
ANDOVER TOWNSHIP

MASTER PLAN

**CODIFICATION and
SELECTED NEW TEXT**

From 1989 to 1992

**CODIFICATION AND SELECTED TEXT PREPARED BY:
John Cilo, Jr. Associates, Inc.
Scarlett Doyle, P.P.**

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INTRODUCTION

The Planning Board presents its amendment to the 1989 revised Master Plan for Andover Township. This plan amendment continues to preserve the unique characteristics of Andover Township, including the protection of environmentally sensitive lands, and the Township's rural character, yet recognizing and responding to the influences of the arterial and selected primary connector roadways which influence growth.

A revised Land Use policy towards effectively dealing with business uses along the arterial route U.S. Route 206 and the primary connector of County Route 616 is included in this plan. The new Land Use Element maintains the planning implementation tool of constraints or critical areas zoning. Other elements within the Master Plan have been revisited to assure a realistic and comprehensive policy.

Several new commercial and business district areas have been added. These new sites are within the U.S. Route 206 corridor and Sussex County Route 616 (Newton-Sparta Road) which are appropriate locations for such development.

It is believed that this framework will provide a sound basis for the formulation of a compatible land development ordinance and zoning map by the governing body.

The text provided are "replacement" pages which are intended to be introduced into the body of the existing plan.

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AMENDED TEXT

3. To require detailed delineations of wetlands and flood plains and require conservation easements to preclude future development of these areas.
4. To allow the intensity of use permitted on a tract to be directly related to its physical characteristics and carrying capacity. Residential densities and nonresidential floor area ratios should be related to site specific development constraints. Densities should be related to site specific development constraints.
5. To require larger lot sizes on environmentally sensitive properties.
6. To discourage development on steep slopes (25 + percent) and to utilize appropriate environmental safeguards and practices when developing moderate slopes (between 15 and 24 percent).
7. To encourage the retention of natural runoff on site to the maximum extent practical.
8. To discourage unnecessary curbing and use natural swales to handle road runoff where possible. Curbing should be utilized where necessary, for example, on sloping roads, business developments and multi-family development and high density single family developments.
9. To minimize site disruption by establishing limits of clearing that are kept to an absolute minimum.
10. To encourage the preservation of existing vegetation by retaining groups of trees inclusive of the drip lines, rather than individual specimens inclusive of drip lines.
11. To include water quality basins where stormwater will flow into wetland areas or water bodies. Grit chambers in catch basins should be encouraged to be used where practical.
12. To limit development on ridge lines, roof lines should be kept below the ridge line to prevent distant views.
13. To allow some flexibility from site plan standards to encourage environmental preservation.

6. To encourage farmland preservation by actively pursuing funds for development rights acquisition, where possible.

C. HOUSING

1. To provide for a variety of housing opportunities in appropriate locations.
2. To create the realistic opportunity for the construction of Andover Township's Mt. Laurel obligation.
3. To limit non-inclusionary multi-family development to areas where it presently exists pursuant to the objectives of Mount Laurel II.
4. To relate density of housing development to environmental characteristics and roadway capacity.
5. To create a desirable environment through the adoption of "lookalike ordinance". This is particularly true for smaller lot subdivisions and multi-family developments.
6. To encourage cluster development on sites which are most appropriate for clustering. Clustering should be encouraged where environmental characteristics of property warrant the cluster option and where continuous open space can be achieved. Such open space should include lands which do not exhibit constraints as identified in Section 14-6.1Ab1.
7. In cluster developments net lot sizes might be smaller than those under conventional zoning.

4. To assure that all developments pay its proportionate share of off-tract roadway improvements, a detailed roadway improvement plan should be prepared so that potential developers are aware of the Township's improvement priorities.
5. To vacate paper streets where development plans have been abandoned and where such paper streets serve no valid future purpose. For example, rights of way which are not technically viable because of wetlands or slopes constraints should be vacated if future extension is not feasible.
6. To encourage a hierarchy of streets within the roadway network, and create separation of streets according to their function ranging from major arterials through local land service roadways.
7. To encourage the construction of pedestrian circulation facilities where they are most likely to be used. Connections should be made between residential developments and commercial areas as well as between residences and schools and parks. Sidewalks paralleling streets are not viewed as the only method of providing pedestrian circulation.
8. To encourage the separation of pedestrian and vehicular circulation not only within the public roadway network but also within private development roads and in nonresidential site plans.
9. To develop and encourage alternative means of transportation including bus routes and park-and-ride facilities. Andover Township is essentially a "bedroom community" with commuters traveling to employment centers to the south and east. Future development within the Township and in the Sussex County region will overburden the existing arterial network if alternative transportation methods are not implemented.
10. To encourage land uses which are compatible with the purpose and function of the roadway classification and circulation characteristics of the roadways within the Township.

G. COMPATIBILITY WITH OTHER PLANNING EFFORTS

1. To insure that the zoning of Andover Township does not conflict with that of adjoining municipalities. High intensity uses should not be placed adjacent to low intensity uses in adjoining municipalities without appropriate buffering.

CIRCULATION PLAN ELEMENT

At the present time there are approximately 60 miles of roads within the Township. Of this total, approximately 40 miles are maintained by the Township, 16 by Sussex County and 3 miles of Route 206 are maintained by the State. (See Map 14)

The Township has an established hierarchy within its roadway network. The Township's streets have been classified according to functional category:

1. **Arterials.** Arterial roads are those which carry large volume of traffic at relatively high speeds. These roads are of regional significance and connect the Township with other points in the County and with the interstate highway network. The only arterial road identified in Andover is U.S. Highway 206.

2. **Primary Connectors.** Primary connectors provide linkage between the Township's residential communities and these roadways carry a lower volume of traffic than arterials and at lower speeds. The principal primary connector streets within Andover Township are Newton-Sparta Road and Limecrest Road.

3. **Local Secondary.** Local secondary streets function as land service roadways and function as collector streets for the connector network.

4. **Local Minor Streets.** These streets act as feeders to connector and local secondary roads and provide direct access to developed areas.

Land uses throughout the Township should be proposed which will positively interact with the volumes and type of traffic on abutting roadways. Andover's existing road network has been analyzed in the accompanying road index. The index includes recommendations regarding improvements of existing conditions. This chart should be updated periodically and improvements should be prioritized through the capital improvement planning process.

Also incorporated within the Master Plan is the Planning Board's recommendation that the Township consider the following roadway design parameters prior to and as a condition of the acceptance of any roadway into the municipal system.

It is strongly recommended that roads conform to the minimum Township design standards for these parameters as minimum eligibility requirements for roadway acceptance.

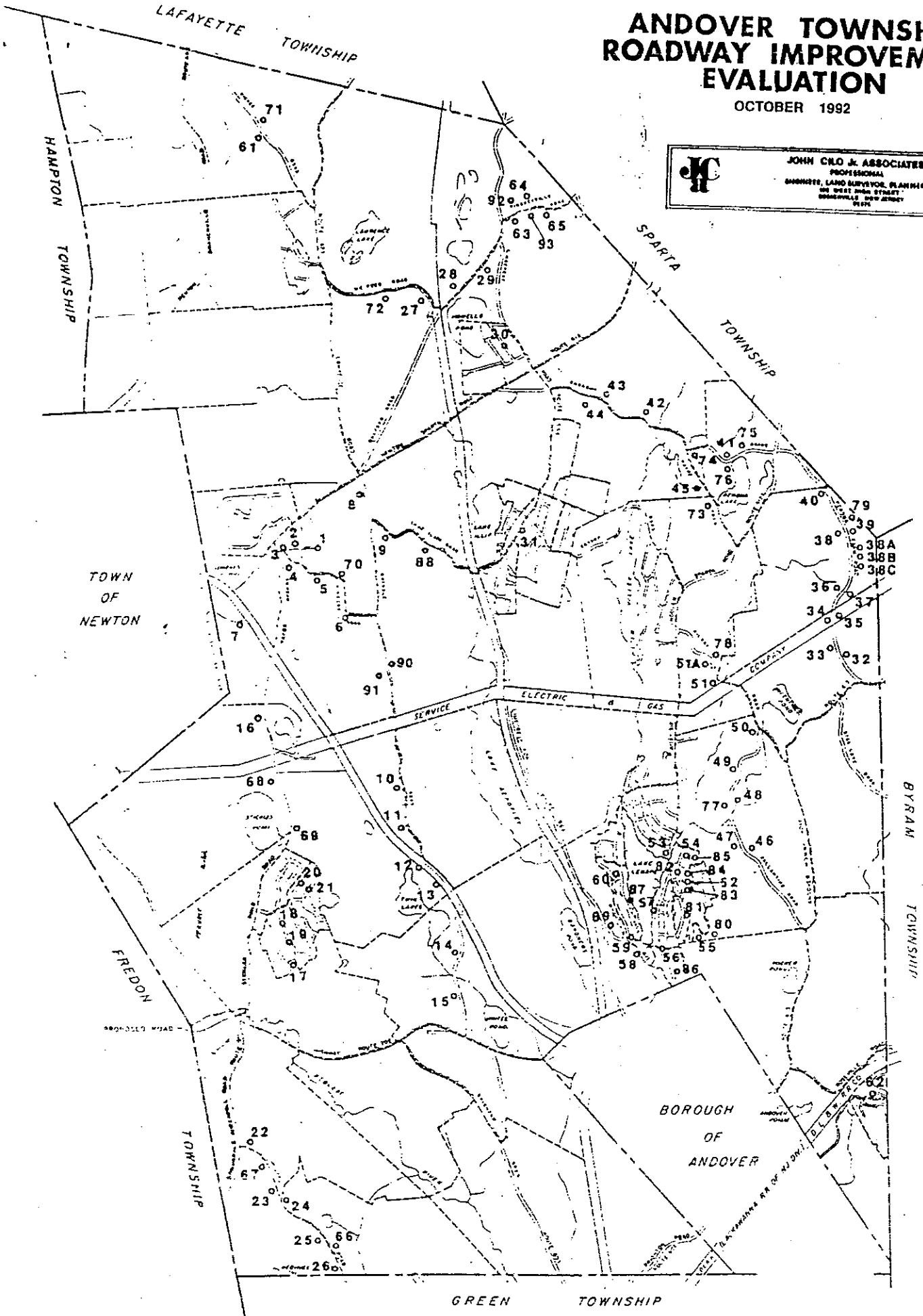
**RECOMMENDED DESIGN PARAMETERS TO BE CONSIDERED
FOR ROADWAY ACCEPTANCE**

- Right-of-way
- Pavement width
- Riding lane width
- Slope of pavement from centerline
- Shoulder width
- Shoulder slope
- Curbing
- Type and depth of road construction
- Design speed
- Maximum grade
- Minimum grade
- Minimum centerline radius
- Earth berm width and slope

ANDOVER TOWNSHIP ROADWAY IMPROVEMENT EVALUATION

OCTOBER 1992

JC
 JOHN CLO J. ASSOCIATES
 PROFESSIONAL
 ENGINEER, LAND SURVEYOR, PLANNER
 201 WEST MAIN STREET
 DANVERVILLE, NEW JERSEY
 07834



ANDOVER TOWNSHIP ROADWAY IMPROVEMENT EVALUATION REPORT - October, 1991 -			
MAP NO.	ROAD NAME	IMPROVEMENT	DESCRIPTION OF ROADWAY CONDITION AND DISCUSSION OF POSSIBLE DESIGN CONSIDERATIONS
1	FLORENCE LANE	DRAINAGE	Wash outs. Steepness of road contributes. Design of r.o.w. drainage needed.
2	LINDA LANE	DRAINAGE	Stormwater bypasses inlet. Design of r.o.w. geometry and drainage needed.
3	DAVIS TERRACE	DRAINAGE	Lack of drainage at the termination of the road. Drainage is needed to catch backwash.
4	PINECREST ROAD	DRAINAGE	Pipe size analysis needed as well as road work. Project should extend to Davis Terrace.
5	PINECREST ROAD	DRAINAGE	Wash and ponding near farmhouse. Drainage structures should be considered in analysis.
6	PINECREST ROAD	DRAINAGE	Ponding area. drainage structures and pipe size analysis is needed.
7	WILSON PLACE	DRAINAGE	Ponding problem. Infrastructure may be considered to run through needed easements.
8	LAKE ILIFF ROAD	DRAINAGE	Wash and ponding problem. Pipe size analysis and drainage design is required.
9	LAKE ILIFF ROAD	DRAINAGE	Ponding problem. Pipe size analysis and drainage design is required.
10	GOODALE ROAD	DRAINAGE	Wash and ponding problem. Inlet and pipe size analysis and drainage design is required.
11	GOODALE ROAD	DRAINAGE	Wash and ponding problem. Inlet and pipe size analysis and drainage design is required.
12	GOODALE ROAD	DRAINAGE	Wash and ponding problem. Inlet and pipe size analysis and drainage design is required.
13	GOODALE ROAD	DRAINAGE	Wash and ponding problem. Inlet and pipe size analysis and drainage design is required.
14	GOODALE ROAD	DRAINAGE	Wash and ponding problem. Inlet and pipe size analysis and drainage design is required.
15	GOODALE ROAD	DRAINAGE	Area subject to flooding. Road elevation study and pipe size analysis required.
16	STICKLES POND ROAD	DRAINAGE	Area subject to flooding. Road elevation study and pipe size analysis required.
17	HOWARD DRIVE	DRAINAGE	Storm collection problem. Evaluation of location of exist. drains, possible relocation and easements.
18	IRVING PLAZA	DRAINAGE	Ponding due to road undulation. Drainage design, pipe size analysis, possible easements.
			Ponding due to road undulation. Drainage design, pipe size analysis, possible easements.

