CH - Morris County Fair Housing Council v. Boonton (Denville) Apr. 22, 1986

Attachments including Brief in Support of Application to ~~Sewer~~ Transfer to the Affordable Council, Residential Building Permits, and Summary Report of Area-Wide Sewer System Capabilities

pg. 165

CH0000048B

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SUPERIOR COURT OF NEW JERSEY
LAW DIVISION - MIDDLESEX/MORRIS
COUNTIES
DOCKET NO. L-6001-78 P.W.

MORRIS COUNTY FAIR HOUSING COUNCIL, et al.,	:	
Plaintiffs,	:	
vs.	:	Civil Action (Mt. Laurel Action)
BOONTON TOWNSHIP, et al.,	:	
Defendants.	:	

ATTACHMENTS

ATTACHMENTS

	Exhibit
Montney, Revised Vacant Land Analysis, June 1984	A
Compliance Plan (June 1985)	B
Velsor, Denville Township Mt. Laurel II Compliance Program - Draft Report (June 1985)	C
N.J. Dept. of Labor, N.J. Residential Building Permits - 1984 Summary (1985) p. 32	D
N.J. Dept. of Labor, Residential Building Permits (various data in 1985 and 1986)	E
Purcell Assoc., Township of Denville, Summary Report, Area-Wide Sewer System Capabilities (May 1985)	F
• Brief of Denville Township in Morris County Fair Housing Council v. Boonton Township, Docket No. A-125-85 p. 45	G
Resolution of the Rockaway Valley Regional Sewerage Authority, March 1985	H
Purcell Assoc., Township of Denville, Summary Report, Area-Wide Water System Capabilities - Mt. Laurel II Considerations (May 1985)	I
Davis Enterprises v. Mt. Laurel Municipality Utilities Authority, Docket No. C-635-81, (Ch. Div., Burlington Cty., March 8, 1983), Order for Interlocutory Restraints Against MLMUA	J

EXHIBIT A

[illegible] HARPER
STEPHAN C. HANSBURY
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DENNISE E. CRIGGS

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COUNSEL

*ADMITTED N.J., N.Y. AND D.C. BARS

June 7, 1984

Honorable Stephen Skillman
Superior Court of New Jersey
Court House
New Brunswick, NJ 08903

Re: Morris County Fair Housing Council, et al
v. Boonton Township, et al
Docket #L-6001-78 P.W.

Dear Judge Skillman:

Enclosed please find Revised Vacant Land Analysis dated June 5, 1984, prepared by Russell Montney, Planner for defendant, Township of Denville. With this submission, the expert reports on behalf of Denville have now been completed and submitted. I am by copy of this letter providing same to Mr. Eisdorfer.

Very truly yours,

Stephan C. Hansbury

SCH/njs
enc
cc: Stephen Eisdorfer, Asst. Deputy Public Advocate

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ROBERT T. CATLIN, AIP
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RUSSELL MONTNEY, AIP
JOHN J. RAKOS, AIP

MEMORANDUM

TO: John J. Harper, Special Counsel
FROM: Denville Township, N. J.
SUBJECT: Russell L. Montney
DATE: Revised Vacant Land Analysis - Mt. Laurel II Litigation
June 5, 1984

On prior occasions, we have prepared studies which examined the vacant land potential for Denville Township. The first such occasion was October 1979 at which time we provided a table in which we listed all available vacant land in Denville by zoning category without regard for the size of these parcels based upon information assembled in conjunction with land use studies that were completed as a part of our Master Plan studies. This information was later updated in December 1980 in conjunction with the Mt. Laurel I litigation.

As shown on the accompanying table, within each of the available vacant land areas, we measured that portion that was impacted by three categories of environmental constraints:

1. Slopes in excess of 25 percent.

2. Composite limitations which included

   Depth to bedrock of 0-6 feet
   Depth to groundwater of 0-5 feet
   Soil permeability - classified unacceptable

3. Flood hazard areas.

The areas remaining without one or more of these constraints were then measured and shown as vacant lands suitable for development. Of the total of 1810 acres of available vacant land identified in this study, 786 acres remained as suitable for development.

Since those studies were made, there have been a number of events that have occurred that have an impact on the suitability of vacant land for development. First of all, the New Jersey Supreme Court, in its Mt. Laurel II decision, reassures us that, "....Mount Laurel is not designed to sweep

away all land use restrictions or leave our open spaces and natural resources prey to speculators. Municipalities consisting largely of conservation, agricultural or environmentally sensitive areas will not be required to grow because of Mount Laurel. No forest or small towns need be paved over and covered with high rise apartments as a result of today's decision."

In our discussions with the Public Advocate's Office, they have recognized that slopes in excess of 15 percent should not be disturbed and that there are practical limits on the size of parcels that should be considered for development in meeting the low and moderate income housing need. In addition, there have been a series of studies which have brought into sharper focus the environmental constraints on these vacant lands, which include:

1. Refinement of flood hazard areas by the Federal Insurance Program and the New Jersey Department of Environmental Protection.

2. Identification of Wetlands by the U. S. Fish and Wildlife Service.

3. The identification of sole source critical groundwater aquifers by Gerathy and Miller, Geonics and others.

4. The identification of Critical Soils areas based upon studies by the Morris County Soil Conservation Service.

In recognition of these events, we have prepared a Revised Vacant Land Analysis based upon this more recent information. This study has consisted of the preparation of a series of six overlays to a new Vacant Land Map. On the Base Map of the Township revised to July 1981, we have shown all vacant parcels of eight acres or larger as well as parcels of five acres or larger that are adjacent to either an eight-acre or another five-acre parcel. Parcels of eight acres were used because they represent the minimum size that might reasonably be expected to be developed for low and moderate income projects and five acres was used on the premise that it could be combined with other lands to form a reasonable project size.

Within each of these vacant areas we have identified, on five acetate overlays, and measured the area for each of the following environmental constrants:

High Water Table This overlay shows those portions of the vacant lands that have a seasonal high water table of from 0-5 feet. Some of the major impediments to development of lands in these areas for high density housing includes limitations on development of basements, construction of sanitary sewers and other utilities such as electrical, telephone and natural gas lines. Over 484 acres of these vacant lands are impacted by high water table.

Stream Overflow Areas Included on this overlay are those areas subject to stream overflow as determined by the flood hazard areas established by the Federal Insurance Program as well as those areas so classified as a part of the Morris County Soil Survey. Yet another 135 acres of these vacant parcels fall within this category.

Assorted Wetlands Adjoining Stream Overflow Areas These are lands identified by the Morris County Soil Survey as well as wetlands identified by the U. S. Fish and Wildlife Service. Just over 200 acres of vacant land are impacted by wetlands.

Critical Groundwater Resource Areas. This overlay shows those areas identified as sole source groundwater aquifers, which must be protected. Just under 290 acres of the vacant lands are within this category.

Slopes In Excess Of 15 Percent. This overlay is taken from the Excessive Slopes Map of the Land Use Ordinance and shows those portions of these vacant lands with slopes of 15 percent or greater. Over 242 acres were found in this category.

On our sixth overlay, we have shown severe restrictions which is a composite of one or more of the previous five overlays which takes into consideration any overlap of these various categories. This area was then deducted from the total area of vacant land to arrive at the total figure for developable vacant land.

This information is shown on the accompanying table which indicates that, of the total of 1166 acres of vacant land, 331 acres are located outside these ares with environmental limitations.

Vacant Land Development Potential
October 1979

	Available Vacant Land (Acres)	Excessive Slopes 25% and Over	Composite Limitations(1)	Flood Hazard Areas	Suitable For Development
C	149.06	28.41	128.17	2.30	13.83
R-C	310.32	35.53	83.00	54.99	179.51
R-1	751.55	149.06	307.48	34.33	368.91
R-2	121.11	17.04	36.62	10.05	66.76
R-2A	40.00	4.75	20.66	-	15.21
R-3	45.92	3.09	17.04	14.58	16.93
R-4	12.62	1.72	7.63	3.16	2.93
A-1	-	-	-	-	-
POS	-	-	-	-	-
B-1	.86	-	.28	.69	-
B-2	17.79	-	10.10	6.89	4.31
B-2A	3.84	-	1.89	-	2.01
B-3	.86	-	.22	.57	-
OB-1	2.12	-	-	-	1.84
OB-2	-	-	-	-	-
OB-3	-	-	-	-	-
OB-4	61.24	3.96	40.23	-	14.92
I-1	5.56	-	3.55	-	.80
I-2	287.17	14.98	176.27	60.56	98.79
TOTAL	1,810.02	258.54	833.14	188.12	786.75(2)

(1) Composite Limitations
Depth to Bedrock = 0-6 feet
Depth to Water = 0-5 feet
Soil Permeability = Unacceptable

(2) This represents 9.58 percent of the total Township area.

DENVILLE TOWNSHIP
REVISED VACANT LAND ANALYSIS
MAY, 1984

Zone	Vacant Acre	High Water Tbl.0'-5' Acre	Stream Overflow Acre	Assorted Wet Area Acre	Critical Ground Water Resource Area Acre	Over 15% Slope Acre	Severe Restrictions* Acre	Developable Land Acre
C	135.36	55.61	-	-	-	45.34	99.51	35.85
R-C	220.26	51.09	11.36	-	127.66	43.53	172.38	47.88
R-1	432.94	140.38	27.54	112.43	-	118.11	268.59	164.35
R-2	32.60	6.71	3.61	1.66	-	5.62	18.31	14.29
R-2A	31.91	18.65	10.33	9.01	-	.97	21.29	10.62
OB-4	70.96	34.72	.23	34.72	-	10.96	58.09	12.87
B-2	3.08	3.08	1.72	-	-	1.20	3.08	-
I-2	239.80	174.53	81.15	49.41	161.40	16.41	193.67	46.13
Total	1,166.91	484.77	135.94	207.23	289.06	242.14	834.92	331.99

*Sewer Restrictions is a composite of one or more of the five environmental constraints which compensates for any overlap of these categories.

