2.3 Digital Imagery that Meets NMAS

The State Mapping Advisory Committee, Aerial Photo Subcommittee, has produced a 1995/97 statewide digital imagery in partnership with the USGS, National Mapping Division. The imagery conforms with the standards of USGS "standard product" for digital orthophoto quarterquads (DOQQs). The imagery is color infrared (CIR), has 3 bands, 1 meter resolution, and is NAD83 in UTM (meters). The standard product is available through the USGS EROS Data Center. The NJDEP has made the data available on the GIS server and on a set of CD-ROMs in SPC feet, NAD83. The CDROMs are available through Maps and Publications.

USGS Resource: http://edcwww.cd.usgs.gov/webglis
http://mapping.usgs.gov
USGS, (703) 648-5931

NJDEP Resource: **GIS Server**
Maps and Publications (609) 777-1038

1991/92 digital imagery is available at 5 ft (quarter quad) resolution or 10 ft (quad) grayscale (1 band) digital files, NAD83. These images meet NMAS at the production scale (1:12000) and are the manuscript images from which the 1991/92 mylar basemaps were made. The files are .gis (ERDAS) files and are 16mb each. These digital images are available on the GIS server but may not be distributed outside the DEP. Others must contact MARKHURD.

NJDEP Resource: **GIS Server**

Contractor Resource: **MARKHURD, Minneapolis, MN (1-800-MAP-HURD).**

2.4 Projection and Datums

2.4.1 Projection and Coordinate System

Based on the Chapter 218, Laws of New Jersey 1989, New Jersey State Plane is required in either meters (or feet), North American Datum 1983. The State of New Jersey is entirely contained within one state plane zone. Special situations may require other projection systems for small scale maps of regional (interstate) or national interest.

2.4.2 Horizontal and Vertical Datums

The North American Datum of 1983 is required for mapping in the horizontal (NAD83). The North American Vertical Datum of 1988 (NAVD 88) should be used when possible rather than the older National Geodetic Vertical Datum of 1929 (NGVD29).

2.5 Other Resources: Aerial Photographs

Historic aerial photography is available for inspection at the NJDEP Tidelands Management Program (TMP) by scheduled appointment. The 1986, 1991/92 and 1995/97 photo color infrared frames are also available for inspection at the TMP. Appointments are required. The 1991/92 and 1995/97 photos may also be purchased from the USGS EROS Data Center.

USGS Resource:	**http://mapping.usgs.gov** **USGS, (703) 648-5931**
NJDEP Resource:	**Tidelands Management Program, (609) 633-7369**
	1997 New Jersey GIS Resource Guide, NJDEP Maps and Publications, CD-ROM Series 2, #1, GIS Tools for Decision Making (609) 777-1039.

3.0 Map Production Specifications (Data Capture)

Mapped information comes from a variety of sources that are not always GIS compatible. Consequently, each source must be evaluated to determine whether redrafting is necessary to prepare the data for entry into the GIS. Much of the data required for the GIS can be derived directly from the photo-interpretation of aerial photos to rectified photo basemaps.

3.1 PHOTO -INTERPRETATION

Today's GIS data development efforts rely to a large degree on the derivation of themes from the stereoscopic interpretation of aerial photos. The DEP has used this technique in conjunction with various photo basemaps to produce land use/land cover and freshwater wetland coverages, for instance. The TMP of DEP maintains an extensive library of current and historical color infrared, color and panchromatic photographs from the 1930's to the present. The TMP offers light tables, photo basemaps and stereoscopes as well as some instruction on set up to assist DEP employees as well as the public and regulated community. This service is available at a modest fee (for outside agencies) and is well worth the effort, particularly if the data are to be captured in the GIS.

Delineators should be intimately familiar with the classification system being employed prior to producing data for input into the GIS. Care should be taken in choosing an appropriate standard classification system. If non-standard classification systems are used, the contractor shall fully describe the system.

3.2 RECOMPILATION

Recompilation involves the redrafting of features from one source to a more accurate, planimetric source based on identifiable features. This method is commonly used to give more accuracy to data that have been delineated on sources of unknown or unspecified quality or paper manuscripts. It is also commonly used to transfer data delineated on or to unrectified photography to a rectified or orthophoto basemap based on a series of local fits of common photo-identifiable features, such as roads.

Other data sources without photo-images may be recompiled to planimetric sources by using other coincident features. For instance, grids on source data may be generated and plotted to planimetric basemaps and used as a guide for the redrafting of information that would otherwise not be usable in a digital form. This has been used to draft historical purveyor boundaries from old atlas sheets to the photoquads, for instance. Whatever the technique, a data dictionary form must be completed describing the recompilation techniques employed.

Resource: Photobase Map Compilation (USDA, 1984).

3.3 DATA AUTOMATION

The conversion of analog data to digital data is a critical step in the creation of a digital database in the GIS. Tablet digitizing was the most common method, however, scanning, GPS and heads-up digitizing have all gained popularity. For tablet digitizing, a manuscript's lines should be clear and complete with no gaps or shortfalls. Operators should not interpret and digitize at the same time. The digitizer should concentrate solely on capturing the exact nature of the features. All maps shall be edge matched prior to digitization to eliminate cartographic errors and reduce digital problems. Digital accuracy shall be evaluated by proof plotting

the digital data to the base at the same scale as the manuscript and overlaying the data to the original map. The linework should be digitized in such a way as to create a digital copy that is within +/- one line width of the original. Edits can be flagged and corrected such that the standard is met.

Heads up digitizing is a new digitizing technique that is useful for capturing data or updates from digital imagery. High resolution digital imagery now allows GIS users to capture edits and delineate features directly on the screen using desktop GIS software. The user must document procedures when using this technique. Users should maintain clear definitions or classifications of features that are being interpreted and delineated. Scales used for data capture should be logged. Detailed classification systems and resolution of imagery may require that features be photo-interpreted from aerial photography to the digital image and then captured on the screen. Ground truth (field verification) remains an important step in establishing the quality of heads-up digitizing, particularly for land cover delineations. Photo-interpreting and heads-up digitizing at the same time can be extremely difficult even for experienced users. Make sure appropriate entries concerning the quality of the data are documented in the metadata files.

The requirements for GPS derived features are discussed in Section 4.0.