MAP NO.	ROAD NAME	IMPROVEMENT	DESCRIPTION OF ROADWAY CONDITION AND DISCUSSION OF POSSIBLE DESIGN CONSIDERATIONS
19	IRVING PLAZA	DRAINAGE	Ponding due to road undulation. Drainage design, pipe size analysis, possible easements.
20	ARTHUR AVENUE	DRAINAGE	Ponding due to road undulation. Drainage design, pipe size analysis, possible easements.
21	ARTHUR AVENUE	DRAINAGE	Ponding due to road undulation. Drainage design, pipe size analysis, possible easements.
22	HUNTSVILLE ROAD	DRAINAGE	Bank erosion and water volume concern. Drainage design and pipe size analysis
23	HUNTSVILLE ROAD	DRAINAGE	Road undulation causing ponding. Possible drainage link to Map # 24, 25 structures.
24	HUNTSVILLE ROAD	DRAINAGE	Road undulation causing ponding. Possible drainage link to Map # 23, 25 structures.
25	HUNTSVILLE ROAD	DRAINAGE	Ponding. Analysis of pipe size and drainage design. Possible link to Map # 23, #24 structures.
26	HUNTSVILLE ROAD	DRAINAGE	New drain pipe needed, basins needed, pipe size analysis and possible easements
27	MCPHEE ROAD	DRAINAGE	Drainage goes onto private property, need easements, basins, drainage analysis and pipe sizing analysis.
28	MULFORD ROAD	DRAINAGE	Basins, piping across road, may need easements, pipe size analysis is suggested.
29	MULFORD ROAD	DRAINAGE	Basins, piping that lead to Map #28 above. Need to do an areawide study for drainage analysis.
30	LONGVIEW ROAD	DRAINAGE	Flooding, basins and pipe design to Terrace, if possible. Areawide drainage study will assist.
31	MAPLE DRIVE	DRAINAGE	Flooding. Basins, pipe to ditch in Skytop. Easements may be needed, depending on drainage study results.
32	PERONA ROAD	DRAINAGE	Flooding. Basins and piping, with computations needed to establish type of basins and pipe size.
33	PERONA ROAD	DRAINAGE	Flooding. Basins and piping, with computations needed to establish type of basins and pipe size.
34	PERONA ROAD	DRAINAGE	Flooding. Basins and piping, guide rail, rip-rap, design and comps. to assure against erosion is required.
35	PERONA ROAD	DRAINAGE	Flooding. Basins and piping, guide rail, rip-rap, design and comps. to assure against erosion is required.
36	PERONA ROAD	DRAINAGE	Flooding. Basins and piping, guide rail, rip-rap, design and comps. to assure against erosion is required.
37	PERONA ROAD	DRAINAGE	Flooding. Basins and piping, guide rail, rip-rap, covered pipe, comps. to assure against erosion is required.
38	PERONA ROAD	DRAINAGE	Basins, drainage analysis to establish need for possible pipe resize, guiderail

MAP NO.	ROAD NAME	IMPROVEMENT	DESCRIPTION OF ROADWAY CONDITION AND DISCUSSION OF POSSIBLE DESIGN CONSIDERATIONS
38A	PERONA ROAD	DRAINAGE	New basin, stormwater comps. to establish rip rap and piping.
38B	PERONA ROAD	DRAINAGE	New basin, stormwater comps. to establish rip rap and piping.
38C	PERONA ROAD	DRAINAGE	New basin, stormwater comps. to establish rip rap and piping.
39	PERONA ROAD	DRAINAGE	Basins, stormwater calcs. to assess possible resize pipe, rip-rap, headwall
40	PERONA ROAD	DRAINAGE	Basins, easements to brook, stormwater calcs. to assess possible pipe resize, rip-rap
41	CURRENT DRIVE	DRAINAGE	Ponding, stormwater calcs to assess possible resize of pipe across road.
42	CURRENT DRIVE	DRAINAGE	Ponding, stormwater calcs to assess possible resize of pipe across road.
43	CURRENT DRIVE	DRAINAGE	Ponding, stormwater calcs to assess possible resize of pipe across road.
44	CURRENT DRIVE	DRAINAGE	Ponding, stormwater calcs to assess possible resize of pipe across road.
45	PAYNE ROAD	DRAINAGE	Filling in of exist. pond. Design for silt basin, drainage comps. needed to verify need for poss. easement.
46	BALLENTINE ROAD	DRAINAGE	Narrow stone road, no drainage, needs full road design. Numerous vertical and horizontal alignment concerns.
47	BALLENTINE ROAD	DRAINAGE	Narrow stone road, no drainage, needs full road design. Numerous vertical and horizontal alignment concerns.
48	BALLENTINE ROAD	DRAINAGE	Narrow stone road, no drainage, needs full road design. Numerous vertical and horizontal alignment concerns.
49	BALLENTINE ROAD	DRAINAGE	Narrow stone road, no drainage, needs full road design. Numerous vertical and horizontal alignment concerns.
50	BALLENTINE ROAD	DRAINAGE	Narrow stone road, no drainage, needs full road design. Numerous vertical and horizontal alignment concerns.
51	KILROY ROAD	DRAINAGE	Ponding, stormwater calcs to assess possible resize of pipe across road.
51A	KILROY ROAD	DRAINAGE	Wash outs. Drainage analysis to establish quantities for basins, pipe.
52	CEDAR DRIVE	DRAINAGE	Possible pipe resize. Need stormwater comps. for analysis, basins needed.
53	ANDOVER-SPARTA RD.	DRAINAGE	County concern currently under discussion
54	PINE CLIFF ROAD	DRAINAGE	Ponding. Basins, piping, boulder problem. Possible link to Cedar, but requires field info. and analysis

MAP NO.	ROAD NAME	IMPROVEMENT	DESCRIPTION OF ROADWAY CONDITION AND DISCUSSION OF POSSIBLE DESIGN CONSIDERATIONS
55	AYERS CIRCLE	DRAINAGE	Pocketing. Basin, pipe, possible easement to Hillcrest and beyond. Needs analysis.
56	SUSSEX AVENUE	DRAINAGE	Ponding, basins, piping, possible easements, but needs field info. and analysis.
57	LENAPE ROAD	DRAINAGE	New pipe, basins, pipe removal. Pipe size requires stormwater analysis.
58	OLD CREAMERY ROAD	DRAINAGE	Icing, basins, pipe extension is needed. Field info. needed for evaluation.
59	HEMLOCK AVENUE	DRAINAGE	Icing, basins and piping is needed. Field info. is needed for evaluation.
60	HEMLOCK AVENUE	DRAINAGE	Ponding. Evaluate pipe sizing and extend drainage pipe, basins are needed.
61	PIERCE ROAD	DRAINAGE	Drainage concerns, vertical and horizontal alignment of 4,000 l.f. is needed.
62	WOODLAWN DRIVE	DRAINAGE	Drainage between houses. Studies are available in a report prepared by engineer Slaby.
63	PINKNEYVILLE ROAD	DRAINAGE	This project is currently under right of way evaluation and design review.
64	PINKNEYVILLE ROAD	DRAINAGE	This project is currently under right of way evaluation and design review.
65	PINKNEYVILLE ROAD	DRAINAGE	This project is currently under right of way evaluation and design review.
66	HUNTSVILLE ROAD	DRAINAGE	Drainage conditions due to undulation. Stormwater studies are needed.
67	HUNTSVILLE ROAD	WIDEN/DRAINAGE	Repair is needed throughout roadway due to drainage conditions in the locations of undulations
68	STICKLES POND ROAD	WIDEN/DRAINAGE	Repair is needed throughout roadway due to drainage conditions affecting roadbed.
69	STICKLES POND ROAD	WIDEN/DRAINAGE	Repair is needed throughout roadway due to drainage conditions affecting roadbed.
70	PINECREST ROAD	WIDEN/DRAINAGE	Repair is needed throughout roadway due to drainage conditions affecting roadbed.
71	PIERCE ROAD	WIDEN/DRAINAGE	Repair is needed throughout roadway due to drainage conditions affecting roadbed.
72	MCPEEK ROAD	WIDEN/DRAINAGE	Repair is needed throughout roadway due to drainage conditions affecting roadbed.
73	PAYNE ROAD	WIDEN/DRAINAGE	Narrow road with pond on one side, house opposite. No place to store snow.
74	PAYNE ROAD	WIDEN/DRAINAGE	Intersection improvement required due to geometry. Redesign advised.

MAP NO.	ROAD NAME	IMPROVEMENT	DESCRIPTION OF ROADWAY CONDITION AND DISCUSSION OF POSSIBLE DESIGN CONSIDERATIONS
75	CURRENT DRIVE	WIDEN/DRAINAGE	Widen, bank concern, drainage, there is no location for snow storage.
76	CURRENT DRIVE	WIDEN/DRAINAGE	Vertical alignment problem with numerous locations exhibiting rock outcrop.
77	BALLENTINE ROAD	WIDEN/DRAINAGE	Insufficient road width, stone road of unknown stds., full drainage analysis needed
78	KILROY ROAD	WIDEN/DRAINAGE	Total road reconstruction with horiz. & vertical align problem, basins, piping.
79	PERONA ROAD	WIDEN/DRAINAGE	Road reconstruction adjacent to Little League Ballfield, alignment concerns
80	AYERS CIRCLE	WIDEN/DRAINAGE	Road widening and reconstruction needed. Alignment concerns and drainage
81	HILLCREST AVENUE	WIDEN/DRAINAGE	Road widening and reconstruction needed. Alignment concerns and drainage
82	PINE CLIFF ROAD	WIDEN/DRAINAGE	Total road reconstruction advised. Boulders, vertical align, roadway crown problems.
83	CEDAR DRIVE	WIDEN/DRAINAGE	Total road reconstr. Boulders, vertical align, crown probs, severe slopes, no avail. parking
84	PROSPECT PLACE	WIDEN/DRAINAGE	Total road reconstruction advised. Boulders, vertical align, crown probs, severe slopes.
85	RIDGE ROAD	WIDEN/DRAINAGE	Drainage analysis needed, possible easement needed by Mooney, piping.
86	SUSSEX AVENUE	WIDEN/DRAINAGE	Total road reconstr. Boulders, vertical align, crown probs, severe slopes, no avail. parking
87	HEMLOCK AVENUE	WIDEN/DRAINAGE	Rock outcrop throughout; consider vertical alignment problems in design.
88	LAKE ILIFF ROAD	WIDEN/DRAINAGE	Road widening and reconstruction needed. Vertical and horizontal alignment, drainage concerns
89	OLD CREAMERY ROAD	WIDEN/DRAINAGE	Rock outcrop throughout; consider vertical alignment problems in design.
90	GOODALE ROAD	WIDEN/DRAINAGE	Road widening and reconstruction needed. Alignment concerns and drainage
91	GOODALE ROAD	WIDEN/DRAINAGE	Road widening and reconstruction needed. Alignment concerns and drainage
92	PINKNEYVILLE ROAD	WIDEN/DRAINAGE	This project is currently under right of way evaluation and design review.
93	PINKNEYVILLE ROAD	WIDEN/DRAINAGE	This project is currently under right of way evaluation and design review.

COMMUNITY RESIDENCES FOR THE DEVELOPMENTALLY DISABLED AND COMMUNITY SHELTERS FOR VICTIMS OF DOMESTIC VIOLENCE

The Municipal Land Use Law, N.J.S.A. 40:55D-66.1 et. seq. is the applicable law governing these uses. That Law provides, in essence, that community residences for the developmentally disabled and community shelters for victims of domestic violence shall be permitted uses in all residential zone districts. However, the Law further provides that in the case of those housing more than six persons, a zoning ordinance may establish the uses as conditional uses in the zone district. The Board concludes that it is important to categorize these uses as conditional uses in the residential zone districts and to establish conditions for the regulation and control of those uses. The Board sees the need to provide for such residences and shelters. However, since these uses will exist in residential zone districts, many of which are fully developed, it is important to establish conditions to insure that these uses, to the greatest extent possible, are compatible with the existing residential neighborhoods into which they will be introduced. It is also important to establish regulations that will protect the privacy of the residents residing in these community residences or community shelters. Likewise, sufficient yard area should be provided for the use of the residents residing therein. Finally, the uses in appearance should be compatible with the neighborhoods where they will exist. Sufficient parking should be established to promote traffic safety and preserve the residential character of the neighborhood.

Where an existing residence is to be converted for one of these uses, it is important that the Sussex County Health Department review and approve the septic system to safeguard against the possibility of ground water contamination, since an increased number of persons may reside in the structure.

An amendment to the Zoning Ordinance establishing community residences for the developmentally disabled and community shelters for victims of domestic violence as conditional uses in all residential zone districts and establishing conditions for those conditional uses has been recommended for adoption by the Andover Township Planning Board, which is consistent with this Master Plan amendment.