EXHIBIT B

DENVILLE TOWNSHIP
MOUNT LAUREL II COMPLIANCE PROGRAM DATE: 6-12-85

II. FAIR SHARE COMPLIANCE

A. INTRODUCTION

Denville Township already has a significant stock of low and moderate income housing. As shown by the 1980 census, Denville has over 400 units of housing affordable to low and moderate income people. Twenty-six percent of the Township's households are low and moderate income households as defined in the Mount Laurel II decision.

The Township acknowledges that homes for low and moderate income people should continue to be made available in Denville. Denville believes that this can best be accomplished by a coherent and coordinated program designed, controlled and implemented by the Township itself. The social, environmental and economic health of the community must be carefully preserved if Denville is to continue to provide affordable low and moderate income homes.

The helter-skelter, immediate force-fit approach must be avoided, because Denville Township cannot survive the introduction of a large number of new residents without adequate environmental review and prior development of adequate infrastructure. In the interest of orderly progress and preservation of community character, Denville's fair share should be provided at a pace consistent with the overall development of the community.

B. COMPLIANCE PROGRAMS

Denville Township will provide its fair share of affordable housing through five principal mechanisms:

1. Rehabilitation of existing substandard housing with assistance from the Morris County Department of Community Development.

2. Conversion of existing structures to create affordable rental units within them.

3. Construction of publicly subsidized affordable senior citizen housing.

4. High density development of approximately 60 acres of land appropriate for such development to provide additional affordable housing.

5. Creation of an overlay zone requiring that all developers provide affordable low and moderate income housing within their developments.

1. Rehabilitation

Denville has already received a one for one compliance credit for 41 housing units rehabilitated by the Morris County Department of Community Development as of July 1984. Department director Grace Brewster reports that twelve Denville households were assisted or found eligible for assistance between August 1984 and May 1985. Ms. Brewster anticipates completing 50 to 60 additional cases in the next five years, making a total of 62 to 72 units beyond the 41 for which Denville has already received credit. Thus, the Township can be expected to satisfy at least 62 units of its fair share obligation by continuing to encourage and support housing rehabilitation.

2. Accessory Conversion

In the spring of 1984 the Township proposed and was prepared to adopt an ordinance providing for and encouraging accessory conversions. A full year has been lost because this approach to implementing fair share was not agreed to at that time. Now, more than a year later, Denville Township again proposes to adopt an accessory conversion ordinance allowing homeowners to create apartments within or, where appropriate, as additions to their homes.

Accessory apartments in Denville must meet the following criteria:

1. The unit must be rented to a low or moderate income household.

2. The rent, including utilities, must be no more than 30% of the income of a low or moderate income household.

3. The owner must agree to comply with the New Jersey Law Against Discrimination, NJSA 10:4-1 et seq.

4. The unit must be subject to controls administered by the Denville Affordable Housing Board to ensure that it is rented by and affordable to lower income households for a reasonable period of time.

Based upon citizen response, the Township believes that accessory conversion will be a very active program. For the purpose of estimating the number of potential conversions, it should be noted that Denville contains about 4,500 single-family detached housing units, of which about 3,200 have three or more bedrooms. Conversion of as little as 3% of the 3,200 larger homes would provide about 100 Mount Laurel units, while a more realistic 5% conversion rate would provide 160 Mount Laurel units.

3. Senior Citizen Housing

With a large and rapidly increasing older population, Denville is particularly concerned about providing additional housing for senior citizens. Denville proposes to build (150) units of publicly subsidized senior citizen housing. This housing will be administered by the Denville Affordable Housing Board. Units will be rented or sold to senior citizens of low and moderate income. Sites should be selected for their proximity to existing adequate infrastructure, public transportation and community services. Possible sites include a 21 acre tract between the end of Luger Road and the Parsippany Troy Hills border and the 19 acres owned by the township on Vanderhoof Avenue.

4. High Density Development

To implement the immediate development of low and moderate income housing, Denville will rezone a limited area of the Township for well-planned high density development. This zone will provide for an initial maximum of (60) acres with densities between 7 and 10 units per acre depending on environmental and infrastructural constraints and community resources. In areas judged by the Township Planning Board to have only minor constraints, densities of 7 units per acre will be sought. In areas with significant constraints densities of up to 10 units per acre of suitable land will be allowed depending on the developer's efforts to minimize impacts to the environment and to contribute to infrastructural improvements. In all cases, site selection and development criteria must be compatibility with existing uses, adequacy of existing infrastructure, environmental constraints and access to public transportation and community services.

If the Planning Board determines that high density development should be allowed such development must provide a significant proportion of the Township's fair share of low and moderate income housing. Denville Township has determined that a 30% set-aside of low and moderate income housing should be mandatory in such high density developments.

It is anticipated that the Nuzzo and Stonehedge tracts may be suitable for a high density approach. Development of these tracts at 7 units per acre with a 30% set-aside could provide approximately 122 units of low and moderate income housing.

5. General Mandatory Set-Aside

To provide additional affordable housing as the Township develops, Denville will prepare an overlay zone requiring that at least 30% of all newly constructed housing units within a subdivision of five or more building lots be affordable to and reserved for persons of low and moderate income. Construction of low and moderate income units will generally be allowed at a

density four times the zoned density. Because small subdivisions will not contain enough market rate units to subsidize development of low and moderate income housing on the site, subdivisions of less than five building lots will have the alternative of paying a fee to the Denville Affordable Housing Board. The Township will specify the structure of this fee after further economic analysis. The Affordable Housing Board will use the proceeds to supplement other sources of financing for the senior citizen housing and accessory conversions discussed in sections 2 and 3 above.

Under this plan, development of all residentially zoned vacant land in the Township would provide about 386 units of Mount Laurel housing.

C. SELECTION OF BUYERS AND RENTERS

All low and moderate income housing units produced under the programs outlined above will be sold or rented to persons of low and moderate income.

The Denville Affordable Housing Board will select buyers and renters from among the income eligible applicants in accordance with the following priority list:

1. Residents of Denville who have lived in the Township for at least one year and who are living in shared or deficient housing.

2. Employees of Denville Township, Denville Township School District, or other public agencies or educational facilities located within the Township who are living in shared or deficient housing.

3. Other persons employed in Denville who are living in shared or deficient housing.

4. Residents of Denville Township not included in (1), (2), or (3) above.

5. Persons employed in Denville Township and living more than 20 miles from their place of work in the Township or living in any urban aid municipality within the Township's Mount Laurel II prospective housing need region.

6. Persons employed within ten miles of the municipal boundary of Denville Township and living in shared or deficient housing.

7. All other persons living in shared or deficient housing within Denville Township's prospective need region, with preference given to those living in designated urban aid municipalities.

8. All others.

In all categories, preference will be given to former residents of Denville over persons who have never lived in the Township.

(302/2)

EXHIBIT C

DENVILLE TOWNSHIP
MOUNT LAUREL II COMPLIANCE PROGRAM

1.0 TOWNSHIP SUITABILITY FOR IMPLEMENTING MT. LAUREL II

A. INTRODUCTION

The criteria outlined below will be used to evaluate suitable areas for development. The criteria are broken out under four subheadings: (1) critical environmental planning criteria, including environmental factors, site design, and land use compatibility; (2) critical infrastructure systems, including water, sewage disposal, storm drainage, and traffic and transportation; (3) township master plan and zoning; and (4) additional planning criteria, including the Morris County Master Plan, and the State Development Guide Plan.

Denville Township will be evaluated using these criteria to identify potential development areas that are consistent with sound environmental and land use planning principles. Those development areas that have been proposed will be compared against each specific criterion in relationship to one another to determine which site(s) is(are) most suitable for development. The best sites will be those that most closely meet all of the criteria; good sites will satisfy most of the criteria, but fall short in a few critical areas; while poor sites will generally exhibit a few positive criteria, but will rank low in other criteria evaluations.

(The object of this suitability analysis will be to determine what the total development potential of the township is and to assess what effect, if any, the use of limiting environmental and non-environmental criteria may have in implementing this development.)

B. CRITICAL ENVIRONMENTAL PLANNING CRITERIA

An understanding of the existing environment is important in identifying areas suitable for acceptable residential development. Development areas need to be identified considering the natural environment so as not to encroach on environmentally sensitive areas such as wetlands, floodplains, steep slopes, or aquifer recharge zones.

1.0 Environmental Parameters

Any land development activity will apply pressure to the existing natural environmental balance of Denville Township. Impacts to one element of this natural system could result in a wide range of effects extending beyond the individual element and affecting the entire system.

1.1 Geology, Topography and Soils

The geologic history and character of an area should be considered prior to development activities. The land forms of Denville Township are predominantly glacial relics that are presently being altered by natural processes associated with the contemporary humid climate. The effects of these processes are evident in the evaluation of soils and drainage patterns of the present environment.

Bedrock geology depth reflects the thickness of overlying soil, surface resistance to excavation, and the hydrologic characteristics for potable water supplies. The ease of excavation usually decreases with depth and may vary considerably with the extent and nature of fracture patterns.

Bedrock is nearest to the surface in areas of high relief or steep slope where glacial scour was the most severe and deepest on flat valley bottoms.

Steep and Excessive Slopes

An area with steep slopes should be avoided for development activities. Areas containing slopes greater than 15 percent are considered to have steep slopes, while slopes greater than 25 percent are excessive. Construction in these areas would increase slope instability, particularly where vegetation is removed and drainage patterns altered, accelerate erosion of surface soils, and involve higher development costs.