The coding of features should follow an approved classification system as adopted by state and federal agencies. These codes follow specifications of organizations responsible for deriving and maintaining the data. For example, the DEP uses the Cowardin et al. (1979) system for the Classification of Wetland and Subaqueous Lands in the United States as adopted by the National Wetlands Inventory of the U.S. Fish and Wildlife Service. In addition the Department supports a modified version of Anderson et al. (1976), USGS, for classifying land use/land cover. For prototype classification schemes, clear concise documentation describing the classes is required.

All attribute coding shall be 100% correctly coded. A full description of each code should be provided as part of the metadata. All documentation shall be delivered in hard copy and on diskette.

NJDEP Resource: GIS Training Courses (3-2169)

4.0 GLOBAL POSITIONING SYSTEM

The NAVSTAR Global Positioning System (GPS) has become a mainstream technology for data collection for GIS. In New Jersey, the technology is being used for GIS related activities by state, county, and municipal government agencies, academic institutions, public utilities, non-profit organizations, and private firms. This satellite based radio-navigation system, developed by the US Department of Defense (DoD), is comprised of a constellation of orbiting satellites (between 24-26) that transmit signals

that can be received by anyone with a GPS receiver. From the signals, a GPS receiver is able to determine its 3D position (latitude, longitude, and elevation) on the surface of the earth. Users can store these locations to represent mapped features in a GIS. Users can not only capture a feature's location, but also enter descriptive attribute data that significantly adds to the final data layer's value in GIS.

Depending on the design of the GPS receiver, and the data collection/data processing techniques used, the horizontal range of accuracy can be 100 meters to sub-centimeter. GPS is most effective when the GPS receiver's antenna has an unobstructed view of the sky. Buildings in urban areas and dense tree cover can create reception problems making GPS collection work difficult in these types of environments. The GPS receiver must be able to receive relatively clear signals from at least four satellites simultaneously to determine a 3D position or fix.

The US DoD maintains the system, and although civilians are allowed to use GPS, the military has imposed a policy called selective availability (SA), which intentionally degrades the accuracy of the system for non-military users. There are GPS data collection/processing techniques non-military users can employ that can result in very high accuracy despite the presence of SA.

The most commonly used GPS receivers for GIS applications are the mapping or resource grade, code based receivers. These are specifically designed for storing mappable features (coordinates and attributes). Positions determined by these receivers are generally in the 1 to 5 meter accuracy range after differential correction.

Positional data collected with GPS must, at a minimum, meet within a 5 meter, 95% confidence standard. This requires all GPS data to be differentially corrected. If accuracy requirements call for higher accuracy, parameter settings have to be adjusted accordingly in order to meet the higher standard. For detailed information on recommended GPS receiver settings, see NJDEP's *Standards for Using Code-Based Global Positioning Systems (GPS) for the Development of Accurate Location Data for Use with Arc/Info and ArcView Geographic Information Systems*.

NJDEP Resource: Lou Jacoby, (609) 633-1203
Contractor Resource: www.state.nj.us/dep/gis

5.0 REMOTE SENSING STANDARDS

Satellite remote sensing imagery is a valuable resource of information that aids in the analysis of the Earth's environment. There are many types of satellite vehicles that orbit the Earth, each with various characteristics and capabilities. One example is the Landsat Thematic Mapper (TM). This satellite collects data at an orbit of 705 kilometers above the Earth. Its on-board sensor measures the amount of surface features light absorbtion and
reflectance across various wavelengths in the electromagnetic spectrum from the

"visible", which is what the human eye perceives, to the "infrared". The spatial resolution (cell size) is 30 meters, meaning one cell represents an area of 30 by 30 meters on the ground. The resultant 7-band digital image reveals a picture of the Earth spanning an area of 185 by 185 kilometers; therefore, only two image "scenes" are necessary to encompass the entire State of New Jersey. These characteristics make the Landsat TM particularly suitable for the environmental analysis of this region.

The Grant F. Walton Center for Remote Sensing and Spatial Analysis (CRSSA) at Rutgers University uses Landsat TM imagery, as well as other satellite vehicles such as SPOT, IRS-C, and AVHRR. Their sensors (primarily Landsat TM), allow CRSSA extensive mapping capabilities for a variety of landscape mapping/monitoring projects throughout New Jersey and neighboring lands containing natural resources that affect this state.

The power and wide usage of remote sensing data merits the existence of standards for content and accuracy. Unfortunately, there are no current remote sensing standards (i.e. positional accuracy) mandated by the Federal Geographic Data Committee (FGDC) at the time of this report. However, there are several federal agency mapping projects which provide useful guidelines for remote sensing data. For example, the Coastal Change Analysis Program (C-CAP), maps and monitors land cover and submerged aquatic vegetation change in coastal zones throughout the United States. C-CAP, administered by the National Oceanic and Atmospheric Administration (NOAA), effectively and thoroughly outlines various remote sensing guidelines related to positional accuracy, land cover/habitat classifications, etc. These protocols were instrumental for CRSSA's mapping of Southern New Jersey for the NOAA C-CAP project.

The remote sensing user community can purchase geo-referenced, terrain-corrected imagery such as Landsat TM from a variety of sources, whether governmental, such as the USGS EROS Data Center, or private enterprises including Space Imaging. When using these data, it is important to understand the "in-house" accuracy standards used by each facility when processing the data.

Overall, there are resources available to guide satellite image analysts in their use of remote sensing data. Until the federal government mandates standards through the FGDC, users must rely on the existing unregulated guidelines provided by individual sources. Many are quite reputable, but for those projects without remote sensing guidelines, it is more challenging to establish appropriate protocol for remote sensing processing and applications.

FGDC Resources: http://www.fgdc.gov/Standards/Standards.html

http://www.fgdc.gov/Standards/Documents/Proposals/swathpr3.html
"Content Standard for Remote Sensing Swath Data" is in the draft stage submitted by NASA to the FGDC Standards Working Group.

USGS Resource: (EROS) Data Center http://edcwww.cr.usgs.gov

ASPRS Resource: **http://www.asprs.org/asprs/resources/standards.html**

NOAA Resource: **Coastal Change Analysis Program (C-CAP): "Guidance for Regional Implementation"**
http://www.csc.noaa.gov/ccap/protocol/protocoltxt.html

Private Sector Resource: http://www.spaceimaging.com
Contains Landsat TM ortho-corrected processing procedures.