LAND USE PLAN ELEMENT

The Land Use Plan Element represents a synthesis of the Master Plan's various sub-elements and is intended to act as a guide toward the future physical development of Andover Township. The Land Use Element divides the lands of the Township into categories based upon both type and intensity of use. The intent of this land use plan is to set forth, in graphic form, a method of implementing the goals and objectives of this plan.

The Land Use Plan establishes an appropriate pattern of development for the Township based upon factors including environmental characteristics, the availability and capacity of infrastructure and roads, the existing land use pattern, compatibility with the planning efforts in adjacent municipalities and the current and future land use needs of the Township.

THE RESIDENTIAL DISTRICTS

This plan proposes seven residential land use classifications. The R-0.5 and R-1.0, R-1.5 and R-2.0 are primarily Single Family Districts, the ML Mt. Laurel Affordable Housing District, the SR, Special Residential senior citizens housing district and the MFR, multi-family residential zone also permit multi-family land uses.

The R-1.0 DISTRICT

This land use plan places most of the Township's land area within the R-1.0 classification. This is a single-family detached classification, which includes a minimum net-adjusted lot area requirement of 43,560 square feet. (1 acre)

This land regulation approach is often called "constraints zoning" or "critical areas" zoning and represents a significant departure from the Township's earlier policies toward single family development.

The prior to 1989, planning efforts of the Township utilized a "block zoning" approach which called for eight distinct single family districts of varying lot sizes ranging from 0.5 acres to 4.0 acres. The inherent problem with this approach is the limited precision with which zone district lines can be drawn. Properties with significant environmental problems were included within districts which permitted relatively small lot sizes. Conversely, some tracts suitable for smaller lot development were included in large lot districts. The zone districts of R-1.5 and R-2.0 are State-approved zoning districts which are incorporated into the airport safety zones of the Newton Airport and Aeroflex Airport.

The constraints zoning approach allows for site specific "tailoring" of lot sizes to the exact character of a tract. The environmental constraints considered in this approach include slopes, seasonal high water table, depth to bedrock, floodplains and wetlands. This approach recognizes the sensitivity of these environmental constraints, and constrained properties will require commensurately larger lot sizes.

The following table outlines the multipliers to be used in the calculation of net lot areas for conventional single family design for specified environmental constraint.

CONSTRAINTS TABLE		
<u>Constraint</u>	<u>Density Factor Per Acre</u>	<u>Resulting Minimum Lot Size</u>
Slopes 25% or more	.2	5 Acres
Slopes 15-24% deep soils	.33	3 Acres
Seasonal high water table at surface	.33	3 Acres
Seasonal high water table 1-3 feet	.5	2 Acres
Shallow depth to bedrock 0 - 3.5 feet	.33	3 Acres
Depth to bedrock 3.5 feet or more	1.00	1 Acre
Floodplain and wetlands	0	5 Acres

For example, if a lot consists entirely of moderate slopes, the resultant minimum lot size would be three acres as follows:

$$3 \text{ acres gross} \times .33 = 1 \text{ acre net}$$

A lot containing 1 acre of seasonal highwater at 1-3' and three acres of steep slopes would have a net lot area of 1.1 acres as follows:

$$1 \text{ acre seasonal highwater at 1-3'} \times .5 = .5 \text{ acres net}$$

$$3 \text{ acres } 25+\% \text{ slopes} \times .2 = .6 \text{ acres net}$$

$$\text{Total 4 acres gross area} \qquad 1.1 \text{ acres net}$$

(For additional information, see constraints appendix)

The proposal calls for a maximum lot size of five acres regardless of environmental constraints. This cap should preclude the legal challenge that the regulations are confiscatory. It should be noted that however, that all other applicable development rules and regulations must be met regardless of lot size. For example, a five acre lot consisting entirely of wetlands must still comply with the DEPE regulations regarding wetlands development. Any lot must provide for a viable building envelope and secure appropriate wastewater permit approval.

Although nominally a 1.0 acre district, the average resultant gross lot sizes may be on the order of two to three acres. In terms of the overall development of Andover Township, this policy will yield a number of lots similar to the potential yield under existing zoning. However, lots will be designed in a site-specific manner which more carefully considers the environmental factors which limit development.

The R-0.5 DISTRICT

This land use designation calls for a 1/2 acre single family development. The half acre lot area is a net area after the application of the constraints calculation (discussed in the R-1.0 section above). The minimum net adjusted lot area for this district is 22,000 square feet.

The R-0.5 districts are located in areas where there is an established pattern of smaller lot development including the Lake Lenape and Lake Illiff areas.

The lands within the R-0.5 classification are largely developed, however, most of the "leftovers" have environmental constraints. This approach is particularly appropriate in the context of the lake communities since it would preclude intensive development on environmentally constrained lands which are adjacent to lakes. This will serve to further the Master Plan objective of assuring the environmental protection of the Township's lakes and streams.

THE R-1.5 DISTRICT

The land use plan exhibits the R-1.5 land use for certain parcels within the State-established Airport Safety zone. Lands within this zoning district remain unaltered from the densities approved through negotiation between the State and Andover Township.

THE R-2.0 DISTRICT

The land use plan exhibits the R-2.0 land use for certain parcels within the State-established Airport Safety zone. Lands within this zoning district remain unaltered from the densities approved through negotiation between the State and Andover Township.

THE MFR - MULTI-FAMILY RESIDENTIAL DISTRICT

The purpose of the land use is to afford an opportunity for balance forms of housing within the Township. A variety of housing types and ownership options are provided within this land use district.

THE CR COMMERCIAL RECREATION DISTRICT

The purpose of the Commercial Recreation District is to acknowledge the unique recreational advantages of certain parcels associated with the Aeroflex Airport an Newton Airport and the additional amenities of the significant water bodies of Lake Aeroflex and Stickles Pond which are also within the limits of the Airport Safety Zone.

The ML DISTRICT

The ML district is an affordable housing district created for the purpose of providing the realistic opportunity for the construction of Andover Township's fair share obligation of 107 units. This district is located in the northwest corner of the Township on either side of Route 206 adjacent to the Town of Newton. This district will permit medium density residential uses including townhouse units and condominium flats. The ML district is discussed at length in the Housing Element section of the Master Plan.

THE SPECIAL RESIDENTIAL DISTRICT

The properties on both sides of Mulford Road in the vicinity of Howell's Pond have been placed in the special residential category. This category has been established to specifically address the needs of senior citizens. The uses permissible in the special residential district include senior citizens housing, nursing homes, congregate care facilities and the requisite support facilities for such uses. These uses will make efficient use of the remaining infrastructure capacity available in the existing treatment plant located within the district.

The SR district properties may also be developed in accordance with the R-1.0 district previously described.

THE BUSINESS DISTRICTS

Andover's business districts are oriented to its arterial roads and primary connector streets. The business zones are located primarily along Route 206 and along Newton-Sparta Road. The extent of the districts and the uses permitted have been reviewed and areas of business expansion have been recommended for these business districts.

A more careful approach toward site design is required to avoid the appearance of "strip development." As discussed in the goals and objectives section, more stringent site design standards are recommended to improve the aesthetic quality of development within the business districts.

These include the use of shared parking facilities to reduce the total amount of impervious coverage, more stringent and uniform sign controls, requiring parking to be screened from rights of way, the use of shared driveways to reduce the number of curb cuts, and the encouragement of a small scale planned commercial development as opposed to individual lot by lot site planning.

The Land Use Plan map shows several changes have been recommended which result in an increase in the amount of land zoned for commercial purposes. These include the Route 206 corridor and the primary connector of Newton-Sparta Road.

Another recommended modification is the introduction of the Business Professional Office/Residential zone district for block 165 lot 6A. The need exists for adequate transition uses between the proposed Planned Commercial Development District and the residentially-zoned areas. The designation of the Business Professional Office use at this location is responsive to this need.

THE PLANNED COMMERCIAL DEVELOPMENT DISTRICT

A tract of approximately 52 acres adjacent to property with frontage in Andover Borough is recommended for Planned Commercial Development. The properties included within this zoning designation are Block 1, lots 3A, 5A, 5B, 5D and 5C. The most significant parcel is lot 5C which contains approximately 50 acres and the cumulative acreage of the balance of the lots contain somewhat in excess of 2 acres in area. This property is uniquely-suited for commercial development due to the availability of access to Route 206 through the business zone of Andover Borough. This distinct feature makes feasible the Planned Commercial Development from a planning and economic standpoint. It is emphasized, however, that care must be exercised because of this association with an adjacent municipality having the highway access. Site planning must therefore be sensitive to the fact that a municipal boundary bisects the tract.

Permitted uses within the Planned Commercial Development are intended to respond to the concerns of traffic and the environment. While it is believed that the floor area ratio enhancement offered for a comprehensive development plan will yield the aesthetic quality and economic vitality envisioned by the community, the specific uses which are placed on the site have a direct bearing on the stated objectives and concerns. It is for this reason that identification of these objectives and concerns as well as clear recommendations for development are needed in this circumstance.

The Planned Commercial Development must be designed in concert with an architectural theme. The mall building as well as all associated detached structures should bear on the same style, and it is recommended that this style be integrated with lighting, walkway and landscaping designs.

Due to the potential for significant negative impacts on the residential neighborhoods of the community, access locations into the site must be from a State highway and not from a municipal roadway. In this way, the non-residential traffic volumes will be primarily confined to roadways which are intended to carry

large volumes of traffic at relatively high speeds. Since these roadways are of a regional significance; the state highway is viewed as appropriate as the sole access road for this development.

The enhanced floor area permitted for this development anticipates that non-essential traffic be held to a minimum. The drive-up service concept generates some forms of traffic which are viewed as unnecessary to the functioning of the Planned Commercial Development. The additional traffic which will result from this form of service will have long term negative impacts on the Township and its neighboring communities. For this reason, certain drive-up facilities should be specifically prohibited.

The Planned Commercial Development must be designed in such a fashion to be sensitive to the existing environment and responsive to the future environmental concerns of the Township. In addition to the environmental controls found in local and state regulations, the careful selection of permitted uses provides necessary controls which will result in uses which facilitate preservation of the environment. The issue of long-term negative impacts on the environment is one which is critical when considering the selection of permitted uses within the Planned Commercial Development. The vehicle idle time which is customarily required for drive-up restaurant facilities produces hydrocarbon emissions which are viewed as an unnecessary burden on the ambient air quality. Within the highway area, there is an inherent air quality degradation which must be considered. To further reduce the air quality by permitting unnecessary hydrocarbon emissions is viewed as not being a responsible approach to maintaining the environmental quality of Andover Township. A reasonable exception to this general statement may be found in the unique characteristics of the drive-up banking facility. This form of drive up service exhibits fewer vehicles per day than would the restaurant drive-up service. Additionally, the time delay for service is more swift in the bank facility. Therefore, the bank drive-up facility is viewed as an acceptable use from this standpoint.

On-site litter is also an environmental concern which is most critical due to the considerable wetland and transition buffer areas which are found in the

immediate vicinity. It is suggested that outside delivery and outside consumption of food products will potentially result in increased litter problems on the site. Maintenance of a clean site in the wetland environment is made considerably more difficult with drive-up restaurant facilities. Since the product in a banking transaction does not generate this form of litter, the bank drive-up facility is an apparent exception. Therefore, the drive-up restaurant facility concept is also rejected on an environmental basis and the drive-up bank facility is viewed as a reasonable use for the Planned Commercial Development.

The Planning Board has reviewed the issue of timeframes during which the uses within the Planned Commercial Development should operate. The Board suggests that activities within the development be controlled relative to hours of operation in an effort to be responsible to the needs of the consumer, and yet to meet the Board's desire to have the site place a minimal burden on the Andover Township Police force and volunteer rescue squad. Since the Development is set well back from the highway (by virtue of the highway frontage land area of Andover Borough), surveillance activities for premises within the Township jurisdiction are more involved and time-consuming. It is therefore strongly recommended that uses which encourage activities late into the evening be prohibited. Uses such as bars and nightclubs, at this location, place an unnecessary burden on the law enforcement and safety personnel. These uses should be specifically prohibited within the Planned Commercial Development site.

THE INDUSTRIAL DISTRICTS

The single largest and most viable tract for medium to large scale industrial development within the Township is the industrial district located south of Aeroflex Airport in the vicinity of Andover Borough. This tract has long term development potential; however, infrastructure and requisite road improvements must be in place if this development is to occur.

This Plan acknowledges the long term development potential for the Aeroflex Airport property. The site is recommended for eventual mixed use development. Possible uses include office/research light manufacturing corporate headquarters along with accompanying commercial and residential development.

THE AIR HAZARD DISTRICTS

The New Jersey Municipal Land Use Law 40:55D-28(2)(c) requires that Land Use Elements of Master Plans show existing and proposed locations of any airports and delineate the boundaries of any air hazard areas pursuant to the Air Safety and Hazardous Zoning Act of 1983.

The Air Hazard Zones specifically prohibit certain uses such as housing, planned unit developments, hospitals, schools, and above ground bulk tank storage of compressed flammable or compressed toxic gases and liquids. Permitted uses within Air Hazard zones include industrial, commercial, open space, agricultural, transportation and airport uses. Height restrictions for all uses vary with location within the hazard area.