Areas of steep and excessive slopes are common in the northern portion of the township and along the ridges in the southern portion of the township.

Soils

Existing soil type and characteristics should be considered in identifying a suitable development area. Soils with high erosion potential, poor drainage, and subject to landslide or slope failure should not be extensively developed. The Morris County Soil Survey and the Denville Comprehensive Plan locate and describe surficial soils found in Denville Township. The soil survey outlines the chemical and physical properties, water levels, suitability for onsite sewage disposal, and other limitations regarding development for each soil type.

1.2 Floodplains

Development in floodplain areas should be restricted as these areas absorb excess water providing important protection against flood damage and siltation from eroded lands upstream. Areas designated as floodplains represent those areas where the probability of a 100-year flood occurring during any one year is about 1 percent. The National Flood Insurance Act of 1968 provides government sponsored flood insurance for structures in designated floodplains. Insurance is limited to communities that have developed measures to limit development in floodplains. New buildings in flood prone

areas are unlikely to receive federal flood insurance. Lending institutions are reluctant to finance construction in such areas. Federal Executive Order (#11988) and State regulations direct the avoidance of floodplain development whenever possible.

Flood hazard areas are concentrated to the north and northeastern end of Denville Township along the Rockaway River, its tributaries and associated lakes. Areas subject to stream overflow, as identified by the U.S.D.A. Soil Conservation Service, are concentrated south of Route 80, along Den Brook, Peck Meadow Brook, and Mitchell's Brook.

1.3 Wetlands

Wetland areas are mapped by the U.S. Fish and Wildlife Service. Wetlands are necessary habitat for a number of plant and animal species. Avoidance of construction in wetlands is directed by federal regulations, unless there is no practical alternative.

Federally designated wetland areas are located in scattered parcels along each of the existing waterways in Denville Township. Large contiguous areas have been identified along Beaver Brook. The U.S.D.A. Soil Conservation Service has also identified wetland areas by soil characteristics. These areas are located south of Route 80 and overlap the federally designated wetland areas.

1.4 Aquifer Recharge Zones

Groundwater is the sole source of drinking water in Denville Township. Areas within the township have been designated as prime aquifer and immediate recharge zones for the federally designated sole source aquifer underlying Denville Township. Protection of the prime aquifer (the groundwater supply) and proper management of recharge areas are critical criteria for development.

Along the terminal moraine in Denville, the Rockaway Valley areas have been delineated as important sites for groundwater recharge to the subsurface aquifers. The quantenary deposits in these areas are a principle source of potable water not only for Denville but its neighboring communities as well. These areas should be preserved to protect the future quantity and quality of groundwater resources.

1.5 Wildland and Wildlife Preservations

Unique and/or critical habitats should be prohibited from development. Areas containing habitat suitable for state-identified rare, threatened or endangered species should also be protected. Areas with diverse habitat able to accommodate a variety of naturally occurring species should be set aside as "green acres" or "wildlife corridors." Use of adjacent land or development density or configuration may need to be regulated to ensure little impact to these important areas.

2.0 Site Design Criteria

2.1 Site Configuration

Size and shape of the site must accommodate the physical layout of proposed land use. Design options increase with increases in size. It is essential to evaluate site suitability in light of potential housing arrangements.

- Site suitability for rural-urban development. Detached single family development on larger lots, onsite sewage and disposal (septic service), low density;

- Site suitability for suburban development. Detached single family development, medium size lots, city sewage, good site drainage;

- o Site suitability for clustered suburban development. Single family houses (attached), provide open space, city sewage° service required, works well with site amenities;

- o Site suitability for urban development. Foundations and heavier structures, and extensive paved areas, city sewage services required, accessibility need high.

2.2 Site Location

Proper location of high density housing within the suburban and rural fabric of Denville must be considered. Past trends of city growth should enhance the location of high density housing. Particular attention to movement of land use (i.e., residential housing) must be provided to evaluate site suitability. Location amid community services, such as mass transit, hospital services, schools, etc., must be evaluated to determine site suitability. Available utilities and possible need for right-of-way access provide extra concern for the proper location of high density housing.

3.0 Land Use Compatibility

3.1 Land Use

Contiguous properties must be studied in light of current land use to ensure compatible use of the proposed site.

- o Suitability of site for alternative land uses must be evaluated.

- o Impacts of alternative land uses shall be considered in light of adjacent property land uses.

- o Responsible practice must be developed for land uses - buffers to mitigate conflicting land uses.

3.2 Historic Resources

Caution must be taken to preserve the unique and significant historical community resources of both natural and built environments:

- o No alteration to sites or structures deemed of historical value except for restoration purposes;
- o No land uses which conflict with the use of those sites for historical purposes permitted in the immediate environs of these sites;
- o Ensure preservation of substantial tracts of hilltop land deemed of visual, environmental, and historical value.

3.3 Aesthetic Resources

Caution must be taken to preserve the aesthetic resources of Denville. Development sites will be evaluated in light of their impact, positive or negative, to Denville's character, visual resources, open space needs, and hillside preservation needs.

Town Character Criteria

- o Architectural Quality. Developments must convey aesthetic character that is compatible with the township as a whole, as well as adjacent properties.
- o Scale of Development. Developments must present a pattern and density of development that is compatible to the township and adjacent properties.

Visual Resources

- o Extended views. Developments must not approach or obstruct valuable vistas or extended views.

- o Developments must not alter existing wooded hillsides deemed of value by the township.

- o Developments must not disrupt scenic terrain of regional prominence.

- o Developments must not disrupt scenic terrain of local interest.

- o Developments must not obscure or disrupt views of water surfaces in Denville.

Open Space Needs

- o Developments should not disrupt space suitable for active and passive recreation.

- o Developments should not negatively impact or alter surface water resources.

- o Developments should consider open space areas where best compatible to adjacent property and township open space needs.

Hillside Preservation

- o Slopes exceeding 15 percent should remain vegetated to prevent soil erosion in developments of hillside settings and to preserve township hillsides.

- Hillsides identified as valuable to the township (visual resource) must be preserved, and developments must not encroach or disrupt the hillside character.

- Adjacent properties to hillside preserves should be carefully reviewed by the township in light of potential impact to aesthetic resources and environmental conservation.

C. CRITICAL INFRASTRUCTURE SYSTEMS

1.0 Water Supply

Development sites should have access to the existing public water supply system. The local municipal well field, water source, transmission, pumping, and storage facilities must be adequate to supply a sufficient quantity of good quality potable water. If the existing water system is incapable of meeting the expected demand, provision should be made to provide new transmission lines, pumping and storage facilities, municipal interconnections and/or additional water sources as required, while minimizing the costs and environmental impacts associated with construction activities. The water system must also be capable of supplying adequate water flow and pressure for fire protection needs.

2.0 Sanitary Sewage Disposal

Development sites should have access to the existing public sewer system. The capacity of local transmission lines, force mains, pump stations, trunk line, interceptor and RVRSA treatment facilities should be adequate to ensure that municipal sewage disposal and treatement can proceed efficiently and reliably without detriment to other system users or to the environment. If the existing sewage transmission facilities are inadequate for the increased flow, additional sewers, pumping facilities and system redundancy must be provided, while cost and the environmental impacts associated with construction activity are minimized.

If connection to public sewage treatment facilities is not feasible, package sewage treatment plant systems may be considered providing there is adequate available space, the plant can be operated reliably and efficiently without generating odors or other neighborhood disturbances, and that the treated effluent can be discharged without detriment to local surface

and groundwater resources. Onsite septic systems may also be considered provided that adequate area and suitable soil conditions exist, and if it is demonstrated that the sole source aquifer will not be contaminated.

3.0 Stormwater Drainage

Site development plans should include adequate drainage plans. The amount of stormwater runoff from the site should be calculated, and methods to convey stormwater from the site provided in order to:

- o avoid aggravation of local or downstream flooding or high water table conditions;
- o minimize the impact of non-point source pollution on surface water, groundwater and wetland areas;
- o minimize erosion; and
- o maximize groundwater recharge where possible.

Any increase in stormwater runoff should not exceed the capacity of downstream stormwater drainage facilities.

4.0 Traffic and Transportation

Development sites should have suitable egress and access to the local road system and principal arterials, such as Routes 46, 53 and 10, and West Hanover Avenue; and to public transportation systems. Local roadways and intersections should be capable of absorbing the increased vehicular and pedestrian traffic safely (without increasing the risk of accidents), and without serious congestion. The increased traffic should not disrupt existing residential areas, nor exceed the design capacity of local roads, intersections and bridges. Deficient intersections and roadway segments should be improved or avoided if adequate improvement is not feasible.

D. TOWNSHIP MASTER PLAN AND ZONING

1.0 Township Master Plan

New developments should consider recent Planning Board discussions and considerations concerning the update to the Denville Master Plan.

- Developments shall be considered with respect to Township Land Use Plan compatibility.

- Developments shall be considered with respect to community facilities and services.

- Developments shall be considered with respect to township distribution of residential dwelling units and population goals.

- Developments shall be considered with respect to township street plan development goals.

2.0 Township Zoning

New development should consider township zoning criteria and policies of the Denville Township Master Plan.

- Developments shall be considered with respect to adjacent property zoning criteria for compatibility.

- Developments shall be considered with respect to township zoning criteria and city wide zoning patterns for assessment of compatibility.

- Developments shall be considered with respect to variance requirements and easements.

- Impact to zoning classification changes shall be considered on adjacent properties and for the township as a whole.