6.0 DATA TRANSFER STANDARDS

In order to enhance data exchange, the following standards should be followed. Presented below are recommended exchange standards for ESRI's Arc/INFO, Arcview and Atlas.

6.1 Arc/INFO and ArcView Digital Exchange Standards

Table 1 details the exchange standards for ArcView , Arc/INFO and Atlas. For "relate," "join" or "link" databases, dbase IV, Access and Excel are preferred.

TABLE 1: Arc/INFO , ArcView and Atlas COMPATIBLE CONFIGURATIONS

PLATFORM	*UNIX Workstation*	*PC*
OPERATING SYSTEM	**UNIX**	**DOS**
FORMAT	**ARC/INFO Import** **Export** **ARCVIEW3.x shapefiles** **DXF**	**FLAT ASCII (SDF)** **ARC INFO Import** **Export** **ARCVIEW3.x shapefiles** **DWG (AutoCad)** **DGN (Microstation)** **DXF**
SOFTWARE	**TAR** **CPIO**	**VARIOUS**

MEDIA	**150 MB TAPE** **3 1/2" HD 1.44MB** **CD-ROM (CD-R)** **EXABYTE**	**3 1/2" HD 1.44MB** **CD-ROM (CD-R)** **120/250MB QIC12O** **COLORADO** **MAYNARD**

7.0 METADATA

Metadata, that is, data about the digital data are required for all digital data layers produced. Metadata is the information that describes the digital data layer based on the parameters that are included in the layer. The Federal Geographic Data Committee has defined the federal metadata standard which all federal agencies are required to produce for each digital data layer. Metadata describes how the data was created, who created the data and who maintains it, when the data was created and/or updated, item (attribute) descriptions, transfer standards, and more. The NJDEP requires that metadata be provided with each digital data layer and that the metadata be FGDC compliant. Standard FGDC compliant metadata is a critical component to information mangement systems (clearinghouses) on the World Wide Web (WWW) and for any interactive mapping applications provided across the WWW.

The following is a statement from the FGDC on the metadata standard.

The objectives of the standard are to provide a common set of terminology and definitions for the documentation of digital geospatial data. The standard establishes the names of data elements and compound elements (groups of data elements) to be used for these purposes, the definitions of these compound elements and data elements, and information about the values that are to be provided for the data elements.

This standard is the data documentation standard referenced in the executive order (Executive Order 12906, "Coordinating Geographic Data Acquisition and Access: the National Spatial Data Infrastructure)." The standard was developed from the perspective of defining the information required by a prospective user to determine the availability of a set of geospatial data, to determine the fitness the set of geospatial data for an intended use, to determine the means of accessing the set of geospatial data, and to successfully transfer the set of geospatial data. As such, the standard establishes the

names of data elements and compounds elements to be used for these purposes, the definitions of these data elements and compound elements, and information about values that are to be provided for the data elements. (Source: FGDC homepage).

Resources: http://geochange.er.usgs.gov
http://www.fgdc.gov

7.1 Metadata Template

An example of an FGDC compliant metadata form with about 40 fields for feature based (point, line polygon) digital data is presented below. Appendix A contains a completed sample form.

NJDEP
FGDC Compliant Metadata

1.0 IDENTIFICATION INFORMATION

1.1 ***Citation -- information to reference data set.***

1.13 ***Native Data Set Environment -- a description data sets in the producer's processing environment.***

1.14 ***Cross Reference -- information about other, related data sets that are likely to be of interest.***

1.2 ***Description -- a characterization of the data set.***

1.2.1 ***Abstract -- a brief narrative of the data set.***

1.2.2 ***Purpose -- a summary of intentions with what the data set was developed.***

1.2.3 ***Supplemental Information -- other descriptive info about data set.***

1.3.1 ***Currentness Reference -- time period(s) for which the data set corresponds to the ground.***

1.6 ***Key Words -- words or phrases summarizing an aspect of the data set.***

1.6.2 ***Place -- geographic locations characterized by the data set.***

1.8 ***Use Constraints -- restrictions and legal prerequisites for using data sets.***

1.13 ***Native Data Set Environment -- a description data sets in the producer's processing environment.***

1.15 ***Cross Reference -- information about other, related data sets that are likely to be of interest.***

2.0 DATA QUALITY INFORMATION

2.1.1 ***Attribute Accuracy Report – an explanation of the attributes in the data set.***

2.1.2 ***Quantitative Attribute Accuracy Assessment***

2.3 ***Completeness Report -- Information about the completeness of the data set.***

2.4.1.1 ***Horizontal Positional Accuracy -- an explanation of the horizontal coordinate measurements.***

2.5 ***Lineage -- information about the events and parameters in which the data set was constructed.***

2.5.1 ***Source Information -- list of sources for the data set.***

2.5.1.2 ***Source Scale Denominator -- the denominator of the representative fraction.***

2.5.1.3 ***Type of Source Media -- the medium of the source data set.***

2.5.1.4.1 ***Source Currentness Reference -- source time period of content information of the source data set.***

2.5.2.3 ***Process Date -- the date when the event was completed.***

3.0 SPATIAL DATA ORGANIZATION

3.2 ***Direct Spatial Reference Method -- the system objects used to represent space in the data set.***

4.0 SPATIAL REFERENCE

4.1.2.1.1 ***Map Projection Name -- name of the map projection.***

4.1.2.2.1 ***Grid Coordinate System -- name of the grid coordinate system.***

4.1.4.1 ***Horizontal Datum Name -- the identification given to the reference system used for defining the coordinates of points.***

5.0 ENTITY AND ATTRIBUTE INFORMATION

5.1.2.1 ***Attribute Label -- the name of the attribute.***

5.1.2.2 ***Attribute Definition -- the description of the attribute(s).***

5.1.2.4 ***Attribute Definition Values -- the valid values that can be assigned for an attribute.***

6.0 DATA DISTRIBUTION

6.4	*Standard Order Process -- the common ways in which the data set can be obtained.*
6.4.2.1	*Name -- the name of the data transfer format.*
6.4.2.2.2.1	*Offline Media*

7.0 METADATA REFERENCE INFORMATION

7.1	*Meta Data Date -- the date the meta data were create or updated.*
7.4	*Meta Data Contact -- the party responsible for creating the meta data.*

8.0 CITATION INFORMATION

8.1	*Originator -- Name of the parties that developed the data set.*
8.4	*Title -- name by which the data set is known.*
8.5	*Edition -- the version of the title.*