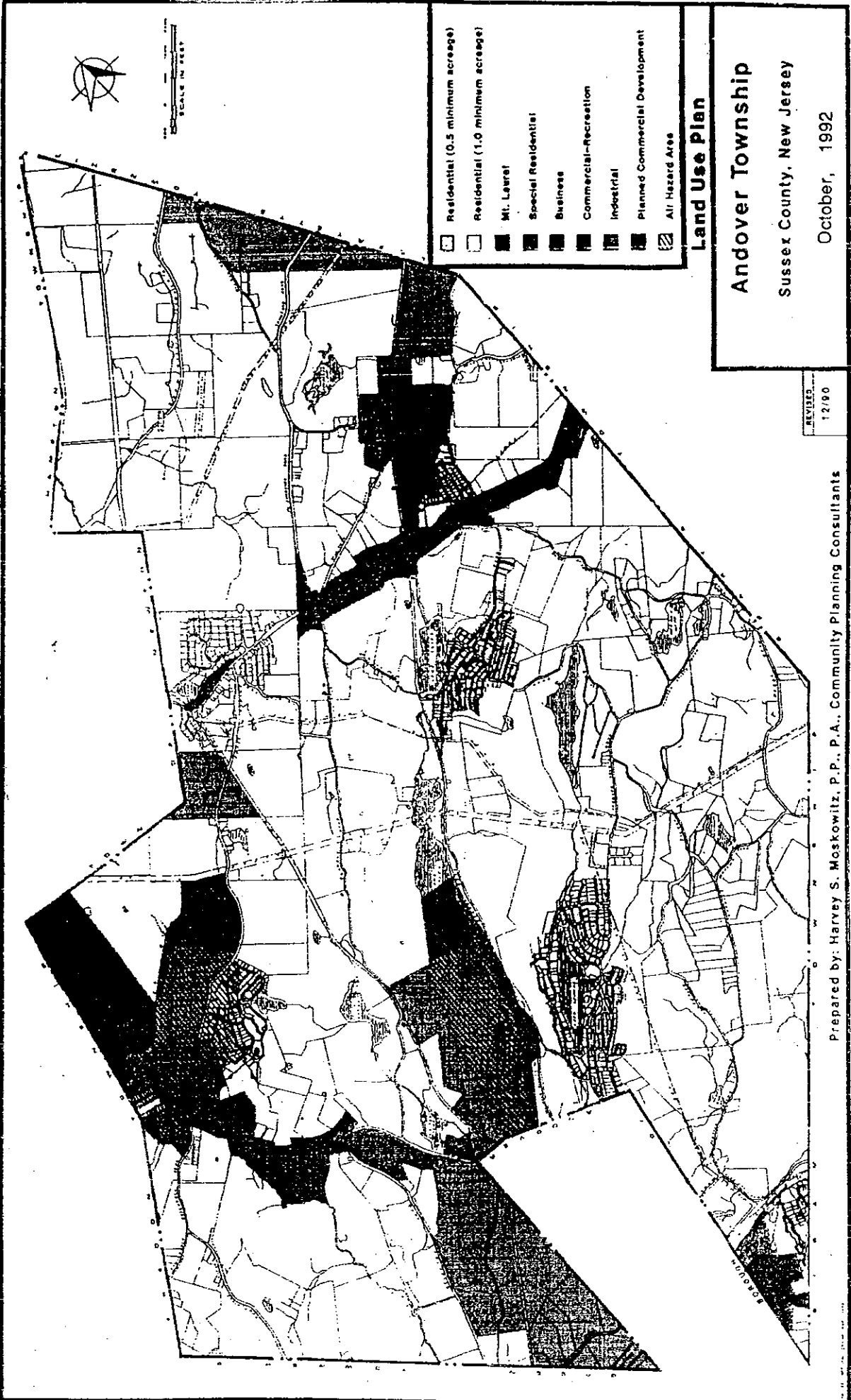
Andover Township contains two public airports, the Aeroflex Andover airport and the Newton Airport. The Aeroflex Airport is located off Limecrest Road, the Newton Airport is accessed via Stickles Pond Road. The extent and location of these facilities and their accompanying air hazard zones have been delineated on the Land Use Plan Map. (see map 18)

COMMUNITY RESIDENCES FOR THE DEVELOPMENTALLY DISABLED AND COMMUNITY SHELTERS FOR VICTIMS OF DOMESTIC VIOLENCE

Reference is made to the housing plan element, page 88, where these uses are discussed in detail.

MAP 19 LAND USE PLAN

Revision of the Land Use Plan (Map 19) has been provided to reflect the use district of Planned Commercial Development which was implemented as a Master Plan amendment in 1990, an industrial land use area amendment along the Lafayette Township line in 1991 as well as the current land use element amendment.



- Residential (0.5 minimum acreage)
- Residential (1.0 minimum acreage)
- Mt. Laurel
- Special Residential
- Business
- Commercial-Recreation
- Industrial
- Planned Commercial Development
- Air Hazard Area



SCALE IN FEET

RECOMMENDED PERMITTED USES

The Planning Board has evaluated the current Ordinance with respect to permitted principal and conditional uses in the various zones, which are located on Route 206 and on Newton-Sparta Road. The Board recommends that the principal and conditional uses within these areas be modified in some instances. In addition, clarification with respect to recommended need for zone definitions are also indicated.

**RECOMMENDED
PERMITTED PRINCIPAL USES AND CONDITIONAL USES WITHIN
THE ROUTE 206 AND NEWTON SPARTA ROAD CORRIDORS
ANDOVER TOWNSHIP, SUSSEX COUNTY**

1992

DESCRIPTION	BR	B	CR	I	BPO	BPO/A	BPO/I	R-1.0	ML
	(delete)		(delete)		(new)				
√ Retail, Service		X			X				
√ Retail, Personal Service		X			X				
√ Retail Sales		X							
√ Banks, fiduciary institutions		X			X		X		
Garden Apts.									
Single family								X	X
Townhouses									X
Printing/Publishing		X		X	X		X		
/ Manufacture billiard tables									
√ Places of Worship		X			•			•	
Agriculture				X	X		•	X	
Commercial Recreation									
Essential Services		•		X	•		X	•	
Animal Hospitals/Kennels		•			X		X		
√ NEW Automobile/vehicle sales		•							
Gasoline Stations		•							
/ Amusement Machines									
√ Public/Private Institutions		•			X			X	
Preschools NURSERY SCHOOLS		•			X				
Liquid Propane sales		•		X					
Light INDUSTRIAL Manufacutring				X			X		
Warehouse/Wholesale				X			X		
Construction Storage				X			X		
Greenhouses and nurseries		X		X	X		X		
√ Airfields*				X					
√ Offices		X		X	X		X		
RESEARCH Laboratories				•			X		
Sand and Gravel operations				X					
Golf Courses					X			X	
Open Space Cluster								X	
Riding Academy/stables								•	
Community Residence shelter					•			•	•
Schools							•	•	
√ Outdoor Recreation								•	X
Minimum lot size (s.f.)**		20,000		130,000	60,000			43,560	

• Denotes that the use is to be a Conditional Use in the Land Use Ordinance

*Airports are permitted in zones which are designated with a ".../A"

**Constraints may be required, see Ordinance for specific requirements

√ Denotes recommendation that the Ordinance be amended to provide a definition for the use specified

/ Recommend for removal from permitted uses in the Zone permitting same

UTILITY SERVICE PLAN

The Utility Service Plan provides data that is useful to Township officials in their assessment of the present and future needs of the Township's facilities and services and to the Planning Board in its recommendations for a capital improvement plan.

Survey analysis of the utilities within and serving Andover Township is an important consideration of the Master Plan process. An adequate level of the municipal utilities services is directly related to the character of the community and provides a key linkage to the future character of the community. Documentation and evaluation of the existing levels of utility facilities is a key measure of the Township's current capacities and provides a window for establishing Andover Township's limitation to absorb future growth.

Infrastructure improvements which are required to bring the utility service up to current standards assist in the planning of capital improvement programs and developer contributions which are important to the effective management of increased development. Drainage and flood control facilities, including storm water management, aid in assuring that properties will be protected from flooding.

STORMWATER MANAGEMENT PLAN

I. INTRODUCTION

This Phase I Stormwater Management Plan has been prepared for the Township of Andover in accordance with the New Jersey Stormwater Management Act, P.L. 1988, c. 32, which amended the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq., and in accordance with the New Jersey Department of Environmental Protection's Stormwater Management Regulations (N.J.A.C. 7:8-3.1(a)1). This Phase I plan targets preventive measures for stormwater control to be applied to the site plan and subdivision review process which includes specific standards for stabilization and specific standards for the design of stormwater management systems. This Phase I plan also identifies existing control requirements. Controls currently found in Andover Township ordinances address flood plain development standards and offer guidelines for stabilization and stormwater control systems. Additional requirements have been established to meet the standards of the Stormwater Management Regulations provided at N.J.A.C. 7:8-3.4, which includes specific standards for stabilization and specific standards for the design of stormwater management systems.

The Stormwater Management Plan is designed to be an integral part of the Township of Andover's Master Plan, as provided by N.J.S.A. 40:55D-28, and has been developed in accordance with N.J.S.A. 40:55D-94 and N.J.A.C. 7:8-2.2. The Stormwater Control Ordinance provided in this plan must be adopted by the municipality within one year of submission of this plan to the County of Sussex Planning Board.

The Stormwater Management Regulations (N.J.A.C. 7:15-3.1) also require the preparation of a Phase II Stormwater Management Plan to provide for long-term comprehensive planning of alternative preventive stormwater management measures in conjunction with remedial stormwater management measures. At this time, the department has not yet established a deadline for preparing or

submitting Phase II plans. This Stormwater Management Plan is not intended to address the Phase II plan.

Flooding is a natural characteristic of rivers and occurs when more water comes down the river than can be carried within the river channel. This results in water overtopping the channel banks and spreading out within an area known as the flood plain. The limits of the flood plain are defined by the rising slopes of surrounding land. The flood plain is a normal part of the river during times of exceptional storm discharge. Most often, however, the flood plain remains free of water. The limits of the flood plain depend on the severity of the storm frequency producing the flooding.

Within the 100-year flood plain is an area termed the floodway, comprised of the river channel and portions of the immediately adjacent overbank area. The floodway carries the major portion of the stormwater with correspondingly greater depths and higher velocities. Structures built within this highly-critical area would be in danger of being washed away, contributing to further damage as the wreckage is carried downstream. Structures built outside the floodway but still within the 100-year flood plain may be inundated. This area of the 100-year flood plain is referred to as the flood fringe.

The development of land generally increases stormwater runoff by reducing the natural retention and the absorption capacity of the soil. This eventually compounds existing stormwater problems and creates problems where previously none had existed.

Responsibility for stormwater improvements within most rural-urban areas has often been non-specific in nature. Property owners undertook correction of particular flooding problems affecting their lands. As costs rose, individuals increasingly turned to their governing bodies for rectification of these problems. Expanded road networks resulted in an accessory system of new stormwater structures constructed by municipal, County, State and Federal

governments. Responsibility, therefore, for construction and maintenance of stormwater systems has been taken by various levels of government as well as by property owners.

Because of the nature of stormwater systems, both piped and open channel construction of these systems at one location may produce undesirable results. Andover Township adopts a project-specific approach to addressing the management of stormwater runoff.

Being aware of these existing stormwater runoff problems and recognizing that the anticipated rapid development will create new problems, Andover Township has prepared the Stormwater Management Plan to mitigate future problems.

II. ACHIEVEMENT OF GOALS

In accordance with the Stormwater Management Regulations, the objectives of this Phase I Stormwater Management Plan and its implementing ordinance are:

1. To reduce artificially-induced flood damage to public health, life and property;
2. To minimize increased stormwater runoff from any new land development where such runoff will increase flood damage;
3. To maintain the adequacy of existing and proposed culverts and bridges, dams and other structures;
4. To induce water recharge where natural storage and geologically-favorable conditions exist, where practicable;
5. To prevent, to the greatest extent feasible, an increase in source pollution;
6. To maintain the integrity of stream channels for their biological functions, as well as for drainage and other purposes;
7. To reduce the impact of development upon stream erosion;
8. To reduce erosion from any development or construction project;
9. To minimize the increase in runoff pollution due to land development, which otherwise would degrade the quality of water and may render it both unfit for human consumption and detrimental to biological life; and

10. To preserve and protect water supply facilities and water resources by means of controlling increased flood discharges, stream erosion, and runoff pollution.

The Phase I Stormwater Management Plan and the implementing Stormwater Management Ordinance will, along with existing stormwater control measures, achieve these objectives.

Clearly-defined jurisdictional authority incorporated into the Stormwater Management Plan, Phase I, and its implementing Stormwater Management Ordinances functions to focus the review and approval process in an orderly manner, thus facilitating the effective review of applications and offer an efficient timeframe for the processing of such applications.

Artificially-induced flood damage will be reduced by appropriately addressing the volumes and velocities of the increased stormwater resulting from development. The strict application of stormwater policies and ordinances will assure against the damages of stormwater runoff.

Stormwater runoff calculations will be required for new subdivision and site plan developments wherein the adequacy of existing and proposed culverts, bridges, dams and other stormwater structures will be evaluated for carrying capacity and adequacy thereof.