E. OTHER PLANNING CRITERIA

1.0 Morris County Master Plan

Development areas should consider the most recent elements of the Morris County Master Plan, which delineate certain land use goals and policies. Site suitability shall be evaluated in light of county policies and planning criteria.

- Developments shall be considered with respect to county land use plan compatibility.
- Developments shall be considered with respect to county facilities and services.
- Developments shall be considered with respect to county population distribution goals.

2.0 State Development Guide Plan

New developments should be located within areas designated "growth area," on the State Development Guide Plan. (The current State Development Guide Plan identifies all of Denville, except the northeastern corner, as a "growth area.") Site suitability shall be evaluated in light of state policies and planning criteria.

- Developments shall be considered with respect to population distribution and population growth.
- Developments shall be considered with respect to housing needs and criteria.

- Developments shall be considered with respect to natural resources and conservation areas.

- Developments shall be considered with respect to agricultural areas and designated Prime Agricultural Areas.

F. TOWNSHIP ENVIRONMENTAL SUITABILITY FOR DEVELOPMENT

The natural environment of Denville Township, as is true for any place, is a complex system of interrelated components. The natural system and its components have been identified by the Township in their comprehensive plan and their natural resources inventory. Each component or element of the natural environment adds to the balance of the system. A change (whether natural or human) to one element of the system may effect the workings of other elements. For example, diverting the flow of a stream will change the habitat and ecology of the area of the old stream channel and that of the new channel.

When planning for development, or a change to the natural environment, the interdependencies and relationships amoog the components of the environment must be kept in mind so as not to impact an adjacent habitat or disrupt the natural system.

The previously described environmental criteria are those which have been found to be critical in protecting and conserving the integrity of Denville Township's natural environment. The following discussion evaluates the development constraints as they relate to the natural environment. Although a portion of a potential development site may preclude development, adjacent areas of the parcel may be suitable for development. In order to protect and conserve these critical areas, development of the adjacent suitable areas may be limited or restricted in some way, such as by maintaining a buffer between the critical area and the development, restricting the density of development, or restricting the type of drainage system and septic system.

Any development proposal must demonstrate that it is an environmentally sensitive development approach that avoids or satisfactorily mitigates adverse environmental impacts, minimizes use of limited land resources and conserves and enhances natural land form, vegetation, and other existing natural features.

1.0 ENVIRONMENTAL PARAMETERS

1.1 Geology, Topography and Soils

The bedrock geology of Denville Township is important to site development as the depth to bedrock reflects the thickness of the overlying soil, the surface resistance to excavation, the feasibility of onsite septic systems and the hydrologic characteristics for potable water. Bedrock is most often nearest the surface in areas of steep slope and deepest in flat valley bottoms. The ease of excavation usually decreases with depth increasing the cost of development. A shallow depth to bedrock often eliminates the use of an onsite septic system to protect the public health. Aquifers in bedrock tend to be thin with low storage capacity and transmissibility. Those areas of the Township where depth to bedrock is at 0 to 6 feet are areas where development should be limited. These areas typically have a steep slope and should not be developed (see discussion on Steep Slope).

Topography

The land surface in Denville ranges from rugged, irregular, hilly terrain to rolling hills that often have flat tops. Ridgelines seem to align along a northeasterly axis. Glacial valleys, "U" shaped are found between the ridges. Land forms generally do not exceed 800 feet above mean sea level except in a few locations in the southern part of the township where elevations reach 1000 feet above mean sea level.

The topography is an indicator of soil cover over bedrock. Steep slopes tend to have a thin soil layer and valley bottoms have a thick soil layer.

Those areas of the township with slopes of 25 percent and over and 15 percent to 25 percent have been identified by the Township in their natural resources inventory. Those areas with slopes exceeding 25 percent should be restricted from development. Those areas with slopes less than 25 percent but not less than 15 percent should have limited development.

As slopes increase, the necessity exists for massive cut and fill grading, operations associated with maintaining maximum grades. Where vegetation is removed and drainage patterns altered there can be problems with slope stability. These issues become most evident as slopes exceed 12 percent as stated in the Denville Comprehensive Plan. In areas highly susceptible to erosion the potential exists for sediment produced with land development that may overload the natural stream transport capacity and result in flooding and damage to the existing biota associated with the water courses.

Areas with slopes greater than 25 percent are extremely susceptible to erosion, soil creep (gradual downslope movement of soil) and potential massive sliding. These areas should not be developed not only for environmental conservation reasons but for personal safety and protection of property.

In terms of implementing the steep slopes criterion, provisions have been enacted by Denville to relate intensity of development to the limitations imposed by topographic conditions, and to do so in a manner that respects natural features and scenic values of a site and adjoining areas. The level of development should be consistent with the level of services that can reasonably be provided in hill areas, and adverse physical phenomena, such as excessive erosion flooding and landsliding, should be advoided.

To protect against slope-related development impacts, the minimum required land area per dwelling unit is, by ordinance, related to the natural topography of the site in accordance with the following table. Percent slope is determined by dividing the change in elevation between contours by the horizontal distance between the respective contours.

TABLE

Percent Slope	Land Area Required per Dwelling Unit
0 - 14 percent	Underlying zoning applies.
15 - 24 percent	Twice the underlying zoning land area per dwelling unit
Greater than 25 percent	No development permitted.

The method for computing the permitted level of development of a site would be to divide the site into the slope bands identified above and tabulate the land area in square feet by each slope category. The land areas in each category are then divided by the land area required per dwelling unit for each category to obtain the total number of dwelling units. Mapping of these slope categories has previously been done township-wide at 5-foot contour intervals.

Where it can be demonstrated that sound site development consistent with the Township Master Plan can be achieved by means of innovative design and development solutions, an increase in the total allowable number of development units up to some percent might be permitted. The following are the types of conditions under which an increase in density might be granted.

A. All or a major portion of required parking is included within residential structures and results in a substantial decrease in the total land area devoted to structures and paved surfaces.

B. Auxiliary transportation modes are used either to reduce the total land area devoted to structures and paved surfaces or to preserve areas of special open space value.

C. Structural systems are employed for residential building which both reduce the land area to be altered from a natural state and preserve the overall natural appearance and scale of the area.

D. Where an increase in dwelling units can be accommodated because of specific topographical conditions of the site, without increasing the total land coverage or requiring grading in excess of that which would be normal for a development of the size determined by the initial calculation of permitted density.

E. An increase in the allowable density would permit construction of housing units of a type or price which would help provide a greater number of affordable housing units in the township.

Soils

Generally, the soils of Denville Township may be divided into four broad soil associations. A soil association, according to the USDA Soil Conservation Service, Soil Survey for Morris County, New Jersey, August, 1976, is a "landscape that has a distinctive proportion pattern of soils." The association contains one or more major soils and at least one minor soil. The soil associations give a general idea of the soils and their suitability for use. For specific development sites the individual soil types must be referred to for suitable uses and restrictions. Soil areas that have been identified as limited for use as septic fields because of poor permeability are shown on the map. These areas have been identified by the Township in their comprehensive plan and natural resources inventory.

The four soil associations are the Rockaway-Hibernia-Urban land association, the Netcong-Rockaway association, Riverhead-Urban land-Pompton association and the Parker-Edneyville association.

According to the Soil Survey for Morris County, New Jersey, the Rockaway-Hibernia-Urban land association is characterized by "deep, well drained to somewhat poorly drained, gently sloping to steep gravelly sandy loams and stony to extremely stony loams and sandy loams that overlie granitic gneiss; on uplands."

Rockaway soils are found on upland areas and are gently sloping to steep. The soils are well drained to moderately well drained. Hibernia soils are found in depressions and drainageways and also at the base of steep slopes. They are gently sloping to steep and generally poor drained. The original soil profile of the Urban land has been changed or covered during construction to the extent that it can no longer be recognized. The depth to bedrock for the soil association is 4 to 10 feet. Rock outcrops are present in a few areas. This soil association is found in the northern section of the township.

Because of the steep slopes, stoniness, and slow permeability, this soil association is poorly suited to farming and most community development. It is well suited to open space and recreation.

According to the SCS, the Netcong-Rockaway association is characterized by "deep, well drained and moderately well drained, gently sloping to very steep gravelly, very stony and extremely stony sandy loams that overlie granitic gneiss; on uplands." This association makes up the center and southern portion of the township.

Netcong soils are generally found on rolling upland and are gently to strongly sloping and well drained. Rockaway soils are found in upland areas. They are gently sloping to very steep and are well to moderately well drained.

The soils in this association are delineated by very steep slopes, many stony to extremely stony areas, and seasonal seepage on top of the more slowly premeable subsoils. Bedrock is generally below 10 feet.

Those areas that do not have steep, stony, or wet soils are considered suited for farming, community development, open space and wildlife habitat. Open space, wildlife habitat or low-intensity recreation uses are better suited for areas with steep, stony or wet soils.

The Riverhead-Urban land-Pompton association is characterized by "deep well-drained to somewhat poorly drained, mearly level to strongly sloping gravelly sandy loams and sandy loams that overlie stratified outwash sand and gravel; on outwash plains and terraces." This association is concentrated along the major waterways of the township.

The areas of urban land within this association have been cut, filled or distributed during construction. Most of these areas are covered with buildings and pavement. Most of the soils in the remaining open spaces have been disturbed to the extent that the original profile no longer exists.

According to the SCS, this association is limited for farming and community development because of inadequate drainage in low areas, the hazard of erosion on sloping soils, and coarse texture. Onsite disposal of septic tank effluent is severely limited for wet areas and for coarse-textured soils. Many of the soils in this association have been rated as prime farmland by the SCS.