9.0 TIME PERIOD INFORMATION

9.1.1	*Calendar Date -- the year*

10.0 CONTACT INFORMATION

10.1.1	*Primary Contact Person*
10.1.2	*Contact Organization*
10.4	*Contact Address*
10.5	*Contact Voice Telephone Number*

Appendix A: Metadata Example

1.0 IDENTIFICATION INFORMATION

1.1 Citation
Mercer County Integrated Terrain Unit
Bureau of Geographic Information & Analysis
Trenton, New Jersey 08625

1.13 Native Data Set Environment/Database:
ARC/INFO Info

1.14 Cross Reference
Lookup tables for land use/land cover, soils, geology and flood prone areas. Lu.class text file describes Anderson et al.
Lookup Table Descriptions:

MERBDRK.LUT	Bedrock geology (primary, secondary).
MERSOILS.LUT	Soils (consult the Soil Survey).
MERFLOOD.LUT	Flood prone areas.
MERSOILINC.LUT	Soil inclusions.
MERLU.LUT	Land use/land cover.
MERSURF.LUT	Surficial geology.

1.2 Description
Land use/land cover mapped using modified Anderson et al. (1976) classification system. Minimum mapping unit = 2.5 areas. Other sources re-scaled to 1:24000 and recompiled to 1986 photo quads based on coincident features. Data Description & Definition; Integrated terrain unit for Mercer County. This information is important to public agencies and private citizens concerned with land developments.

1.2.1 Abstract
A compilation of 4 data layers, geology, soils, flood prone, land use/land cover which were based upon 1986 aerial photography.

1.2.2 Purpose/Brief Description
Soils
Flood prone
Geology
Land use/land cover
Flood areas have been identified for: (1) urban areas where the upstream drainage basin exceeds 25 square miles, (2) rural areas in humid regions where the upstream drainage basin exceeds 100 square miles, (3) rural areas where in semiarid regions where the upstream drainage basin exceeds 250 square miles, and (4) smaller drainage basins, depending on topography and potential use of the flood plains.

1.2.3 Supplemental Information
Meritu.e00 - export file for the data distribution. Flood-prone Documentation Taken Directly from USGS Flood-prone Maps. Approximate boundaries of flood-prone areas are shown on this map. There is on the average about 1 chance in 100 that the designated areas will be inundated in any year. The flood-prone areas have been delineated through the use of readily available information on past floods rather than from detailed surveys and inspections. In general, the delineated areas are for natural conditions and do not take into consideration the possible effects of existing or proposed flood control structures except where those effects could be evaluated. The 89th Congress, in House Document 465, recommended the preparation of flood-prone area maps to assist in minimizing flood losses by quickly identifying the areas of potential flood hazards. More detailed flood information may be required for other purposes such as structural designs, economic studies, or formulation of land-use regulations. Such detailed information may be obtained from the U.S. Geological Survey, other Federal agencies, or state, local, and private agencies.

1.3.1 Currentness Reference
Land use/land cover interpreted from 1986 JSS CIR (1:58000) photos. Geology recompiled from 1906 (1:63360) Atlas Sheet. Soils recompiled from 1971 SCS Soil Survey. Flood prone areas recompiled from paper USGS flood maps (polys closed by contractor & coded as such).

1.6 Keywords
Land use, soils, mercer, geology, flood prone

1.6.2 Geographic Extent/place
Geographic Area; Mercer County

1.8 Use Constraints
Data Distribution Agreement

2.0 DATA QUALITY INFORMATION

2.1.1 Attribute Accuracy Report
Frequencies run to check for valid attribute. Land use codes containing #9 values require field verification.

2.1.2 Quantitative Attribute Accuracy Assessment
Basemap (photo quad) feature position are good to about +/- 60 feet or better. Delineated lines good to about +/- feet from locations on manuscript. Freshwater wetlands and geology are general, more detail in FWW and Cogo map coverages. Map Accuracy; National Map Accuracy Standard (NMAS)
Cartographic Quality; Data has not been systematically plotted on mylar and checked to basemap. Nodeerrors, labelerrors and slivers resolved.

2.3 Completeness Report
Photo-Quad. Automation Status; Complete.

2.4.1.1 Horizontal Positional Accuracy
Meets National Map Accuracy at the scale created

2.5 Lineage
Scan Data was derived/delineated from 1986 photo-quad.

2.5.1 Source Information

2.5.1.2. Source Scale Denominator
24000

2.5.1.3 Type of Source Media
Mylar

2.5.1.4.1 Source Currentness Reference
1986

2.5.2.3 Process Date
June 1989

3.0 SPATIAL DATA ORGANIZATION

3.2 Direct Spatial Reference
Polygon

4.0 SPATIAL REFERENCE

4.1.2.1.1 Map Projection Name
Polyconic

4.1.2.2.1 Grid Coordinate System
NJ State Plane Feet

4.1.4.1 Horizontal Datum Name
NAD27, Projected in NAD83

5.1.2.1 Attribute Label

Item Name & Description;

LAND-USE	Land use/land cover code (four digit)
PRIM-GEOL	Primary geology
SEC-GEOL	Secondary geology
SURFICIAL-GEOL	Surficial geology
FLOOD PRONE	Flood prone areas
SOIL-INCLUSIONS	Soil inclusions for polygons that had soil polygons of less than 2.5 areas.
SOIL-LABEL	SCS soil label
SOIL-CAPS	SCS soil labels in capitals for reselects.