Stormwater procedures affording the opportunity for recharge are considered to be a reasonable mechanism for stormwater management, where practicable. The feasibility of such recharge will require site-specific testing to assure that geologically-favorable conditions exist.

Stormwater Management Plan, Phase I, and its associated ordinances, prevent, to the greatest extent feasible, an increase in source pollution. Detention basin holding timeframes are specified in an effort to detain the turbulent stormwater, thereby allowing for

settlement and adherence of particulates and oils which are then made available for natural biological degradation processes.

Within the implementing ordinance, stream channel sections and drainage calculations are to be provided with development plans. Engineering design mechanisms necessary for maintenance of sound biological ecosystems, devoid of the biological stress experienced in conditions of erosion, must be provided by a licensed Professional Engineer.

The Soil Erosion and Sedimentation Control Ordinance also assures the reduced threat of development upon the stream corridor and upon the biological balance of the ecosystem.

The implementing ordinance requires identification of and preservation of wetland and wetland transition areas in accordance with State regulations. This compliance will assist to minimize the threat of pollution due to land development which might otherwise degrade the quality of surface and ground water supplies. Water supply facilities will therefore be afforded the protection offered by stream corridor management and runoff discharge control. These requirements inherently address the conditions of pollutants as well as stormwater volumes and velocities.

III. DELINEATION OF JURISDICTIONAL AUTHORITY

Board of Health

The Andover Township Board of Health (Sussex County Health Department) maintains jurisdiction over the wastewater plans for development within Andover Township. While the plans principally deal with the adequacy of treatment for wastewater, the board also assures that adequate distance from wetlands and water sources is maintained.

Township Engineer

The Township Engineer of Andover Township has jurisdiction over all soil erosion and sedimentation control measures which are required as part of a development plan and building plan. The engineer has the authority and the responsibility to review proposed developments and determine if the development meets the standards set forth in the Phase I plan. The Township Engineer has the responsibility to provide inspection services during the construction phase to assure the adequate installation and implementation of the soil erosion and sedimentation control measures which have been approved for the development.

Planning Board

The Andover Township Planning Board has jurisdiction over the mechanisms for stormwater management such as detention facilities, stormwater recharge facilities, or a combination thereof, and construction activities within flood-prone areas of the Township. The Planning Board review is based upon the adopted Master Plan objectives and upon ordinance provisions which specify non-impervious coverages as well as the management of the increase in stormwater volume, velocities and water quality. It is within the Planning Board's jurisdiction to establish effective means for stormwater management.

Environmental Commission

The Andover Township Environmental Commission has the responsibility to review proposed development and provide advice to the Planning Board on numerous environmental issues, including such pertinent information regarding the site which might affect stormwater management and water quality. The Environmental Commission is an advisory body; it has responsibilities defined by ordinance which forms the foundation for such environmental reviews.

The Review Process

Review of stormwater management applications will be made on a site-specific or project-specific basis as opposed to a regionalization program approach. Applications for development involve numerous design considerations which must address the goals and objectives of the Andover Township Master Plan and the goals and objectives of the Andover Township zoning ordinances. A separate application to the board of jurisdiction would commence discussions regarding stormwater management and the alternative approaches which most closely suit the specific site. In conjunction with the board's review, discussions with outside jurisdictions may be held in order to facilitate the development of a fully-coordinated plan.

Applications shall be submitted to the Planning Board or Zoning Board of Adjustment (Township Clerk) for site development (Section 12B.4, 13A-1.8, 14-5, 15-7.11, 13A-2.6, 13A-2.10, 18-5.1, 13A-2.11). Fees are required for the site development application in accordance with Section 15-7.2 in which the stormwater management review is included.

Applications shall be submitted to the Board of Health for review and approval (Section 14-5.3, 14-6i, 2-21.3). Separate fees are required for the application in accordance with Section BH 7-10.

Applications shall be submitted to the Township Engineer for soil erosion and sedimentation control permit approval (Section 17-7.5, 17-7.1, 17-9). Soil erosion/sedimentation control permit fees are required for the application in accordance with Section 17-7.

Applications shall be submitted to the Environmental Commission requesting advice. This application is without fee and is forwarded to the Commission by administrative action of the secretary of the board having jurisdiction (Section 14-5, 2-26).

IV. EVALUATION OF EXISTING STORMWATER MANAGEMENT PLANS AND ORDINANCES

State and Federal Laws

A national flood control program was initiated in the United States in 1936. Nonetheless, control measures do not cope with the continuing encroachment into flood plains throughout the nation, and consequently, flood damage and destruction are increasing yearly.

Destruction from floods affects approximately six percent of United States land and slightly more than six percent of New Jersey land.

Stormwater Management Regulations

As flooding conditions continue, a need for a unified approach to solving flooding problems is recognized. A body of regulations affecting drainage has been drafted to control stormwater runoff. These laws pertain to land use, stream encroachments and control and building regulations. They are primarily Federal and State laws, although power is also delegated to a County or municipal authority. The major thrust of these regulations is to control the effects of increase in stormwater runoff. The New Jersey Flood Plains Act, National Flood Insurance Program and New Jersey Stream Encroachment Law) aid in this regard. The present New Jersey State government body authorized to control water is the Division of Water Resources of the Department of Environmental Protection. The most relevant of the statutes affecting stormwater control include the following:

1. Dam and Reservoir Law - 1914

This law grants the State the power to approve or reject any proposed dam. Specifically, a dam may not be constructed without State approval if its net effect is to raise the mean low-water

height of the stream more than five feet, or if the area to be drained is more than one-half square mile.

2. Stream Encroachment Law - 1929

The State is empowered to approve or reject construction of bridges, culverts, fills, walls, channel improvements, pipe crossings or other encroachments on streams.

3. Flood Hazard Law - 1962

The law established the right of the State to survey and delineate flood plains and floodway limits and to erect signs informing the public of the potential hazard of the area.

4. Flood Plains - 1972

This statute requires State regulation of delineated floodways and municipal regulation of the development and use of lands in associated flood fringe areas in accordance with minimum standards to be promulgated by the Department of Environmental Protection.

5. Construction Permits Act - 1975

This statute supplemented the Department of Environmental Protection Act of 1970 (P.L. 1970, C.33, N.J.S.A. 13:1D-1 et. seq.) applies to construction permit applications filed on or after December 22, 1975. The permits covered include: approval of plans for the development of any waterfront upon any navigable waterway pursuant to N.J.S.A. 12:5-3; a permit for regulated activities under the "Wetlands Act of 1970" (N.J.S.A. 13:9A-1 et seq.); approval of a structure (or alteration) within the natural and ordinary high-water mark of any stream pursuant to N.J.S.A. 58:1-26; and approval of the plans and specifications for the construction, changes, improvements, extensions or alterations to any sewer system pursuant to N.J.S.A. 58:11-10. Improvements to any stream including

culverts, channel realignment, and channel linings require approval and a permit issued by the New Jersey Department of Environmental Protection, Division of Water Resources Bureau. All new development applications within the Township which may affect those items mentioned in the previous paragraph are subject to this law, as determined by the Township Engineer. Approval of the Department of Environmental Protection on all applications is a requisite for action by the Planning Board or for the issuance of a building permit. Andover Township may require that more stringent criteria be used for these approvals if justified by the specific application.

6. Public Law 92-500

In addition, as dictated by Public Law 92-500, Federal Water Pollution Control Act, Section 404, the United States Army Corps of Engineers is designated as the review and enforcement agency for all stream encroachments on streams, rivers, and lakes defined as Navigable Waters of the United States up to their headwaters. Headwater is defined as the point where the stream flow rate is less than five cubic feet per second.

Reviews and permits are required from both of these agencies for major stream improvements in Andover Township.

The existing County and municipal Stormwater Management Plans and Ordinances, approval status, jurisdictional authority and implementation of existing plans and ordinances are:

County Plans and Ordinances

Ordinance Section	Jurisdictional Authority	Subject
V-0 (1-4) and P (1-4)	County Planning Board	Reviews, culverts, bridges stormwater facilities, drainage rights-of-way

Sussex County does not have an adopted Stormwater Management Plan.

Municipal Plans and Ordinances

There is currently no municipal Stormwater Management Plan incorporated into the Andover Township Master Plan. Ordinances currently regulating stormwater collection and discharge within the applicable jurisdiction are as follows:

Ordinance Section	Jurisdictional Authority	Subject
12B-1.4	Board	Methods to minimize flood loss.
12B-4.3	Const Code Official	Determines if in floodway, issues permit.
12B-4.3a	Board	Permit review in flood-prone areas.
12B-4.4a	Board	Reviews and considers variances.
12B-5.2	Board	Specific standards for flood-prone areas.
14-6.1d-4	Board	Protects streams from siltation, pollution, erosion. Requires buffer zone at stream and regulates fill in this corridor, regulates storm frequency.
14-6.1i	Board of Health	Review of submission.
14-6.1j	Twp. Engineer	Soil erosion control measures.

Ordinance Section	Jurisdictional Authority	Subject
14-6.1.3	Board	Requires wetlands L.O.I. from State.
17-4.4	Twp. Engineer	Soil erosion and sediment regulations.
17-5	Twp. Engineer	Soil erosion and sediment control measures.
18-5.3d	Board	Drainage standards.

Evaluation of Consistency with Objectives and Standards

Evaluation of Consistency with Objectives and Minimum Standards of the Stormwater Management Regulations

Ordinance Section	Objectives	Standards	Addressed in Implementing Ordinance
12B-1.4	yes	yes	-
12B-4.3	yes	N/A	-
12B-4.3a	yes	N/A	-
12B-4.4a	yes	N/A	-
12B-5.2	yes	yes	-
12B-15.1	yes	yes	-
14-6.1d-4	yes	no	yes
14-6.1i	yes	yes	-
14-6.1j	yes	yes	-
14-6-1.3	yes	yes	-
17-4.2	yes	yes	-
17-4.4	yes	no	yes
17-5	yes	yes	-
18-5.3d	yes	no	yes

Municipal ordinance amendments addressing the following objectives or standards are needed to achieve compliance with the Stormwater Management Regulations (N.J.A.C. 7:15-3.1):

- collection design standards and procedures
- detention design standards and procedures
- discharge design standards and procedures
- stream bank stabilization standards and procedures
- stabilization design standards and procedures
- water quality [storage] standards

V. EVALUATION OF NEEDS

Assessment of Items Necessary to Achieve Compliance

The following documents are incorporated by reference herein which contain standards, including structural standards and non-structural measures necessary to manage stormwater.

However site specific information is required as part of any application for development in order to determine particular stormwater management measures required for any particular site or area.

Sussex County Soil Survey

ASCE - Manual Design and Construction of Sanitary and Storm
Sewers, No. 37

Controlling Urban Runoff - Metropolitan Washington Council
of Government

Delineated Streams Maps for Andover Township

Andover Township Zoning and Land Use Ordinances

Andover Township Master Plan

Technical Release 20 (TR-20)

Technical Release 55 (TR-55)

Sussex County Acceptance

FIRM maps indicating flood-prone areas

Hydraulic Engineering Circular No. 15

Design of Stable Channels with Flexible Linings

Municipal Implementation Ordinance Amendments which are
consistent with goals and objectives of the Stormwater
Management Plan:

Standards for Construction of Individual

Subsurface Disposal Systems (NJ DEP)

Standards for Erosion and Sediment Control

Municipal Land Use Law

Andover Township Wastewater Management Plan (to be
adopted)

A Guide to Stormwater Management Practices in New Jersey

Technical Manual for Stream Encroachment 7.88, as amended
Magnitude and Frequency of Floods in New Jersey with
Effects of Urbanization - Special Report 38

**Estimate of Technical Resources Necessary to Undertake
Implementation of the Phase I Plan**

1. Personnel

Professional Engineer - Township Engineer, Planning
Board Engineer, or Zoning Board Engineer having
jurisdiction.

Technical staff members under the direction of the
Professional Engineer

Secretarial staff

2. Physical Resources

Technical reports noted in "A" above
Computer and printing capability for the TR-55
and Special Report 38 output
Calculators, design instrumentation

**PROPOSED STORMWATER CONTROL ORDINANCE
CHAPTER XII-C**

AN ORDINANCE TO CREATE CHAPTER XIIC TO SUPPLEMENT THE REVISED GENERAL ORDINANCES OF THE TOWNSHIP OF ANDOVER, TO BE KNOWN AS THE STORMWATER CONTROL ORDINANCE.

BE IT ORDAINED by the Township Committee of the Township of Andover, in the County of Sussex, State of New Jersey, that the Revised General Ordinances of the Township of Andover, shall be and are hereby amended and supplemented as follows:

Section 1.

Chapter XII-C shall be entitled The Stormwater Control Ordinance and shall include the following sections and subsections:

CHAPTER XII-C

12C-1.0 Statutory authorizing, Findings of Fact, Purpose and Objectives.

12C-1 STATUTORY AUTHORIZATION.

The Legislature of the State of New Jersey has in N.J.S.A. 40:55D-28 (b) (5) and 40:55D-93 et seq. delegated the responsibility to local governmental units to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry. Therefore, the Township Committee of the Township of Andover, State of New Jersey does ordain as follows:

12C-1.2 FINDINGS OF FACT.