The Parker-Edneyville association is characterized by "deep, excessively drained and well drained, steep to very steep very gravelly sandy loams, gravelly loams, and extremely stony sandy loams that overlie granitic gneiss; on uplands." This association is found in the southern tip of the township.

Parker and Edneyville soils are found on the top and sides of ridges. The Parker soils are generally steep to very steep, are excessively drained and very gravelly. The Edneyville soils are steep and well drained. Bedrock is found as shallow as 4 feet but is typically more than 10 feet deep.

The soils in the association, according to the SCS are limited by steep to very steep slopes, stoniness and rock outcrops. This association has been found to be unsuitable for farming activities and is severly limited for intensive development. It has been found suitable for open-space activities and for the protection of the watershed. Most areas of the association are woodland.

1.2 Floodplains

The 100-year floodplain, as designated by the Flood Insurance Rate Map issued by the Federal Emergency Management Agency (FEMA) on April 17, 1985, should be restricted from development activities. Floodplain areas absorb the excess water that cannot be accommodated by the water course affording protection against flood damage to adjacent lands and siltation from eroded lands upstream.

Development within the township has extended into the Rockaway River Valley, encroaching upon the floodplains. With the additional development has come an increase in damage as a result of seasonal flooding.

Flooding along the Rockaway River occurs virtually throughout the entire length of the waterway within Denville Township with the greatest damage occurring along the area of Riverside Drive and the river-front properties in the area of Diamond Spring Road Bridge (FEMA, October 17, 1984). Flooding along Beaver Brook has not caused extensive damage as the low-lying area is presently undeveloped.

Flooding associated with Den Brook occurs along the shoreline of Lake Estling and Indian Lake. Additional damages have also occured along Peck Meadow Brook and Woodland Avenue. U.S. Route 46 and Denville Center have been inundated on occasions when both Den Brook and the Rockaway River experience flooding (FEMA, October 17, 1984).

1.3 Wetlands

Areas designated as wetlands by the U.S. Fish and Wildlife Service on the National Wetlands Inventory maps should be restricted from development. Development of these lands is regulated by the U.S. Corps of Engineers. A permit to fill or dredge these lands must be filed and approval must be granted prior to any work done.

Development surrounding the designated wetlands should be carefully reviewed to insure the wetland is not adversely impacted by the activities on adjacent lands.

The control of runoff and sediment is vital in protecting the integrity of the wetland area.

1.4 Aquifer Recharge Zones

In Denville Township, prime aquifer zones occur in "buried valleys". As reported in the "Water Resource Study of the Rockaway Valley" these thick zones of saturated sand and gravels occupy relatively narrow channels in bedrock--these channels underlie present river valleys. In Denville the principal stream valleys involved are the Rockaway River and Beaver Brook. However, it should be noted that recharge is not limited to the river valleys, but occurs over entire watershed areas. Thus, contamination in upland areas can degrade groundwater quality. In other words, development in all parts of the township is constrained to some degree by the need for aquifer protection.

One feasible mechanism for protecting Denville's critical groundwater resources would be an overlay zoning district of the type recommended in the Geonics water resources study of Rockaway Valley. As envisioned in the Geonics report this ground water resource protection district would overlay existing zoning in Denville and would include the valley floors and adja-

cent slopes within a 1,000-foot buffer zone. There would be two zones in the overlay district : 1) a "Prime Aquifer Zone" which would include the area immediately over the Rockaway River channel and a 600-foot radius buffer zone around each township municipal water supply well: and 2) a "Zone of Immediate Recharge" containing area outside the "Prime Aquifer Zone".

To protect groundwater resources, all development would be discouraged, but not prohibited, in the "Prime Aquifer Zone". One exception is industrial development which should be prohibited. In the "Zone of Immediate Recharge", residental and commercial development would be permitted subject to the following conditions: 1) private wells and onsite sewage disposal should be carefully regulated; 2) filling of lowland areas and storage of chemicals and petroleum products should be prohibited; and 3) cluster development and maintenance of large open spaces should be encouraged in the "Zone of Immediate Recharge". In considering development proposals in the "Zone of Immediate Recharge", a key finding would be no net negative impact on ground water quality and quantity.

Alternatively, the delineation by USEPA of an aquifer recharge zone for the Unconsolidated Quaternary Aquifer of the Rockaway River could be used as a basic identification of areas sensitive to development-induced groundwater contamination.

1.5 Wildland and Wildlife Preservation

According to the Natural Resources Inventory (NRI) for Denville Township (June 1976), there are five major habitat types in the township: (1) wetlands (marshes, bogs and swamps), (2) mesic upland wooded habitat, (3) open land, (4) urban/residential, and (5) lakes and streams. Species common to Denville Township or known to occur in the township are identified within the NRI document. Some species known to appear in Denville Township have been identified by the State of New Jersey as rare, threatened or endangered species. The habitats of these species must be protected to help insure the survival of the few remaining individuals of the species.

2.0 SITE DESIGN CRITERIA

2.1 Site Configuration

The physical layout of a development must accommodate the dimensions of the selected site. Design options increase rapidly as a site increases in size. The larger the site the greater the amount of potential useable and unuseable land that may be incorporated into the development concept. Site shapes exhibit infinite variety. Regardless of dimension and despite unusual slope, site potential can be maximized be skillful site planning. It is essential to evaulate site configuration in light of potential housing arrangements.

An inventory of vacant land has been mapped for Denville. Vacant parcels are assessed in light of site configuration and acreage. The development potential of parcels exceeding 50 acres are considered to have the highest flexibility, parcels between 10 and 50 acres are given next highest potential, and parcels under 10 acres are classified as minimal potential in light of housing flexibility.

2.2 Housing Suitability

Potential housing suitability is identified in four types related to the intensity of development; rural-urban, suburban, clustered suburban and urban. Rural-urban refers to detached single family development on large lots, larger than an acre, with onsite sewage disposal through means of a septic tank. Suburban refers to the most common subdivision type of development. Density may vary from one unit on less than one acre to 6 units per acre. At lower density, septic tanks may be an option, otherwise such a development is usually sewered. Clustered suburban is similar in overall density to the suburban type, but it is assumed this type of development can be clustered at higher densities, leaving some areas open. Urban includes all types which entail greater ground coverage than the

suburban type, and includes institutional, small commercial and light industrial development. These four housing types and their criteria for development are discussed as they relate to the vacant land in Denville Township.

- o Rural-Urban Development

  The suitability for this type of development is possible in Denville, the only restriction being the limited availability of areas over which septic tanks can be located. In terms of location and desirability, this type is generally compatible with factors like vegetative and wildlife resources, open space resources, historic and visual resources, and steep and excessive slope limitations; and generally incompatible within specific limits of geology, topography and soils.

- o Suburban Development

  Suburban development is suitable in areas of good site drainage because the higher degree of ground coverage will result in less opportunity for improving existing drainage by grading. The most suitable areas for suburban development are restricted in Denville to moderately sloping hillsides. This type of development should avoid hilltops, and riparian lowlands because of its uniformly disbursed extensive coverage. This development type is incompatible with most scenic locations (vegetative/wildlife resources, open space resources, historic and visual resources, steep and excessive slope resources), for these resources would be adversely affected, if not all together eliminated, with suburban development. From a locational point of view, its suitability is low and restricted to some tolerant areas along moderate slopes and rolling lowlands throughout the Denville basin.

- Clustered Suburban Development

  The suitability for this type of development is more extensive than suitability for suburban development in Denville. Clustered type of development differs from the suburban type as it requires more paved surfaces within the clusters, can more easily adapt to sloping terrain (15 to 25 percent), and encourages leaving larger open areas to alternative land uses. Clustered housing arrangements are compatible with all slopes less than 25 percent, open space resources, wildlife, and vegetative resources, historic and visual resources, and generally incompatible with floodplains, and site specific limits of geology and soil.

- Urban Development

  Urban development necessitates foundations for heavier structures and extensive paved areas. Its suitability is limited in Denville, being restricted to lands over geologic formations suited to support heavier structures and moderately sloping to flat areas for large paved surfaces.

2.3 Site Location

Proper location of housing developments within the suburban and rural fabric of Denville must be considered. Vacant land has been mapped for Denville Township, from which location potential with respect to site accessibility, available utilities, and past trends of township growth is used to develop a gradation of good, fair, or poor site potential.

Accessiblity is a factor essential to a site's development potential. Highway access and transportation facilities to places of employment, the central business district, shopping centers, schools, churches, and

recreation places are primary considerations for site development potential. Accessibility takes two forms, vehicular and pedestrian. With respect to pedestrian accessibility, nearly all of Denville's developable parcels are poorly located. Lack of adequate bikeways, greenways, and park links are the main cause. In regard to vehicular transportation, many of Denville's developable parcels are well lcoated. While proximity to places of employment is not always necessary or desirable, good access by both public and private transportation will add to site potential. Low-income housing needs differ with respect to location, from those of middle and high income housing. If low income housing is proposed, a site within walking distance of employment centers is ideal. If the site lacks public transit and is over a mile in walking distance from employment or shopping, then it may be poorly located for low income housing needs.

Available utilities present limits and constraints for site development potential. Infrastructure analysis will provide necessary and relevant information to assess vacant parcels with regard to utility sources.

3.0 LAND USE COMPATIBILTY

3.1 Land Use

Existing land use has been mapped by Denville Township; both vacant and occupied properties. Vacant parcels are of particular interest when assessing developmet potential and when excluding rehabilitative measures for alternative land uses. Site potential with respect to alternative land use has been assessed for vacant properties in Denville Township, and is presented in a nominal order of good, fair, or poor development potential.

- Site development is feasible when the impact of any change of existing land use does not lessen the inherent natural or cultural resources of the property.