BEDROCK GEOLOGY CODES:

"BGN"
"BGN"
"BYRAM GNEISS"

"EH"
"EH"
"HARDYSTON QUARTZITE"

"GB"
"GB"
"GABRO"

"GN"
"GN"
"AMPHIBOLITES AND GNEISSES"

"KET"
"KET"
"ENGLISHTOWN SAND"

"KM"
"KM"
"MAGOTHY FORMATION"

"KML"
"KML"
"MOUNT LAUREL SAND"

"KMR"
"KMR"
"MAGOTHY AND RARITAN FORMATIONS"

"KMT"
"KMT"
"MARSHALLTOWN FORMATION"

"KMV"
"KMV"
"MERCHANTVILLE CLAY"

"KNS"
"KNS"
"NAVESINK MARL"

"KRGB"
"KRGB"
"RED BANK (GLAUCONITE SAND UNIT)"

"KW"
"KW"
"WENONAH SAND"

"KWB"
"KWB"
"WOODBURY CLAY"

"TBH"
"TBH"
"BEACON HILL GRAVEL"

"TCH"
"TCH"
"COHANSEY SAND"

"THT"
"THT"
"HORNERSTOWN MARL"

"TKW"
"TKW"
"KIRKWOOD SAND"

"TMQ"
"TMQ"
"MANASQUAN MARL"

"TRB"
"TRB"
"BRUNSWICK FORMATION"

"TRBA"
"TRBA"
"BEDS SIMILAR TO LOCKATONG FORMATION"

"TRBD"
"TRBD"
"DIABASE"

"TRL"
"TRL"
"LOCKATONG FORMATION"

"TRS"
"TRS"
"STOCKTON FORMATION"

"TVT"
"TVT"
"VINCENTOWN SAND"

"WGN"
"WGN"
"WISSAHICKON SCHIST"

FLOOD PRONE AREAS CODES:

1 - "USGS Documented Flood prone Area"
2 - "Undocumented Flood prone Area"
8 - "Water"
9 - "Not a Flood prone Area"

SOIL INCLUSION CODES
0 - "NO INCLUSIONS"
1 - "SOIL POLYGONS < 2.5 ACRES OMITTED"

SOILS CODES:

"Ad" - "Alluvial land, wet"
"Ae" - "Alluvial land, very wet"
"AfB" - "Aura sandy loam, moderately firm, 0 to 5 percent slopes"
"AfC" - "Aura sndy loam, moderately firm, 5 to 10 percent slopes"
"BbB" - "Birdsboro loam, 0 to 6 percent slopes"
"BbB2" - "Birdsboro loam, 2 to 6 percent, eroded"
"BbC2" - "Birdsboro loam, 6 to 12 percent slopes, eroded"
"BdA" - "Birdsboro silt loam, 0 to 2 percent slopes"
"BdB" - "Birdsboro silt loam, 2 to 6 percent slopes"
"BnA" - "Birdsboro soils, sandy subsoil variants, 0 to 2 percent slopes"
"BnB" - "Birdsboro soils, sandy subsoil variants, 2 to 6 percent slopes"
"BnC" - Birdsboro soils, sandy subsoil variants, 6 to 12 percent slopes"
"BoB" - "Birdsboro soils, gravelly solum variants, 0 to 5 percent slopes"
"Bt" - "Brownansville silt loam"
"BuA" - "Bucks silt loam, 0 to 2 percent slopes"
"BuB" - "Bucks lilt loam, 2 to 6 percent slopes"
"BuB2" - "Bucks lilt loam, 2 to 6 percent slopes, eroded"
"BuC" - "Bucks silt loam, 6 to 12 percent slopes"
"BuC2" - "Bucks silt loam, 6 to 12 percent slopes, eroded"
"CdA" - "Chalfont silt loam, 0 to 2 percent slopes"
"CdB" - "Chalfont silt loam, 2 to 6 percent slopes"
"CdB2" - "Chalfont silt loam, 2 to 6 percent slopes, eroded"
"CdC2" - "Chalfont silt loam, 6 to 12 percent slopes, eroded"
"CeB" - "Chalfont very stony silt loam, 0 to 6 percent slopes"
"Cf" - "Cut and fill land, clayey substratum"
"Cg" - "Cut and fill land, gravelly material"
"Ct" - "Cut and fill land, rock substratum"
"Cu" - "Cut and fill land, stratified substratum"
"Df" - "Downer fine sandy loam, gravelly clay loam substratum"
"DgA" - "Doylestown silt loam and Reaville silt loam, wet varient, 0 to 2 percent sl"
"DgB" - "Doylestown silt loam and reaville silt loam, wet varient 2 to 6 percent slo"
"DgB2" - "Doylestown silt loam and Reaville silt loam, wet varient, 2 to 6 percent sl"
"DgC" - "Doyestown silt loam and Reaville silt loam, wet varient 6 to 12 percent slo"
"DgC2" - "Doylestown silt loam and Reaville silt loam, wet varient, 6 to 12 percent s"
"DwB" - "Dragston and Woodstown sandy loams, 0 to 4 percent slopes"
"Ek" - "Elkton silt loam"
"EvB" - "Evesboro loamy sand, 0 to 5 percent slopes"
"EwB" - "Evesboro soils, sandy loam subsoil variants, 0 to 5 percent slopes"
"Fd" - "fallsington sandy loam"
"Fm" - "Fresh water marsh"
"FrB" - "Fort Mott loamy sand, 0 to 5 percent slopes"
"FrC" - "Fort Mott loamy sand, 5 to 10 percent slopes"
"GaB" - "Galestown loamy sand, 0 to 5 percent slopes"
"GeB" - "Galestown sandy loam, 0 to 6 percent slopes"
"Km" - "Klej soils, sandy loam subsoil variants"
"KsC" - "Klinesville shaly loam 6 to 12 percent slopes"
"KsE" - "Klinesville shaly loam, 12 to 30 percent slopes"
"LaB" - "Lansdale sandy loam, 2 to 6 percent slopes"
"LcC2" - "Lansdale channery loam, 6 to 12 percent slopes"
"LcD2" - "Lansdale channery loam, 12 to 18 percent slopes, eroded"
"LdC" - "Lansdale very stony loam, 0 to 12 percent slopes"
"LdE" - "Lansdale very stony loam, 12 to 30 percent slopes"
"LeA" - "Lawrenceville and Mount Lucas silt loams, 0 to 2 percent slopes"
"LeB" - "Lawrenceville and Mount Lucas silt loams, 2 to 6 percent slopes"
"LeB2" - "Lawrenceville and Mount Lucas silt loams, 2 to 6 percent slopes"
"LeC2" - "Lawrenceville and Mount Lucas silt loams, 6 to 12 percent slopes, eroded"
"LgC" - "Legore gravelly loam, 6 to 12 percent slopes"
"LgD" - "Legore gravelly loam, 12 to 18 percent slopes"
"LgE" - "Legore gravelly loam, 18 to 30 percent slopes"
"LhB" - "Lehigh silt loam, 0 to 6 percent slopes"
"LhB2" - "Lehigh silt loam, 2 to 6 percent slopes, eroded"
"LhC2" - "Lehigh silt loam, 6 to 6 percent slopes, eroded"
"Lk" - "Lenor-Keyport silt loams"
"Mf" - "Made land, dredged river materials"