(A) Uncontrolled stormwater from development may result in areas of the Township of Andover which may be subject to periodic inundation. This may result in the loss of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures

for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety, and general welfare.

(B) A stormwater management plan shall also include such structural changes and such additional nonstructural measures and practices as may be necessary to manage stormwater.

12C-1.3 STATEMENT OF PURPOSE

It is the purpose of this ordinance to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed:

- A. To protect human life and health;
- B. To minimize expenditure of public money for costly flood control projects.
- C. To minimize storm water runoff from any new land development where such runoff will increase flood damage.
- D. To reduce soil erosion from any development or construction project.
- E. To assure the adequacy of existing and proposed culverts and bridges.
- F. To induce water recharge into the ground where practical.
- G. To prevent, to the greatest extent feasible, an increase in nonpoint pollution.
- H. To maintain the integrity of stream channels for their biological functions, as well as for drainage.

12C-1.2. Criteria

a. No land area in the Township shall be developed so that:

1. The rate of stormwater runoff occurring at that area is increased over that which occurs under existing conditions.

2. The drainage of adjacent areas is adversely affected.

3. Soil erosion during and after development is increased over that which naturally occurs.

4. Soil absorption and groundwater recharge capacity of the area is decreased below that which occurs under existing conditions.

5. The natural drainage pattern of the area is significantly altered.

12C-2. Definitions

Unless specifically defined below or otherwise provided in the Andover Township Land Development Ordinance, words or phrases used in this ordinance shall be interpreted so as to give them the meaning they have in common usage and to give this ordinance its most reasonable application.

"Agricultural development" means land uses normally associated with the production of food, fiber and livestock for sale. For purposes of this ordinance, such uses shall not include the development of land for the processing or sale of food and the manufacture of agriculturally-related products.

"Detention basin" means an embankment and associated space for impoundment of water or, alternatively, the space for impoundment partially or entirely created by excavation rather than by

embankment, in either case designed to temporarily retain stormwater runoff.

"Detention facility" means a detention basin or alternative structure designed to temporarily retain stormwater runoff.

"Flood hazard areas" means the floodway and flood fringe areas as determined by the Department of Environmental Protection under Section 3 of the Flood Hazard Area Control Act (P.L. 1979, c. 359).

"Flood plain" means the flood-hazard areas of delineated streams and areas inundated by the 100-year flood in non-delineated areas.

"Floodway" means the channel of a natural stream and portions of the flood hazard areas adjoining the channel, which are reasonably required to carry and discharge the flood water or flood flow of any natural stream.

"Freshwater wetlands" means an area that is inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation; provided, however, that the Department of Environmental Protection, in designating a wetland, shall use the three parameter approach (that is, hydrology, soils and vegetation) enumerated in the April 1, 1987, interim-final draft, "Wetland Identification and Delineation Manual" developed by the United States Environmental Protection Agency, and any subsequent amendments thereto.

"Infiltration basin" means a detention facility designed to infiltrate retained water to the subsurface and which is not an injection well.

"Nonpoint source pollution" means pollution from any source other than from any discernible, confined and discrete conveyances,

and shall include, but not be limited to, pollutants from agricultural, silvicultural, mining, construction, subsurface disposal and urban runoff sources.

"Recharge" means the replenishment of underground water reserves.

"Stormwater runoff" means flow on the surface of the ground, resulting from precipitation.

"Wet basin" means a detention basin designed to retain a minimum depth of four feet of water on a permanent basis.

12C-1.3. Technical Standards

a. Runoff Control Details

In order to duplicate as nearly as possible natural drainage conditions, the regulation and control of stormwater runoff and erosion for any land area to be developed shall be through on-site water detention and/or ground absorption systems, which include but are not limited to the following:

1. Detention areas which may be depressions in parking areas, excavated basins, basins created through use of curbs, stabilized earth berms or dikes or any other form of grading which serves to temporarily impound and store water;

2. Rooftop storage through temporary impoundment and storage of stormwater on flat or slightly pitched building rooftops by use of drain outlets which restrict the stormwater runoff from the roof surface;

3. Dry wells or leaching basins which control stormwater runoff through ground absorption and temporary storage;

4. Porous asphaltic pavement which preserves the natural ground absorption capacity of a site and provides a subsurface reservoir for temporary storage of stormwater;

5. Any system of porous media, such as gravel trenches drained by porous wall or perforated pipe which temporarily stores and dissipates stormwater through ground absorption;

6. Any combination of the above-mentioned techniques which serves to limit stormwater runoff from a given site to what presently occurs there;

7. Preservation of natural vegetation.

b. Standards for the Design of Stormwater Detention Facilities

1. Stormwater detention facilities shall be designed to contain an amount equal to the increase in volume of runoff which would result from development of any site during storm frequencies of 1, 2, 5, 10, 25, 50 and 100-year storm events. The volume of runoff shall be computed on the basis of the total rainfall which produced the flood of record for the area involved and shall be equivalent to the rainfall excess as previously defined. The total rainfall which produced the flood of record shall be determined from accurate local records of the United States Department of Commerce, National Water Service, or by calculations using accepted engineering design techniques.

2. The design of the detention basin must demonstrate that stormwater runoff from the site is so controlled that both on-site and off-site erosion is neither caused nor worsened. Also, the design is to show that the potential of downstream flooding is not increased from the proposed development. In calculating the foregoing, volumes and rates of 1, 2, 5, 10, 25, 50 and 100-year storm frequencies shall not be increased over the maximum flow

rates before development. The plans for disposition of stormwater, either by retention or detention on site or by means of channeling shall protect downstream property. The stormwater calculation provide a description of potential flood damages, including a summary of flood stages from State and Federal sources and an erosion and sedimentation control plan for both the construction phase and post-construction phase, shall be submitted for review by the Board Engineer.

Design of the retention basin and/or infiltration basin must demonstrate that the total volume from a post 100-year storm frequency runoff can be impounded in the basin. In addition to impounding the runoff of the 100-year storm, an additional volume of a 10-year storm frequency should be provided. The volume of the 10-year storm post-development shall be released at the 10-year storm pre-developed rate.

3. The runoff coefficients (CN) shall be determined for each site for both existing and proposed conditions and the difference in the two shall be used to compute the volume of rainfall excess for design of stormwater detention facilities. The volume for design is equal to the depth of the rainfall excess multiplied by the area of the site. If any such facility will contain water in normal conditions, the amount so contained shall not be counted in calculating the capacity required for the detention of water for the design storm. Rainfall intensity shall be as recommended by the Board's Engineer.

4. In the case of detention facilities utilizing porous media for ground absorption, such as dry well, porous pavement or the like, the volume of the porous media shall be large enough to contain the total volume of rainfall excess within the voids. Ground absorption systems shall be used only where the infiltration rate of the receiving soil is acceptable as determined by percolation tests and soil borings to determine the soil characteristics and groundwater table elevations or as determined by the Board's Engineer.

Provisions shall be made to contain overflow of such systems on-site or to surface drain the overflow in such a way as not to adversely affect any other property.

5. If detention facilities utilizing surface impoundment such as detention basins or rooftop storage are used, sufficient volume to fully contain the total volume of rainfall excess shall be provided. The outlets of such facilities shall be designed to limit the maximum discharge rate of stormwater runoff to what occurs at the site under existing conditions and shall discharge in such a way as not to adversely affect any other property. If rooftop storage is proposed, the weight of the impounded water on the roof shall be accounted for in the structural design of the building and the roof shall be designed to provide maximum protection against leakage. If berms or dikes are used to create the impounding area, they shall be adequately stabilized and the slopes protected with vegetative cover, paving or rip rap to protect against failure or breaching.

6. If a combination of different stormwater detention techniques is used, combined volume of the systems shall be large enough to fully contain the total volume of rainfall excess.

7. Stormwater detention facilities shall be constantly maintained by the owner to ensure continual functioning of the systems at design capacity and to prevent the health hazards associated with debris buildup and stagnant water. In no case shall water be allowed to remain in any facility long enough to constitute a mosquito-breeding disease or any other type of health problem, unless approved as a multifunction facility to include water such as a pond. The filling in or removal of the stormwater detention basin facilities by the owner, without the written authorization of Andover Township Committee, Sussex County Planning Board or New Jersey Department of Environmental Protection and Energy by the owner, tenant, may result in penalties as prescribed in Section 12C-4 in addition to restoring the stormwater detention facilities to the approved design and construction.

8. Detention and sediment and erosion control facilities shall be designed in conformance with the Standards for Soil Erosion and Sediment Control in New Jersey of the New Jersey Soil Conservation Commission as approved by the Board's Engineer and the Township Engineer, except where the Board's Engineer has determined that conditions peculiar to a certain site warrant exception.

9. Sediment and erosion control measures shall be installed prior to any other site development, shall apply to all aspects of the proposed development and shall be in operation during all stages of development. Increased runoff and sediment resulting from modified soil and surface conditions caused by the proposed development shall be minimized and, where possible, retained on site.

10. Detention facilities shall be designed to minimize propagation of insects, particularly mosquitoes.

11. In many instances, the provision of separate detention facilities for a number of single sites may be more expensive and more difficult to maintain than provision of joint regional facilities for a number of sites. In such cases, the applicant or applicants may seek approval under this ordinance of joint regional detention facilities which will fulfill the requirements of this ordinance.

If regional facilities are to be built or funded by developers or groups of developers, the corresponding legal agreements must be carefully written, and the off-tract contribution provisions in N.J.S.A. 40:55D-42 must be complied with where applicable and Section 13A-3.16 et. seq. of the Andover Township Ordinance.

12. In all cases, multiple-level outlets or other fully-automatic outlets shall be designed so that peak discharge rates from the development for the design storms will not be increased from what would occur if the development were not constructed. Outlet waters shall be discharged from the development at such

locations and velocities as not to cause additional erosion or additional channels downstream of the development and shall be in accordance with "*Standards for Soil Erosion and Sediment Control*" administered by the Township Engineer.

13. Where the project consists of two phases (I) new construction which requires provisions of storm drainage under the terms of this ordinance, and (II) repair or rehabilitation of existing structures and surfaces which does not result in increasing the extent of impervious areas or in rendering existing surfaces less pervious, the detention requirements may be computed on the basis of phase (I) exclusively.

14. If detention basins or other detention facilities are provided through which water passes at times other than following rainfall, the Board Engineer shall be consulted concerning design criteria. It will become necessary for detention requirements to be met, despite the necessity of passing certain low flows. This applies to all onstream or online detention basins.

15. Detention basins located in freshwater wetlands may be allowed only in accordance with the Freshwater Wetlands Protection Act, N.J.S.A. 13:9B-1 et seq., and any rules adopted pursuant thereto.

c. Design of Detention Facilities - Hydrology

1. This section presents the hydrologic method to be used by Andover Township for developing inflow hydrographs and determining maximum release rates for proposed detention basins. It should be noted that wherever possible stream flow records should be utilized in determining design flows, and the hydrologic method presented in this section will be used only when such records are unavailable.

Andover Township adopts the hydrologic methods of the Soil Conservation Service (SCS) as the basis for calculations. The SCS

publication *"Urban Hydrology for Small Watersheds,"* Technical Release No. 55, June 1986, as amended in Technical Release 20, published by the United States Department of Agriculture or as amended. Further, the SCS Type III twenty-four hour design rainfall distribution as presented in TR-55 is to be used.

Briefly, the procedure for developing inflow and outflow hydrographs is as follows:

- a. Determine tributary drainage area to proposed detention basin in square miles;
- b. Determine the ground conditions and convert this to a Runoff Curve Number (CN);
- c. Obtain the twenty-four hour design rainfall in inches for the given storm;
- d. Convert the twenty-four hour rainfall into inches of runoff using the computed CN and the SCS runoff equation;
- e. Multiply the drainage area in square miles from Step 1 by the inches of runoff computed in Step 4 to obtain a constant multiplier with units of square miles-inches;
- f. Determine the time of concentration to the proposed basin utilizing TR-55;
- g. Construct the hydrograph by multiplying the Type III Tabular Hydrograph Coordinates (TR-55 Exhibit 5-III) for the time of concentration obtained in Step 6 by the multiplier in square mile-inches computed in Step 5 to obtain flows in cubic feet per second for the various times listed in the tabular coordinates.

2. The twenty-four hour design rainfalls to be utilized by Andover Township are as follows:

Table 1
24-Hour Principal Rainfalls

Storm Frequency (Years)	24-Hour Rainfall (Inches)
1	2.7
2	3.3
5	4.3
10	5.2
15	5.5
25	6.0
50	6.5
100	7.5

3. Runoff Curve Numbers are parameters that reflect both the average soil type and land use prevalent in the drainage basin. All of the soil types in Andover Township have been classified, labeled and mapped on aerial photographs by the National Cooperative Soil Survey of the Soil Conservation Service. A list of these soils by soil name and symbol, as well as the Hydrologic Soil Group to which they belong, are contained in Exhibit A-1 of TR-55, June 1986. To account for varying land uses and soil covers within each soil group, these soil groups have been broken down into different land use categories as shown in Table 2-2a, 2-2b and 2-2c of TR-55.

4. Time of Concentration is defined as the time required for runoff to travel from the most hydraulically-distant point in the drainage area to the point at which hydrograph or peak flow rate is to be computed. It should be noted that separate time of concentrations representing both undeveloped and developed conditions in a watershed are to be computed. Chapter 3 of TR-55 is to be utilized to calculate the Time of Concentration.