The nature and intensity of parcels adjacent to vacant properties must be assessed to determine compatability with any change in land use.

- o Site development is feasible when the impact or any change of existing land use does not create "spill-over" effects to lessen the inherent natural or cultural resources of the adjacent properties.

Site suitability for residential land use must be assessed to determine site development potential. Desirable factors for residential land use are: parcels adjacent to public open space, cultural, and community facilities (parks, schools), and compatible economic and social character of surrounding properties. Undesirable factors for residential land use are uses incompatible with residential development such as railroad tracks, run-down commercial development, and noxious industrial uses. Proximity to the adverse effects of traffic and large storage tanks of gas, oil, or water are also undesirable factors of site potential.

- o Residential development is feasible when desirable factors outweigh undesirable factors.

- o When non-compatible uses abut areas being considered for residential use, buffering, berming, and other forms of screening can substantially reduce adverse impacts.

The size, condition, appearance, and precise nature of conflicting land uses need to be fully presented by the developer to the Denville Planning Board for critical evaluation of land use compatability. A wide gradation exists between potentially noncompatible uses; some can be accommodated while others cannot be avoided. In general, compatibility can be measured by the degree to which adjacent uses detract from residential environments, and are reflected in the classification of site potential for residential use.

3.2 Historic Resources

The specific goals and objectives of Denville Township's Master Planning endeavors calls for Denville to preserve the township's historical sites. Caution must be taken to preserve the unique and significant historical resources of both the natural and built environments.

- o No alteration to sites or structures deemed of historical value except for restoration purposes.
- o No alteration to natural features deemed of historical significance except for preservation purposes.
- o No land uses which conflict with the use of these sites for historical purposes permitted in the immediate environs of these sites.

At present the Denville Township Historical Society refers to three specific historical resources of the built environment. All sites are located in the urban fabric of Denville's central business district (Peer's Store, St. Francis Health Resort, and the Denville Railroad Station). Structures recognized by Morris County Master Plan endeavors (Historic Preservation Element) are the Morris Canal - Fork #8, and the Ebeling House located near the southwest township border on Openaki Road. Impact to these sites by proposed development must be assessed to ensure proper preservation. All of these structures are mapped on the Historical Resources Inventory.

Historical resources of the natural environment are extensive in Denville Township. Denville's earliest developments arose as resorts and summer cottages of New York City vacationers. It is because of Denville's abundant natural resources, specifically hills and lakes, that Denville began to develop. Due to Denville's earliest beginnings, all lakes in Denville Township are considered a historical natural resource. Rock Ridge, Indian

Lake, Cooks Pond, Laurel Lake, and Lake Arrowhead are designated on the Historical Resources Inventory map, and are to be preserved without alteration.

Hilltops in Denville have names like Beacon Hill, Snake Hill, and Union Hill. Due to their eminent attraction to resort seekers and cottage dwellers, these hilltops are considered a natural historical resource to the Township of Denville, for they are closely associated with Denville's earliest beginings.

Vegetative resources of historical value are delineated on the Historical Resources Inventory Map. Federal and State designated wetlands present sensitive ecological communities of both vegetal and wildlife value. Many threatened and endangered species habitat in the environs, and thus the State of New Jersey prohibits development of any designated wetland properties.

3.3 Aesthetic Resources

Visual Resources

In the diversity of its visual environments, Denville is unique to its county neighbors. Dramatic lakefront views, wooded, rugged hills, ambling creeks, pastoral landscapes, and tight-knit zones of rural, suburban, urban and industrial character are visually intensified by their juxtaposition to the natural environs. It is the strength and relatively undisturbed quality of the natural features of the setting which give the environment shape and form the basis for a potentially unique image of high quality for the Denville environs.

Analysis of the major travel corridors has been correlated with the analysis of features significant to the Township of Denville. Dominant hilltops and ridgelines have been identified and correlated with the topographic

map. Four categories of analysis are mapped: major scenic routes, visually significant hilltops and ridges, visually significant hillsides, and visually significant skyline vegetation.

- o Major travel corridors are important to the Denville image. The appreciation of a traveler for the area is generated by the quality and character of the area traveled.

- o Visually significant hilltops and ridges, defined as topographic features that dominate the visual field from both near and far views, are to be identified and mapped. The uninterrupted profile of these hills and ridge tops is recognized as a critical feature. Conflicts are most noticeable where housing developments disrupt this continuity when sited on these dominant profile lines, rather than in subordinate locations. (i.e., along the military crest).

- o A significant feature associated with the above is the presence of skyline trees. These are noted as trees which are congruent with hilltop and ridge areas and which serve to heighten and complement the topography.

Within the local environment of Denville, these features take on increased significance. Key hilltops become dominant focal points within local streets and neighborhoods. Within the central business district and along Routes 46, 10, and 80, the steep sides of the hills tend to dominate and condition the near and far visual fields by their encompassing presence. The vegetation along these hillsides and hilltops has unusual visual strength.

Significantly, in many areas the visual impact of natural vegetation is extended and carried through developed areas by boulevard trees. Mature trees in the older lakeside neighborhoods have this effect.

Open Space Needs

Available open space in Denville Township is best delineated by Denville's vacant land inventory. Caution must be taken to preserve the open space resources of Denville. Current Township Master Plan endeavors indicate Denville's need to evaluate and expand the existing recreational facilities and to provide for new facilities where appropriate. Percentage of land used for public/semi-public needs amounts to 10.4 percent of total land available in 1975, and 10.5 percent of total land available in 1981, representing a 0.1 percent increases in public open space over a 6 year period. It is Denville's responsibility to meet current and future open space needs. Existing parks have been expanded, however, additional land must be acquired through an active land acquisition program as directed by the Planning Board of Denville. Denville must work toward a reasonable ratio of population distribution to open space resources in order to provide public space of unique quality for the Denville environs.

- Development should not disrupt space suitable for active and passive recreation.
- Developments should consider open space areas where best compatible with adjacent property and township open space needs.

Township open space needs will be met by assessment of site suitability for recreational use. Vacant land has been mapped and is assessed in light of this specific criteron. Desirable locations for recreational use encompass water related sites (stream and lake), sites for specific interest (hilltops, hillsides, historical significance), vegetative or wildlife interest.

Four recreation types are considered for suitability identification. These are; intensive recreation, general recreation, natural recreation, and cultural/historical recreation. "Intensive" includes all forms of recreation requiring some preparation of ground forms. These include activities

like field, court, and track sports. Denville has developed some intensive recreation resources within the public school system. Critical requirements for intensive forms of recreation include generally flat land with good drainage. Flat land is not extensive in Denville Township. "General" recreation refers to park or camp type use which includes some intensive type use. The "natural recreation" type covers reservations which are predominantly in their natural state with their recreation use limited to passive activities. The "cultural historical recreation" type includes those areas where cultural and/or historical resources exist for use as educational and passive recreation. A subcategory of water-related recreation can be identified as occurring in any of the four recreation types.

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5. Community Services

a. Introduction

Denville Township's police and fire departments and its recreational and educational facilities are barely adequate to service the present population of approximately 14,500. The current Denville Master Plan and recent Planning Board discussions on updating the Master Plan are both based on an ultimate population of about 20,000. However, if established principles of municipal master planning are disregarded and the Township is required to accept extensive high density development, Denville's population will quickly rise far beyond 20,000.

For example: the court has ruled that Denville's fair share of Mount Laurel housing is 883 units. Assuming that, contrary to the compliance program proposed by the Township (see Chapter II), Denville is required to provide 700 of these units through 20% set-aside within market rate developments and is allowed credit for only 51 units through rehabilitation of existing units (the court's number) and only the remaining 132 units through other mechanisms such as senior citizen housing and accessory conversion. The total number of new housing units would be 5 X 700, or 3,500, plus 132 for a total of 3,632 units. Site plans for potential Mount Laurel developments in Denville indicate that of the 3,500 units subject to set-aside, about one sixth would have one bedroom, about one half would have two bedrooms and the remaining third would have three bedrooms. The majority of the 132 units provided through other means would be one bedroom units. An extensive study of housing in New Jersey conducted by the Center for Urban Policy Research of Rutgers University (Sternlieb, 1974) indicates that 3,632 units of this type and bedroom distribution would contain a population of approximately 9,900, which would bring Denville's population to over 24,000. This is far in excess of the ultimate population planned for by the township, county and regional agency, all of which could be reached in relatively few years if an aggressive program of development is imposed on the Township.

Such population growth would overwhelm Denville's existing community services. Problems in specific areas are discussed in the sections that follow.

b. Public Schools

Based on data in the Rutgers study referred to above, it is estimated that high density developments of the kind proposed for Denville will generate about 34 public school students for every 100 dwelling units. The 3,500 units required to produce 700 Mount Laurel units at 20% set-aside would therefore contribute approximately 1,200 new students to the public school system. Of these, about 240 would be the responsibility of the Morris Hills Regional High School District and about 960 would attend Denville Township public schools.

Denville Township School District

The Denville Township School District includes two schools serving grades K-6 and one for grades 7-8. Total enrollment as of June 1984 was 1,410. The addition of 960 students would bring this total to 2,370, exceeding the combined functional capacity of these schools, which is 1,997. A new school would have to be constructed.

According to the Denville Township School District Educational Facilities Master Plan, the pupil/teacher ratio in the District is 14 to 1 and the average class size is 21. To maintain the present ratio and class size while absorbing 960 new students, the District would have to hire 69 new teachers.