"MoA" - "Matapeake loam, 0 to 2 percent slopes"
"MoB" - "Matapeake loam, 2 to 5 percent slopes"
"MoC2" - "Matapeake loam, 5 to 10 percent slopes, eroded"
"Mq" - "Mattapex and Bertie loams"
"MvB" - "Mount Lucas very stony silt loam, 0 to 6 percent slopes"
"McC" - "Mount Lucas very stony silt loam, 6 to 12 percent slopes"
"NeB" - "Neshaminy silt loam, 0 to 6 percent slopes"
"NeC" - "Neshaminy silt loam, 6 to 12 percent slopes"
"NeC2" - "Neshaminy silt loam, 6 to 12 percent slopes, eroded"
"NhC" - "Neshaminy very stony silt loam, 0 to 12 percent slopes"
"NhE" - "Neshaminy very stony silt loam, 12 to 30 percent slopes"
"Ot" - "Othello silt loam"
"PeB" - "Penn shaly silt loam, 0 to 6 percent slopes"
"PeC" - "Penn shaly silt loam, 6 to 12 percent slopes"
"PeD" - "Penn shaly silt loam, 12 to 18 percent
"Pg" - "Pits"
"Pu" - "Plummer sandy loam"
"Pv" - "Plummer sandy loam, very wet"
"Pw" - "Portsmouth silt loam, thin surface variant"
"QkB" - "Quakertown silt loam, 0 to 6 percent slopes"
"QkB2" - "Quakertown Silt loam, 2 to 6 percent slopes, eroded"
"QkC" - "Quakertown silt loam, 6 to 12 percent slopes"
"QkC2" - "Quakertown silt loam, 6 to 12 percent slopes, eroded"
"QuB" - "Quakertown channery silt loam, 2 to 6 percent slopes"
"QuC" - "Quakertown channery silt loam, 6 to 12 percent slopes"
"QuC2" - "Quakertown channery silt loam, 6 to 12 percent slopes, eroded"
"QuD2" - "Quakertown channery silt loam, 12 to 18 percent slopes, eroded"
"RaA" - "Readington and Abbottstown silt loams, 0 to 2 percent slopes"
"RaB" - "Readington and Abbottstown silt loams, 2 to 6 percent slopes"
"RaB2" - "Readington and Abbottstown silt loams, 2 to 6 percent slopes, eroded"
"RaC2" - "Readington Abbottstown silt loams, 6 to 12 percent slopes, eroded"
"ReA" - "Reaville silt loam, 0 to 2 percent slopes"
"ReB" - "Reaville silt loam, 2 to 6 percent slopes"
"ReB2" - "Reaville silt loam, 2 to 6 percent slopes, eroded"
"ReC2" - "Reaville silt loam, 6 to 12 percent slopes, eroded"
"Ro" - "Rowland silt loam"
"SdD" - "Sandy and silty loam, strongly sloping"
"SdE" - "Sandy and silty loam, steep"
"SrA" - "Sassafras sandy loam, 0 to 2 percent slopes"
"SrB" - "Sassafras sandy loam, 2 to 5 percent slopes"
"SrC" - "Sassafras sandy loam, gently undulating"
"SrC2" - "Sassafras sandy loam, 5 to 10 percent slopes,"
"SbS" - "Sassafras gravelly sandy loam, 2 to 5 percent slopes"
"StC3" - "Sassafras sandy clay loam, 5 to 10 percent slopes, severely eroded"
"SyB" - "Sassafras Woodstown sandy loams, gently undulating"
"TnB" - "Tinton loamy sand, 2 to 5 percent slopes"
"To" - "Tioga fine sandy loam"
"Ug" - "Urban land, Galestown material"
"Us" - "Urban land, Sassafras material"
"VmC" - "Very stony land, Mount Lucas and Neshaminy materials, 0 to 12 percent slope"
"VnE" - "Very stony land, Neshaminy material, 12 to 30 percent slopes"
"Vw" - "Very stony land, Watchung material"
"We" - "Watchung silt loam"
"WfB" - "Woodstown-Fallsington sandy loam, gently undulating"
"W" - "Stream, River"
"W" - "Lake, Pond"
"Unk" - "Unknown"

SURFICIAL GEOLOGY CODES:
"QBS" - "BEACH SAND"
"QF" - "RECENT FILL"
"QG" - "GRAVEL"
"QM" - "TIDAL MARSH AND SWAMP DEPOSITS"
"X" - "NO SURFICIAL DEPOSIT"
"W" - "WATER"
"QBS" - "BEACH SAND"
"QF" - "RECENT FILL"

"QG" - "GRAVEL"
"QM" - "TIDAL MARSH AND SWAMP DEPOSITS"
"X" - "NO SURFICIAL DEPOSIT"
"W" - "WATER"

LAND USE/LAND COVER CODES:

1000 - "Urban Land"
1100 - "Residential"
1200 - "Commercial and Services"
1211 - "Military Reservations"
1300 - "Industrial"
1400 - "Transportation/Communication/Utilities"
1500 - "Industrial and Commercial Complexes"
1600 - "Mixed Urban or Built-up Land"
1700 - "Other Urban or Built-up Land"
1800 - "Recreational Land"
1804 - "Athletic Fields (Schools)"
2000 - "Agriculture"
2100 - "Cropland and Pastureland"
2200 - "Orchards, Vineyards, Nurseries, Horticultural Areas"
2260 - "Cranberry Bogs"
2300 - "Confined Feeding Operations"
2400 - "Other Agriculture"
4000 - "Forest"
4100 - "Deciduous Forest"
4200 - "Coniferous Forest"
4210 - "Pitch-Pine Lowland Forest"
4300 - "Mixed Forest"
4310 - "Coniferous/Deciduous Forest"
4320 - "Deciduous/Coniferous Forest"
4400 - "Brushland/Shrubland"
5000 - "Water"
5100 - "River Channel"
5200 - "Lake or Pond"
5300 - "Reservoir"
5400 - "Bay, Estuary"
5410 - "Bay, Estuary"
5420 - "Dregded Lagoon"
6000 - "Wetlands"
6100 - "Coastal Wetlands"
6110 - "Saline Marshes"
6120 - "Freshwater Tidal Marshes"
6130 - "Vegetated Dune Communities"
6200 - "Interior Wetlands"
6210 - "Deciduous Wooded Wetlands"
6220 - "Coniferous Wooded Wetlands"
6221 - "Cedar Swamp"
6230 - "Brush-Dominant and Bog Wetlands"
6240 - "Non-Tidal Marshes"
7000 - "Barren Land"
7100 - "Beaches"
7200 - "Bare Exposed Rock, Rock Slides, etc."
7300 - "Extractive Mining"
7400 - "Altered Lands"
7500 - "Transitional Areas"
7600 - "Undifferentiated Barren Lands"