5. For purposes of computing runoff, all undeveloped or unpaved lands (e.g. cultivated, pasture, wooded or grassy) in the site shall be assumed, prior to development, to be in good hydrologic

condition, regardless of conditions existing at the time of computation. For lands to be considered cultivated, they shall have been used for such purposes uninterruptedly for a period of at least seven of the last ten years prior to the time of computation. If such uninterrupted use has not occurred or cannot be satisfactorily documented, woods shall be assumed to be the predeveloped land condition of the undeveloped or unpaved lands.

6. Any major agricultural development as defined in the ordinance shall be submitted to the Board Engineer for review and comment in accordance with this ordinance and any Soil Conservation District guidelines. An agency may condition approval of such stormwater control measures upon a positive approval of the Andover Township Engineer.

7. Soil erosion and sediment control shall be provided in accordance with "*Standards for Soil Erosion and Sediment Control*" promulgated by the State Soil Conservation Committee pursuant to N.J.A.C. 4:24-42, administered by the Township of Andover.

d. Hydraulics

1. The hydraulics of all proposed detention basins will be reviewed utilizing standard hydraulic formulas and parameters.

2. In order to prevent the erosion of channels and spillways, the maximum flow velocities at the outlet of proposed detention basins and erodible spillways are of particular concern. Minimum velocities are also of interest so as to prevent siltation and the subsequent loss of flow capacity. In light of the concerns, maximum allowable design velocities for unlined channels shall comply with the criteria contained in Hydraulic Engineering Circular No. 15, "*Design of Stable Channels with Flexible Linings*," published by the Federal Highway Administration of the U. S. Department of Transportation. When the maximum allowable velocities cannot be

maintained in an unlined channel, suitable channel lining shall be provided in accordance with Hydraulic Engineering Circular No. 15.

3. All detention basin routings will be performed using acceptable routing methods. Selected time increments will be of short enough duration to allow reasonable approximation of the inflow hydrograph.

e. Structural Requirements

The following list of general structural criteria shall be used when reviewing a proposed stormwater detention basin.

1. Principal Outlets and Structures

a. To minimize the chance of clogging and to facilitate cleaning, outlet pipes should be at least eighteen inches in diameter. All pipes are to be reinforced concrete pipe conforming to ASTM C 76 with rubber gaskets pursuant to ASTM C 443.

b. Eight (8") inch thick anti-seep collars are to be installed along outlet pipes. Reinforcement steel shall be No. 5 bars at twelve inches both ways with two inches of cover on both faces (minimum).

c. All principal outlet structures shall be steel reinforced concrete cast in place. All construction joints are to be watertight. All pipes, stubs, and/or fittings are to be cast monolithically in the walls.

d. Trash racks and anti-vortex devices will be required where necessary and should be designed to facilitate cleaning. A rise-type outlet structure which conveys flow over its top should have an anti-vortex cover constructed of reinforced concrete.

e. Suitable lining is to be placed upstream and downstream of principal outlets as necessary to prevent scour and erosion. Such lining shall conform to the criteria contained in Hydraulic Engineering Circular No. 15, "*Design of Stable Channels with Flexible Linings*," or "*Standards for Soil Erosion and Sediment Control in New Jersey*," published by the N. J. State Soil Conservation Committee.

f. All concrete shall have a minimum twenty-eight day compressive strength of 3000 PSI. Allowable extreme fiber stress in compression shall be 1200 PSI.

g. All reinforcing steel shall be intermediate grade, new deformed billet-steel conforming to ASTM A615 (latest edition), Grade 40 minimum. Allowable stress in tension shall be 20,000 PSI.

SECTION 2. Emergency Spillways

a. Vegetated emergency spillways shall have side slopes not exceeding four horizontal to one vertical.

b. Emergency spillways not excavated from undisturbed soil shall be suitably lined and shall comply with criteria contained in Hydraulic Engineering Circular No. 15 or "*Standards for Soil Erosion and Sediment Control*" mentioned above.

c. Maximum velocities in vegetated emergency spillways excavated from undisturbed soil shall be checked based on the velocity of the peak flow in the spillway resulting from the routed Emergency Spillway Hydrograph.

SECTION 3. Dams and Embankments

a. The minimum top widths of all dams and embankments are listed below. These values have been adopted from the "*Standards for Soil Erosion and Sediment Control in New Jersey*."

Table II
Minimum Top Widths

Height (feet)	Top Width (feet)
0-15	10
15-20	12
20-25	14

b. Maximum side slopes for all dams and embankments are four horizontal to one vertical.

c. All earth fill shall be free from brush, roots and other organic material subject to decomposition.

d. Cutoff trenches are to be excavated along the dam or embankment centerline to impervious subsoil or bedrock.

e. An impervious central core is to be constructed in the dam/embankment consisting of compacted clay material.

f. Safety ledges shall be constructed on the side slopes of all detention basins having a permanent pool of water. The ledges shall be four to six feet in width and located approximately two and one-half to three feet below and one to one and one-half feet above the permanent water surface.

g. The upstream face of the dam and/or embankment of a permanent pool detention basin shall be stabilized to protect it against wave erosion.

h. The fill material in all earth dams and embankments shall be compacted to at least ninety-five percent of the maximum density obtained from compaction tests performed by the appropriate method of ASTM D698.

i. A detention basin with a permanent pool shall have a gravity drain to permit complete emptying of the basin when necessary.

j. Any detention facility that impounds water through the use of an artificial dike, levee or other barrier and raises the water level five feet or more above the usual mean low water height when measured from the downstream toe of dam to the emergency spillway crest is classified as a dam and subject to the New Jersey Dam Safety Standards, N.J.A.C. 7:20. All such dams must be designed, constructed, operated and maintained in compliance with the rules of N.J.A.C. 7:20.

f. Water Quality Storage/Control

1. All site developments shall provide water quality storage in accordance with this ordinance. The standard requires that a proposed "dry" stormwater detention basin must detain the runoff from a one and one-quarter inch, two-hour rainfall or the one year, twenty-four hour SCS Type III storm in such a way that no more than ninety percent of this runoff will be gradually drained from the basin at the end of:

A. 18 hours for residential developments, and

B. 36 hours for all other types of development.

2. The retention time shall be considered a brim-drawdown time, and therefore shall begin at the time of peak storage.

In providing the above retention times, the required outlet diameter should not be less than three inches. For all projects, the required detention time shall be equal to the values given above or the time which results from the use of a three-inch diameter orifice, whichever is less.

In permanent ponds or "wet" basins, the water quality storage requirement shall be satisfied when the volume of permanent water is at least three times the volume of runoff produced by the water quality design storm.

3. All outlets shall be designed to function without manual, electric or mechanical controls. The required orifice may be constructed from metal, concrete or appropriate material and placed over a larger opening in the basin's outlet structure and attached with non-corrosive, removable fittings where suitable. Gasket material should be placed behind the plate to insure a watertight fit where appropriate. A removable trash rack is required in front of the outlet to prevent clogging. All trash racks should be designed to limit flow velocities through them to a maximum of two feet per second.

4. For a proposed detention basin which has off-site as well as on-site areas tributary to it, the computation of the resultant runoff from the one and one-quarter inch, two-hour water quality design storm should either include or exclude the off-site area, depending upon the following conditions:

A. Include the off-site area if it is presently undeveloped or developed to a lesser extent than is proposed for the project site.

B. Exclude the off-site area if it is presently developed to an equal or greater extent than is proposed for the project site.

In addition, on-site areas not controlled by the detention facility should be kept to a minimum. Where the impact of an uncontrolled on-site area is felt to be significant, special measures may be required including, where possible, the storage of an equivalent amount of runoff from developed off-site areas normally excluded from the computations (see B above). Projects of this nature and all other project with unusual site characteristics will be reviewed on

an individual basis and preliminary discussions with the Board's Engineer.

Both wet and dry basins can be utilized to comply with the requirements of the stormwater management regulations.

In the case of wet detention basins, the permanent storage water shall not be included in the analysis.

Where soils have sufficient permeability, the production of zero runoff from the site under conditions of the one and one-quarter inch water quality storm will be considered sufficient to meet the water quality requirement for residential developments, provided that the seasonal high ground water does not rise to within four feet of the bottom of the detention facility. (In this situation the detention facility is functioning as an infiltration facility.) However, an infiltration device cannot be applied on sites where subsurface conditions allow for rapid infiltration. For other than residential developments, approvals will be on a case-by-case basis after technical review by the Planning Board Engineer. The object of this review will be to avoid the potential for contamination of ground water. Other technology may be substituted pursuant to Section 12C-1.6.

g. General Requirements of Stormwater Management

1. A subsurface soils investigation is to be performed at all stormwater basin sites, the results of which are to appear on the plans. For the retention basin or infiltration basin, permeability tests and a soil log of the site to a depth of at least six feet below the bottom of the basin shall be shown on the plans.

2. The minimum bottom slope of the basin shall be two percent, unless extraordinary site conditions prevent practical installation. In all cases, low flow channels may be required to convey small inflows to the basin outlet.

3. The basin is to be sodded or topsoiled and seeded, including the bottom, side slopes and all earthen dams and embankments.

4. The design dimensions of the detention basin shall be maintained throughout construction unless it is to be used as a siltation basin during construction in the watershed. If so, it shall be immediately returned to design dimensions following the completion of such construction.

5. Water quality for the basin shall be provided by controlling the one-year storm or a storm of one and one-quarter inches of rainfall falling uniformly in two hours. The minimum size of the orifice shall be three inches in diameter.

12C-1.4. Safety Measures

Safety measures are to be incorporated in the design of all stormwater and infiltration control projects. These may include but not be limited to fencing; warning signs/stadia rod indicating depth at lowest point, and outlet structures designed to limit public access.

12C-1.5. Detention Basins in Flood Plains

1. There will be no detention basins in the floodway except for those on-stream.

2. New development must be in compliance with all applicable regulations under the Flood Hazard Area Control Act, N.J.S.A. 58:16A-50 et seq.

3. In addition, new development, including construction of detention basins, should be avoided in flood plains, but where this is unavoidable, a special examination to determine adequacy of a proposed detention facility during extreme storm events shall be required. This examination is required to determine what effects, if

any, the tailwaters created by the flood plain have on the outflow from and effective storage within the detention facility. All designs of basins in flood plains, therefore, should be based upon an accurate and thorough determination of tailwater effects resulting from runoff from the site and the watershed contributing to the flood plain.

12C-1.6. Planning and Design Standards for Maintenance and Repair

A. The goal for the planning and design of a stormwater management facility is for its operation with the least practical amount of maintenance. To accomplish this, the facility shall be developed to eliminate avoidable maintenance tasks, minimize the long-term amount of regular maintenance, facilitate the performance of required maintenance tasks and reduce the potential for extensive, difficult, and costly remedial or emergency maintenance efforts.

B. Strong, durable, and noncorroding materials, components, and fasteners shall be used to reduce required maintenance efforts. These include but are not limited to lightweight noncorroding metals such as aluminum for trash racks, orifice plates, and access hatches; hardy, disease-resistant grasses for bottoms and side slopes, as prescribed by Soil Erosion and Sediment Control Standards administered by the Andover Township Engineer; reinforced concrete for outlet structures and inlet headwalls; and gabions for channel and outlet linings.

12C-1.7. Alternatives To Detention Basins

A. It is not necessary that basic requirements for water quantity and quality control be satisfied by means of detention basins. A combination of measures including, but not limited to, rooftop storage, tanks, dry wells, or sheet flow through vegetated areas may be used for the purpose, with consideration for the

appropriateness of the facility, anticipated length of life, feasibility of continued maintenance, and environmental impacts (e.g. contamination of ground water).

12C-1.8. Exemption from Detention Basins

12C-1.8.1 The Planning Board upon the recommendation of the Board's Engineer may waive the requirement of a detention basin if the following conditions are met:

A. The difference between the pre-developed conditions runoff and post-developed conditions is 1.0 cfs or less and the runoff is directed into a drainage system. The calculations shall be made by using the rational method based on a 100-year storm using the runoff coefficient given in ASCE Manning No. 37.

B. When the released flow from a detention basin adds to the peak flow in the receiving stream and causes flooding.

12C-1.9. Assessment of Items Necessary to Achieve Compliance

The following documents are incorporated by reference herein which contain standards, including structural standards and non-structural measures necessary to manage stormwater.

However site specific information is required as part of any application for development in order to determine particular stormwater management measures required for any particular site or area.

Sussex County Soil Survey

ASCE - Manual Design and Construction of Sanitary and Storm
Sewers, No. 37

Controlling Urban Runoff - Metropolitan Washington Council
of Government

Delineated Streams Maps for Andover Township

Andover Township Zoning and Land Use Ordinances

Andover Township Master Plan

Technical Release 20 (TR-20)

Technical Release 55 (TR-55)

Sussex County Acceptance

FIRM maps indicating flood-prone areas

Hydraulic Engineering Circular No. 15

Design of Stable Channels with Flexible Linings

Municipal Implementation Ordinance Amendments which are consistent with goals and objectives of the Stormwater Management Plan:

Standards for Construction of Individual

Subsurface Disposal Systems (NJ DEP)

Standards for Erosion and Sediment Control

Municipal Land Use Law

Andover Township Wastewater Management Plan (to be adopted)

A Guide to Stormwater Management Practices in New Jersey

Technical Manual for Stream Encroachment 7.88, as amended

Magnitude and Frequency of Floods in New Jersey with

Effects of Urbanization - Special Report 38

**12C-2. REQUIREMENTS FOR A SITE DEVELOPMENT
STORMWATER PLAN**

12C-2.1. Submission of Site Development Stormwater Plan

A. Whenever an applicant seeks municipal approval of a development subject to this ordinance, the applicant shall submit all of the required components of the checklist for the site development stormwater plan as part of the submission of the application for subdivision or site plan approval.