Denville would incur substantial additional expenses for educational materials and for busing. The need for additional busing would be particularly great if the Township were required to meet its Mount Laurel obligation through builder's remedies. In keeping with sound planning

principles, the existing schools are located near concentrations of population, reducing the need for busing. In contrast, several of the projects proposed by the potential Mount Laurel developers are in remote areas of the Township, far from any of the three schools in the Denville District. It follows that the proposed developments and developments on other vacant tracts around the Township would disproportionately add to the demand for busing in Denville. While 3,500 new units would increase the number of students by about 68%, it could more than double the need for busing.

Increased busing, in turn, would add to Denville's already severe traffic problems. Because traffic must stop when school buses are picking up or discharging passengers, the impact of busing on traffic flow is considerable. The problem can be severe in areas such as the outlying sections of Denville where narrow, winding roads make it very difficult for motorists to pass school buses between stops. In these sections of the Township Mount Laurel development would not be suitable.

Morris Hills Regional High School District

The Morris Hills Regional High School District (MHRHSD) contains two schools serving grades 9-12. These schools draw students from Rockaway Borough, Rockaway Township, Wharton Borough and Denville Township. At present, all of Denville's public high school students attend one school, Morris Knolls Regional High School, which is located off Franklin Avenue in Denville. This school also serves over 90% of Rockaway Township.

The combined current enrollment in the MHRHSD is about 3,000 students. The MHRHSD Educational Facilities Master Plan recommends a combined functional capacity of 3,100 to avoid overcrowding and provide adequate programsupport space. Construction of 3,500 new townhouses and garden apartments in Denville would generate about 240 new high school students. This number alone would push enrollment above the recommended functional capacity, but Denville is not alone in the District. Wharton Borough, Rockaway Borough

and Rockaway Township also have Mount Laurel obligations to meet; and all of both boroughs and a large section of Rockaway Township are within a growth area designated by the State Development Guide Plan, as is almost all of Denville. This means that all four municipalities must provide a share of the regional need for low and moderate income housing as determined by the court. Mount Laurel development will bring additional high school students into each municipality. This may necessitate construction of a third high school somewhere in the District. Denville Township would have to pay a significant portion of the cost of any new facility.

The impact of such a massive influx of new students could not be adequately handled by the township and would place all students, both new and existing, at a substantial educational disadvantage.

c. Police

According to Police Chief Howard C. Shaw, the Denville Township Police Department is currently understaffed. The Department consists of 28 officers, 4 dispatchers and 3 clerical workers to cover 12.6 square miles and about 4500 residences. According to Chief Shaw the Department should have at least 32 officers but cannot hire additional personnel due to budget restrictions.

For policing purposes, the Township is divided into three districts. Normally, a patrol car or two is assigned to each district 24 hours a day. However, there are times when so many officers are tied up in municipal court proceedings that a district cannot be covered at all. Adequate adjustments cannot be made because overtime pay is largely ruled out by the limited budget. If an emergency call is received from an uncovered district the response must come from police headquarters rather than from within that district. Response time can be as long as ten minutes.

The Denville Police must patrol Routes 10, 46 and 53 and assist the State Police on Interstate 80. Chief Shaw notes that at least five cars should be assigned to traffic enforcement 16 to 17 hours a day, more than triple the current allocation of manpower and equipment for that purpose. This cannot be done under current conditions because the available officers are kept busy by an increasing number of other reported and observed events requiring police response. In 1983 the Denville Police Department responded to 16,900 "incidents"; in 1984 the number was 21,167.

The department estimates that if the population of Denville increased by two thirds, as in the Mount Laurel scenario outlined in the introduction to this section, they would need two thirds more police officers just to maintain the minimum level of protection that is possible under present budgetary constraints. That means 18 or 19 new officers for minimum protection. To provide adequate protection about 25 new officers would be needed. In addition, more patrol cars, office space, and clerical personnel would be required.

It should be noted that even the current level of police protection cannot be taken for granted. The Denville Township Police Department exceeded its budget before the end of the last fiscal year and expects to exceed it again, and earlier, this year.

The influx of population projected under the Mount Laurel II builder's remedy scenario would leave Denville without adequate police protection.

d. Fire Department and First Aid Squad

The Denville Township Volunteer Fire Department and First Aid Squad is an all-volunteer organization with 90 members. The Department maintains three stations: the Main Street Firehouse in the Central Business District, the Union Hill Firehouse on Franklin Road off Route 10 (southwestern Denville), and a station on River Road just off Diamond Spring Road in the northeastern

section of the Township. Equipment includes three 1,500 gallon per minute pumpers, one 1,250 gallon per minute pumper, one 75-foot snorkel, a rescue vehicle and three ambulances, one of which is substandard according to Fire Chief Henry Hammond. Replacement of the substandard ambulance has been delayed for lack of funds.

During daytime hours Monday through Friday, Fire Department members are scattered over a large geographical area at their regular places of employment. Chief Hammond reports that fire alarms at those times are generally answered by only five to eight members, the average response being closer to five than to eight. Because of the lack of personnel at other stations, daytime response on workdays must come from the Main Street Firehouse. This station is far from the outlying sections of Denville, especially the southernmost parts of the Township. Response time is already dangerously long, and the traffic congestion that accompanies the projected population growth will make it even longer.

Development of high density housing in outlying sections of Denville would clearly increase the potential for a major fire disaster. Under current conditions, the typical residential fire involves a single, detached dwelling unit occupied by two to five people. In a Mount Laurel development a typical fire would involve or immediately threaten six to sixteen attached units occupied by fifteen to fifty people.

The potential for disastrous fires and the traffic congestion generated by extensive high density development could force Denville to establish a full-time, paid fire department and first aid squad to ensure that a full response could be mounted from any of the three fire houses. Each station would have to be fully manned and equipped around the clock. The cost to the Township would be enormous, in terms of both taxes and dramatically increased fire insurance premiums.

e. Public Recreational Space

Denville does not have enough public recreational space to adequately serve the needs of its present population. Children and adults have trouble finding space for outdoor team sports, and the four public tennis courts fall far short of meeting the demand. There is no public golf course within the Township. Denville has one small public lake in the northeastern corner of the Township and no public swimming pool.

New Jersey Department of Environmental Protection (NJDEP) guidelines recommend that at least 3% of a municipality's developed and developable land be set aside as public open space by the municipality, and that at least 7% of each county's developed and developable land be set aside as public open space by the county. The municipality's share and the county's share are not to overlap; municipal and county open space should total at least 10% of the developed and developable land in the county. Undevelopable land is excluded from this formula because it tends to be inaccessible to the people who need recreational space.

Based on Denville's Master Plan Community Facilities Inventory and topographical mapping of the Township, it is estimated that only about 2.5% of Denville's developed and developable land is available to the general public for recreational use. At the county level the open space supply is even more deficient in relation to the state guideline. Data supplied by the Morris County Parks Commission shows that the Morris County park system contains only 2.8% of the total land area of the county. Within Denville, only about 3.0% of the developed and developable land is county-owned recreational space. This is less than half of the 7% recommended by the NJDEP.

Both Denville and Morris County need to acquire more developable land within the Township to add to their park systems. A significant increase in population would make this need more acute and would also make it more

difficult and expensive to satisfy. Land prices are already high but will climb much higher as the supply of vacant land is depleted. Denville Township and Morris County should therefore fill out their park systems before extensive new development takes place. This will not be possible if the Township and the County are forced to apply their limited resources to accommodating rapid implementation of the Mount Laurel mandate.

6. Fiscal Impact

As indicated by the discussion in sections 4 and 5 above, Denville Township would have to expand its infrastructure systems and its community services to accommodate any significant increase in population. Denville could not accommodate the large influx of residents that would accompany extensive use of the Mount Laurel builder's remedy without a thorough expansion and upgrading of the Township's systems and services. This would cause an extensive drain on the township's fiscal resources.

Only part of the off-site costs caused by new development could be collected from developers; the balance would have to be raised by Denville. The only practical way for a municipality to raise the large sums that would be required is through the issuance of bonds. Sale of municipal bonds creates municipal debt, and municipal debt is limited by state law.

As of October 22, 1984, Denville's debt limit as reported by Township Director of Finance Patrick W. Bailey was $16,028,374.07 and its net municipal debt was $3,266,847.08. Available municipal debt was therefore $16,028,374.07 minus $3,266,847.08, or $12,761.526.99. Twelve million dollars would not cover the Township's expenses in providing the additional infrastructure and services that would be necessitated by extensive Mount Laurel-related development. However, it would be sufficient to increase Denville's debt service costs, currently less than 9% of the municipal budget, to about 30% of the budget. Mr. Bailey has advised the Township that debt service generally should not exceed 20% of the budget.

Furthermore, it is doubtful that Denville could sell another twelve million dollars in bonds even if the Township wished to take on the additional debt. The general obligation bonds issued by Denville in February 1983 were rated A1 by Moody's Investors Service and A by Standard and Poor's,

several steps below the highest rating, AAA. Because bond ratings reflect a municipality's ability to repay its debt, the rating tends to go down as the debt rises. Should Denville attempt to increase its municipal debt several-fold through bond sales, it is clear that the rating of the Township's bonds would fall low enough to make them very difficult to sell. Failure to sell the bonds would make it impossible for Denville to improve its infrastructure and expand its community services.