5.1.2.2 Attribute Definition
see above

5.1.2.4 Attribute Definition Values
see above

6.0 DATA DISTRIBUTION

6.4 Standard Order Process
All data is available through map sales on the Central, South and North Jersey. CD-ROM $30.00 per CD.
NJ Department of Environmental Protection Maps and Publications
P.O. Box 438
428 E. State Street
Trenton, NJ 08625
(609) 777-1039
Make a **check payable** to: Treasurer, State Of New Jersey.

6.4.2.1 Digital Transfer Information
Data is available in the following format Arc/Info, export.

6.4.2.2.2.1 Offline Media
Data Distribution Agreement (NJDEP)
Agrees to abide by the terms and conditions of the following:

I. Description of Data to be Provided
The data provided herein are distributed subject to the following conditions and restrictions.

Subject Data Layers

For all data contained herein, (NJDEP) makes no representations of any kind, including, but not limited to, the warranties of merchantability or fitness for a particular use, nor are any such warranties to be implied with respect to the digital data layers furnished hereunder. NJDEP assumes no responsibility to maintain them in any manner or form.

II. Terms of Agreement

1. Digital data received from the NJDEP are to be used solely for internal purposes in the conduct of daily affairs.
2. The data are provided, as is, without warranty of any kind and the user is responsible for understanding the accuracy limitations of all digital data layers provided herein, as documented in the accompanying Data Dictionary and Readme files. Any reproduction or manipulation of the above data must ensure that the coordinate reference system remains intact.
3. Digital data received from the NJDEP may not be reproduced or redistributed for use by anyone without first obtaining written permission from the NJDEP. This clause is not intended to restrict the distribution of printed mapped information produced from the digital data.
4. Any maps, publications, reports, or other documents produced as a result of this project that utilize NJDEP digital data will credit the NJDEP's Geographic Information System (GIS) as the source of the data with the following credit/disclaimer:
"This (map/publication/report) was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized."

5. Users shall require any independent contractor, hired to undertake work that will utilize digital data obtained from the NJDEP, to agree not to use, reproduce, or redistribute NJDEP GIS data for any purpose other than the specified contractual work. All copies of NJDEP GIS data utilized by an independent contractor will be required to be returned to the original user at the close of such contractual work.

Users hereby agree to abide by the use and reproduction conditions specified above and agree to hold any independent contractor to the same terms. By using data provided herein, the user acknowledges that terms and conditions have been read and that the user is bound by these criteria.

7.0 METADATA REFERENCE INFORMATION

7.1 Metadata Date
May 1, 1996

7.4 Metadata Contact
John Fleming or Lenora Ross

8.0 CITATION INFORMATION

8.1 Originator
NJ Department of Environmental Protection

8.4 Title
Meritum

8. 5 Edition
#1

9.0 TIME PERIOD INFORMATION

9.1.1 Calendar Date
YEAR 1996

10.0 CONTACT INFORMATION

10.1.1 Contact Person(s) Primary
Larry Thornton/John Tyrawski, NJDEP
Production Staff; ESRI & AIS, Redlands, CA

10.1.2 Contact Organization
Bureau of Geographic Information & Analysis

10.4 Contact Address
NJDEP/OIRM/BGIA
401 E. State St.
P.O. Box 428
Trenton, NJ 08625

10.5 Contact Voice Telephone
609-984-2243

Appendix B: Scale Horizontal Accuracy for NMAS

SCALE	+/-Feet	+/-Meters
1:12000	33.3	
1:24000	40	12.2
1:63360	105.6	32.2
1:100000	166.7	50.8
1:250000	416.7	127
1:500000	833.3	254