B. The applicant shall demonstrate that the project meets the standards set forth in this ordinance.

C. The applicant shall submit five copies of the materials listed in the Checklist for Site Development Stormwater Plans in accordance with Section 13A-3.8 of Andover Township Land Use Ordinance.

Site Development Stormwater Plan Approval

The applicant's site development project shall be reviewed as a part of the subdivision or site plan review process by the municipal board or official from which municipal approval is sought. That municipal board or official shall consult the engineer retained by the Planning and/or Zoning Board (as appropriate) to determine if all the checklist requirements have been satisfied and to determine if the project meets the standards set forth in this ordinance.

12C-2.2. Checklist Requirements

12C-2.2.1. The following information shall be required:

A. Topographic Base Map

The reviewing engineer may require upstream tributary drainage system information as necessary. It is recommended that the topographic base map of the site be submitted which extends a minimum of two hundred feet beyond the limits of the proposed development at a scale of 1"=200' or greater, showing two-foot contour intervals. The map, as appropriate, may indicate the following: existing surface water drainage, marshlands and other wetlands, pervious or vegetative surfaces, existing man-made structures, roads, bearing and distances of property lines, and significant natural and man-made features not otherwise shown.

B. Environmental Site Analysis

A written and graphic description of the natural and man-made features of the site and its environs shall be provided. This description should include a discussion of soil conditions, slopes, wetlands, and vegetation on the site. Particular attention should be given to unique, unusual, or environmentally-sensitive features and to those that provide particular opportunities or constraints for development.

C. Project Description and Site Plan(s)

A map (or maps) at the scale of the topographical base map indicating the location of existing and proposed buildings, roads, parking areas, utilities, structural facilities for stormwater management and sediment control, and other permanent structures is required. The map(s) shall also clearly show areas where alterations occur in the natural terrain and cover, including lawns and other landscaping, and seasonal high ground-water elevations. A written description of the site plan and justification of proposed changes in natural conditions may also be provided.

D. Stormwater Management Facilities Map

The following information, illustrated on a map of the same scale as the topographic base map, shall be included:

1. Total area to be paved or built upon, proposed surface contours, estimated land area to be occupied by the stormwater management facilities and the type of vegetation thereon, and details of the proposed plan to control and dispose of surface water.
2. Details of all stormwater management facility design, during and after construction, including discharge provisions, discharge capacity for each outlet at different levels of detention and emergency spillway provisions with maximum discharge capacity of each spillway.

12C-2.3. Calculations

- a. Comprehensive hydrologic and hydraulic design calculations for the pre-development and post-development conditions for the design storms specified in Section 12c-1.3 of this ordinance.

b. When the proposed stormwater management control measures (e.g. infiltration basins) depend on the hydrologic properties of soils, then a soils report shall be submitted. The soils report shall be based on on-site boring logs or soil pit profiles with permeability test. The number and location of required soil borings or soil pits shall be determined based on what is needed to determine the suitability and distribution of soil types present at the location of the control measure.

12C-2.5. Maintenance and Repair Plan

a. The design and planning of the stormwater management facility shall be in accordance with the goals and objectives of this section.

b. Preventative, corrective and aesthetic functional maintenance procedures shall be detailed which ensure the continuation of the intended function of the facility.

c. Maintenance and repair plans for stormwater management facilities shall identify the parts or components of the facility that need to be maintained, and when repairs are required, the equipment and skills or training necessary. Plans for stormwater management facilities shall detail the accessibility of maintenance personnel and equipment. Costs and sources of funds shall be identified when possible.

d. A schedule shall be developed of when and how often maintenance will occur to maintain proper function of the stormwater management facility. To reduce the potential for extensive, difficult, and costly remedial or emergency maintenance efforts, the schedule of maintenance activities shall include inspections to ensure proper performance of the facility between scheduled clean-outs.

e. Where a stormwater management facility is used for sediment control during construction, a debris and sediment disposal site shall be confirmed before the facility is constructed. The disposal site may or may not be at the site of the proposed development. The responsible party shall demonstrate that he or she is capable of financing the removal and disposal of debris and sediment before the facility is operating. Disposal site(s) shall be included in the Soil Erosion and Sediment Control Plan and certified by the Township Engineer.

f. Provisions for periodic review and evaluations to determine the overall effectiveness of the maintenance program and the need for revised or additional maintenance procedures, personnel, and equipment shall be included in the facilities maintenance and repair plan.

12C-2.6. Waiver from Submission Requirements

The municipal official or board reviewing an application under this ordinance may, in consultation with the Board Engineer, waive submission of any of the requirements of this section when it can be demonstrated that the information requested is impossible to obtain or it would create an undue hardship on the applicant to obtain and its absence will not materially affect the goals and objectives of the ordinance and will not materially affect the review process.

12C-3. CONTINUED MAINTENANCE, REPAIR AND SAFETY

12C-3.1. Applicability

(a) All stormwater systems shall be kept in good functioning order.

12C-3.2. Responsibility for Continued Maintenance, Repair and Safety

A. The requirements of this section do not apply to stormwater management facilities that are dedicated to and accepted by the municipality or another governmental agency. Responsibility for operation and maintenance of stormwater management facilities, including periodic removal and disposal of accumulated particulate material and debris, shall remain with the property owner, unless assumed by a governmental agency, with permanent arrangements that it shall pass to any successor or owner. If portions of the land are to be sold, legally binding arrangements shall be made to pass the basic responsibility to successors in title. These arrangements shall designate for each project the property owner, governmental agency, or other legally-established entity to be permanently responsible for inspection and maintenance, hereinafter in this section referred to as the responsible person.

B. Prior to granting approval or as a condition of final subdivision or site plan approval to any project subject to review under this ordinance, the applicant shall enter into an agreement with the Township to ensure the operation and maintenance of the stormwater management facility. In cases where property is subdivided and sold separately, a homeowners association or similar permanent entity shall be established as the responsible person, absent an agreement by a governmental agency to assume responsibility. It shall be demonstrated to the Township that a proposed new responsible entity has the capability to complete and finance necessary maintenance. A two-year maintenance guarantee shall be required.

C. In the event that the stormwater management facility becomes a danger to the public safety or public health, or if it is in need of maintenance, the Township shall so notify the responsible person in writing. Upon receipt of that notice, the responsible

person shall have fourteen (14) days to effect maintenance and repair of the facility in a manner that is approved by the Township Engineer . If the responsible person fails or refuses to perform such maintenance and repair, the municipality or Sussex County may immediately proceed to do so and shall bill the cost thereof to the responsible person.

12C-3.3 Continued Maintenance and Repair Procedures

A. Preventative maintenance procedures are required to maintain the intended operation and safe condition of the stormwater management facility by greatly reducing the occurrence of problems and malfunctions. To be effective, preventative maintenance shall be performed on a regular basis and include such routine procedures as training of staff, periodic inspections, grass cutting and fertilizing, silt and debris removal and disposal, upkeep of moving parts, elimination of mosquito-breeding habitats, pond maintenance, and review of maintenance and inspection work to identify where the maintenance program could be more effective.

B. Corrective maintenance procedures are required to correct a problem or malfunction at a stormwater management facility and to restore the facility's intended operation and safe condition. Based upon the severity of the problem, corrective maintenance must be performed on an as-needed or emergency basis and include such procedures as structural repairs, mosquito extermination, removal of debris, sediment and trash removal which threaten discharge capacity, erosion repair, snow and ice removal, fence repair and restoration of vegetated and non-vegetated linings.

SECTION 4. Penalties

12C-4. Any responsible person who violates any portion of Section 12C-3.2 or Section 12C-3.3 of this ordinance shall be subject to the following penalties:

A fine of \$1,000. or 100 hours of community service may be levied.

12C-5. EFFECTIVE DATE

This Ordinance shall take effect upon final passage and approval by the Sussex County Planning Board or water resources association as appropriate or sixty (60) days after submission to said agency if they fail to act.

ADJACENT ZONING

One of the purposes of zoning and a goal of this Master Plan is to prevent development conflicts between neighboring municipalities, the County and the State as a whole. For this reason, the zoning ordinances of each of the eight municipalities bordering Andover Township were examined. The existing zoning was compared with Andover Township's proposed Land Use Plan and in some cases changes were made to assure compatibility. (see Map 19)

HAMPTON TOWNSHIP

The land in Hampton Township adjacent to Andover Township's northwestern border is within an "R" residential zone district which is a 2 acre single-family zone. The zoning in Andover Township in this area had previously been for industrial purposes. The land use plan recommends changing this area to a one acre constraints zoning district.

LAFAYETTE TOWNSHIP

Lafayette Township abuts Andover Township at its northern boundary line. The lands adjacent to Andover in Lafayette are in two different zone districts. There are to areas of Limited industrial zoning at either end of the boundary with an area of 2 acre single-family zoning located in Lafayette, near the center of this boundary line. For the most part, the adjacent zoning is compatible. Residential zones mainly abut residential zones, and there is an area of shared industrial zoning.

SPARTA TOWNSHIP

Sparta Township abuts Andover's eastern border. The zoning in Sparta includes R-R rural residential and R-1 one acre zone district. Both of these residential districts are compatible with the adjacent one acre constraints zoning in Andover with the introduction of enhanced buffers which should be required along the business zone which straddles the Newton-Sparta Road corridor.

BYRAM TOWNSHIP

Byram Township shares a common boundary with Andover Township's southwesterly quadrant. The entire Byram border is residentially zoned, including R-1, R-2 and R-4 zone districts. These zones are compatible with Andover's one acre constraint zoning and are also compatible with the Planned Commercial Development due to the significant wetlands constraints located at the interface of these jurisdictions. Significant visual buffers are required when such use abuts a residential zone district. It is recommended that review of development applications at the interface between residential and non-residential districts concentrate on development controls which provide a buffer by distance and landscaping rather than by fencing of the non-residential component of the development. It is strongly recommended that no activities which extend into the late evening hours be permitted to abut these residential zones.

ANDOVER BOROUGH

The Township shares three common boundaries with Andover Borough. The southeastern boundary consists of C-3 highway commercial zoning, C1/PUD zoning and an area of R-1 single-family zoning.

The northern shared border of Andover borough and Andover Township consists of C-1 commercial zoning and R-1 single-family zoning. The commercial zoning is in the vicinity of Route 206. The adjacent zoning in Andover Township is for industrial uses for lands which are largely within the air hazard zone of Aeroflex Airport. The R-1 zoning in Andover borough is compatible with the one acre constraints zoning in Andover Township.

The southeastern boundary of Andover borough consists of C-3 Highway Commercial zoning. An Andover Township zoning Business Professional Office/Residential (BPO/R) and Planned Commercial Development for lots abutting those having frontage on State Highway Route 206 is viewed as being consistent and compatible with the C-3 zoning in Andover Borough.

Andover Township and Borough share a third boundary along the Borough's northwest border. The zoning consists of Industrial Park/Planned Unit Development (IP/PUD), Residential/Planned Unit Development (R-1/PUD), and Shopping Center/Planned Unit Development (C-2/PUD). the adjacent lands lying within Andover Township are industrially zoned. The PUC zone in the Borough will assure adequate buffering and separation of uses located in both towns.

GREEN TOWNSHIP

The southwestern portion of Andover abuts Green Township. The zoning within Green consists of three different zones including AR-3.5, AR-2.5, and AI-5 zone. These are agricultural residential zones and an agricultural industrial zone.

In Andover Township the majority of this boundary is within a one acre constraints zone and is therefore consistent. The area where this border intersects with the line separating the Township from Andover Borough is within an industrial zone.

	Approx. cost
--- 1989: New turnout gear	\$ 15,000
Pumper to replace existing unit	250,000
--- 1990: Aerial truck	550,000
Addition to station to house aerial	100,000
Tanker to replace existing unit	140,000
--- 1991: New two bay substation	125,000
Pumper to replace existing unit	270,000
New pagers (to replace ones in use)	10,000
--- 1992: Brush truck to replace existing unit	60,000
--- 1993: Tanker to replace existing unit	170,000
New rescue/utility vehicle	110,000
 Total estimated five year capital improvement costs:	 \$1,800,000

RECREATION COMMITTEE

- new storage facility/field house (w/bathrooms) at Hillside Park
- beach on Lake Illiff (to be completed w/Green Acre funds)
- development of three sports fields on Goodale Road
- the renovation (winterizing) of the Hillside Park hall
- basketball court ball improvements at Hillside Park

ROAD DEPARTMENT

- four-wheel drive pickup w/snow plow
- (Construction of a municipal garage was completed on July 17, 1992 in accordance with the recommendations of the 1989 Master Plan.)