Appendix C: Quarterquad Template for New Jersey

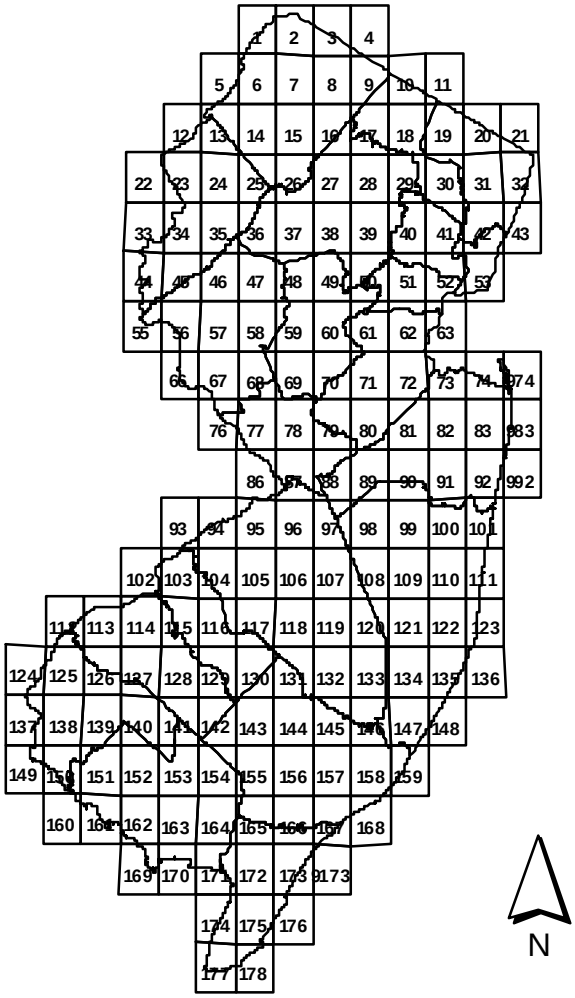

Figure 1: Photoquad Index

Table 1: Photoquad Number & Name	
1	MILFORD PA-NJ
2	PT. JERVIS S. NJ-NYPA
3	UNIONVILLE NY-NJ
4	PINE ISLAND NY-NJ
5	LAKE MASKENOZHA PA-NJ
6	CULVERS GAP NJ-PA
7	BRANCHVILLE NJ
8	HAMBURG NJ
9	WAWAYANDA NJ-NY
10	GREENWOOD LAKE NY-NJ
11	SLOATSBURG NY-NJ
12	BUSHKILL PA-NJ
13	FLATBROOKVILLE NJ-PA
14	NEWTON WEST NJ
15	NEWTON EAST NJ
16	FRANKLIN NJ
17	NEWFOUNDLAND NJ
18	WANAQUE NJ
19	RAMSEY NJ-NY
20	PARK RIDGE NJ-NY
21	NYACK NY-NJ
22	STROUDSBURG PA-NJ
23	PORTLAND NJ-PA
24	BLAIRSTOWN NJ
25	TRANQUILITY NJ
26	STANHOPE NJ
27	DOVER NJ
28	BOONTON NJ
29	POMPTON PLAINS NJ
30	PATERSON NJ
31	HACKENSACK NJ
32	YONKERS NJ-NY
33	BANGOR PA-NJ
34	BELVIDERE NJ-PA
35	WASHINGTON NJ
36	HACKETTSTOWN NJ
37	CHESTER NJ
38	MENDHAM NJ
39	MORRISTOWN
40	CALDWELL NJ
41	ORANGE NJ
42	WEEHAWKEN NJ-NY
43	CENTRAL PARK NY-NJ
44	EASTON NJ-PA
45	BLOOMSBURY NJ
46	HIGH BRIDGE NJ
47	CALIFON NJ
48	GLADSTONE NJ
49	BERNARDSVILLE NJ
50	CHATHAM NJ
51	ROSELLE NJ
52	ELIZABETH NJ-NY
53	JERSEY CITY NJ-NY
55	RIEGELSVILLE PA-NJ
56	FRENCHTOWN NJ-PA
57	PITTSTOWN NJ
58	FLEMINGTON NJ
59	RARITAN NJ
60	BOUND BROOK NJ
61	PLAINFIELD NJ
62	PERTH AMBOY NJ-NY
63	ARTHUR KILL NY-NJ
66	LUMBERVILLE PA-NJ
67	STOCKTON NJ-PA
68	HOPEWELL NJ
69	ROCKY HILL NJ
70	MONMOUTH JUNCTION NJ
71	NEW BRUNSWICK NJ
72	SOUTH AMBOY NJ-NY
73	KEYPORT NJ-NY
74	SANDY HOOK NJ-NY
76	LAMBERTVILLE PA-NJ
77	PENNINGTON NJ-PA
78	PRINCETON NJ
79	HIGHTSTOWN NJ
80	JAMESBURG NJ
81	FREEHOLD NJ
82	MARLBORO NJ
83	LONG BRANCH NJ
86	TRENTON WEST PA-NJ
87	TRENTON EAST NJ-PA
88	ALLENTOWN NJ
89	ROOSEVELT NJ
90	ADELPHIA NJ

Table 1: Continued

91	FARMINGDALE NJ
92	ASBURY PARK NJ
93	FRANKFORD PA-NJ
94	BEVERLY PA-NJ
95	BRISTOL PA-NJ
96	COLUMBUS NJ
97	NEW EGYPT NJ
98	CASSVILLE NJ
99	LAKEHURST NJ
100	LAKEWOOD NJ
101	POINT PLEASANT NJ
102	PHILADELPHIA PA-NJ
103	CAMDEN NJ-PA
104	MOORESTOWN NJ
105	MOUNT HOLLY NJ
106	PEMBERTON NJ
107	BROWNS MILLS NJ
108	WHITING NJ
109	KESWICK GROVE NJ
110	TOMS RIVER NJ
111	SEASIDE PARK NJ
112	MARCUS HOOK PA-NJ-DEL
113	BRIDGEPORT NJ-PA
114	WOODBURY
115	RUNNEMEDE NJ
116	CLEMENTON NJ
117	MEDFORD LAKES NJ
118	INDIAN MILLS NJ
119	CHATSWORTH NJ
120	WOODMANSIE NJ
121	BROOKVILLE NJ
122	FORKED RIVER NJ
123	BARNEGAT LIGHT NJ
124	WILMINGTON S. DEL-NJ
125	PENNS GROVE NJ-DEL
126	WOODSTOWN NJ
127	PITMAN WEST NJ
128	PITMAN EAST NJ
129	WILLIAMSTOWN NJ
130	HAMMONTON NJ
131	ATSION NJ
132	JENKINS NJ
133	OSWEGO LAKE NJ
134	WEST CREEK NJ
135	SHIP BOTTOM NJ
136	LONG BEACH NE NJ
137	DELAWARE CITY DEL-NJ
138	SALEM NJ
139	ALLOWAY NJ
140	ELMER NJ
141	NEWFIELD NJ
142	BUENA NJ
143	NEWTONVILLE NJ
144	EGG HARBOR CITY NJ
145	GREEN BANK NJ
146	NEW GRETNA NJ
147	TUCKERTON NJ
148	BEACH HAVEN NJ
149	TAYLORS BRIDGE DEL-NJ
150	CANTON NJ-DEL
151	SHILOH NJ
152	BRIDGETON NJ
153	MILLVILLE NJ
154	FIVE POINTS NJ
155	DOROTHY NJ
156	MAYS LANDING NJ
157	PLEASANTVILLE NJ
158	OCEANVILLE NJ
159	BRIGANTINE INLET NJ
160	BOMBAY HOOK DEL-NJ
161	BEN DAVIS PT. NJ-DEL
162	CEDARVILLE NJ
163	DIVIDING CREEK NJ
164	PORT ELIZABETH NJ
165	TUCKAHOE NJ
166	MARMORA NJ
167	OCEAN CITY NJ
168	ATLANTIC CITY NJ
169	FORTESCUE NJ
170	PORT NORRIS NJ
171	HEISLERVILLE NJ
172	WOODBINE NJ
173	SEA ISLE CITY NJ
174	RIO GRANDE NJ
175	STONE HARBOR NJ
176	AVALON NJ
177	CAPE MAY NJ
178	WILDWOOD NJ
974	SANDY HOOK EAST
983	LONG BRANCH EAST
992	ASBURY PARK EAST
9173	SEA ISLE CITY EAST

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