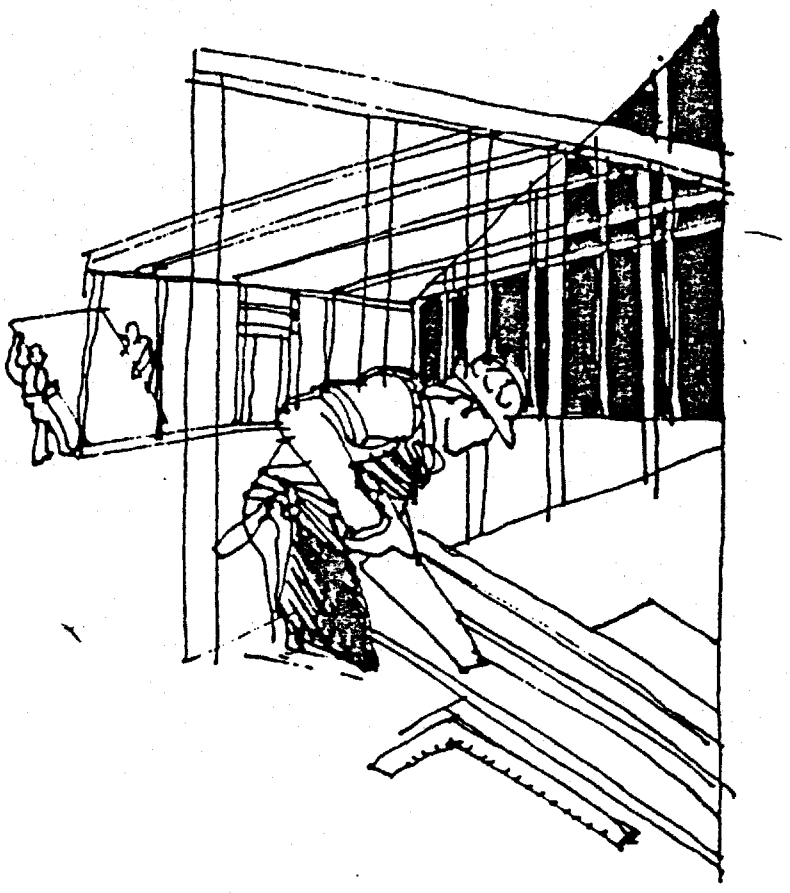
Recent discussion with Moody's and Standard and Poor indicate both consider the potential for pending Mount Laurel development and its associated debt requirements to be extremely negative factors in bond ratings assigned to a "Mount Laurel" community.

If the fiscal integrity of Denville Township is to be preserved, any new development must be implemented gradually.

THOMAS H. KEAN
Governor

EXHIBIT D

NEW JERSEY



Residential Building Permits

1984 SUMMARY

STATE OF NEW JERSEY
DEPARTMENT OF LABOR
DIVISION OF PLANNING & RESEARCH
OFFICE OF DEMOGRAPHIC & ECONOMIC ANALYSIS
C N 388
TRENTON, NEW JERSEY 08625-0388

August 1985

TABLE 10

DWELLING UNITS AUTHORIZED BY BUILDING PERMITS

1984 ANNUAL SUMMARY FOR MUNICIPALITIES IN MORRIS COUNTY

	Dwelling Units Authorized				Residential Demolitions	
	Total	Single Family	2 to 4 Family	5 or More Family	1983	1984
Boonton Town	41	37	4		3	0
Boonton Twp.	28	28			0	0
Butler Boro	7	3	4		0	0
Chatham Boro	12	12			0	0
Chatham Twp.	117	24		93	4	1
Chester Boro	5	5			0	0
Chester Twp.	64	64			1	4
Denville Twp.	44	44			3	0
Dover Town	79	10		69	0	0
East Hanover Twp.	45	45			0	3
Florham Park Boro	47	47			0	2
Hanover Twp.	50	50			1	4
Harding Twp.	26	26			0	0
Jefferson Twp.	100	100			0	2
Kinnelon Boro	68	68			1	0
Lincoln Park Boro	234	86	24	124	0	0
Madison Boro	69	59	2	8	3	2
Mendham Boro	59	59			0	1
Mendham Twp.	33	33			0	0
Mine Hill Twp.	25	13	12		0	1
Montville Twp.	150	145		5	1	6
Morris Twp.	166	164	2		0	2
Morris Plains Boro	18	18			2	1
Morristown Town	134	84	14	36	7	9
Mountain Lakes Boro	2	2			1	1
Mt. Arlington Boro	5	5			0	0
Mt. Olive Twp.	76	76			4	2
Netcong Boro	13	5	8		0	0
Parsippany-Troy Hills Twp.	70	64		6	8	5
Passaic Twp.	69	63	6		0	0
Pequannock Twp.	18	18			2	1
Randolph Twp.	107	107			2	8
Riverdale Boro	3	3			0	0
Rockaway Boro	5	5			1	0
Rockaway Twp.	88	40		48	0	0
Roxbury Twp.	120	120			3	5
Victory Gardens Boro	0				0	0
Washington Twp.	232	232			0	1
Wharton Boro	4	2	2		0	0
Total	2,433	1,966	78	389	47	61

RESIDENTIAL BUILDING PERMITS

STATE OF NEW JERSEY
THOMAS H. KEAN
Governor

CHARLES SERRAINO
Commissioner

Data for February 1985

Prepared in April 1985

Planned homebuilding in New Jersey slowed somewhat in February. The number of dwelling units authorized by building permits for the month totaled 1,865. Although down somewhat from a very strong January level, planned units in February 1985 were about 300 above the February 1984 total. Single-family construction accounted for over 72% of the current month's total, while about 20% of the permits issued were for apartment units.

January and February are usually considered "slow" months for homebuilding activity. Still, the year-to-date total of 4,298 units was noteworthy because it was 46.7% above the number of authorizations registered for the same period one year ago. All types of private-unit construction realized gains over the period, with three- or four-family units showing the greatest increase.

Geographically, all but 3 of the state's 21 counties reported equal or higher levels of activity for the first two months of 1985 compared to the same period of 1984. Middlesex, Ocean, Monmouth, and Cape May Counties recorded exceptionally strong starts this year.

RESIDENTIAL CONSTRUCTION AUTHORIZED BY BUILDING PERMITS
THE STATE OF NEW JERSEY

Type of Construction	FEBRUARY 1985[1]	JANUARY 1985[2]	Year to Date[3] 1985	1984	% Change
Total Dwelling Units Authorized	1,865	2,433	4,298	2,929	+ 46.7
Private units	1,865	2,433	4,298	2,929	+ 46.7
Single family	1,345	1,665	3,010	1,832	+ 64.3
Two family	132	148	280	270	+ 3.7
Three or four family	17	101	118	32	+268.8
Five or more family	371	519	890	795	+ 11.9
Public units	0	0	0	0	-
Estimated Cost of Residential Construction (000's)	$121,879	$151,945	$273,824	$194,738	+ 40.6
New residential buildings	$100,381	$129,185	$229,566	$159,450	+ 44.0
Additions and alterations	$ 21,498	$ 22,760	$ 44,258	$ 35,288	+ 25.4

[1]Based on reports received from 431 of 567 municipalities
[2]Based on reports received from 396 of 567 municipalities
[3]Does not include late reports

Source: NJ Department of Labor

FEBRUARY 1985

Municipality	Dwelling Units
MONMOUTH COUNTY (Cont'd)	
Freehold	0
Freehold Twp.	1
Hazlet Twp.	1
Highlands	0
Holmdel Twp.	15
Howell Twp.	18
Interlaken	0
Keansburg	2
Keyport	*
Little Silver	*
Loch Arbour Vil.	0
Long Branch	0
Manalapan Twp.	31
asquan	0
Marlboro Twp.	0
Matawan	2
Middletown Twp.	12
llstone Twp.	2
nmouth Beach	2
Neptune Twp.	24
Neptune City	0
Ocean Twp.	6
Oceanport	0
Red Bank	0
Roosevelt	0
Rumson	0
a Bright	*
a Girt	*
Shrewsbury	*
Shrewsbury Twp.	0
South Belmar	*
Spring Lake	*
Spring Lake Heights	0
Tinton Falls	165
Union Beach	0
Upper Freehold Twp.	0
Wall Twp.	4
West Long Branch	*

Municipality	Dwelling Units
MORRIS COUNTY	144
Boonton	0
Boonton Twp.	0
Butler	0
Chatham	*
Chatham Twp.	1
Chester	0
Chester Twp.	1
Denville Twp.	6
Dover	0
East Hanover Twp.	1
Florham Park	1
Hanover Twp.	2
Harding Twp.	0
Jefferson Twp.	8
Kinnelon	4
Lincoln Park	0
Madison	3
Mendham	0
Mendham Twp.	0
Mine Hill Twp.	0
Montville Twp.	4
Morris Twp.	2
Morris Plains	2
Morristown	70
Mountain Lakes	*
Mt. Arlington	0
Mt. Olive Twp.	6
Netcong	*
Parsippany-Troy Hills Twp.	1
Passaic Twp.	13
Pequannock Twp.	*
Randolph Twp.	10
Riverdale	*
Rockaway	0
Rockaway Twp.	1
Roxbury Twp.	4
Victory Gardens	*
Washington Twp.	4
Wharton	0

Municipality	Dwelling Units
OCEAN COUNTY	226
Barnegat Twp.	*
Barnegat Light	1
Bay Head	0
Beach Haven	2
Beachwood	3
Berkeley Twp.	*
Brick Twp.	16
Dover Twp.	15
Eagleswood Twp.	0
Harvey Cedars	4
Island Heights	0
Jackson Twp.	29
Lacey Twp.	21
Lakehurst	0
Lakewood Twp.	3
Lavallette	2
Little Egg Harbor Twp.	5
Long Beach Twp.	8
Manchester Twp.	54
Mantoloking	0
Ocean Twp.	4
Ocean Gate	*
Pine Beach	*
Plumsted Twp.	5
Point Pleasant	26
Point Pleasant Beach	2
Seaside Heights	0
Seaside Park	3
Ship Bottom	2
South Toms River	0
Stafford Twp.	20
Surf City	1
Tuckerton	0
PASSAIC COUNTY	79
Bloomingdale	*
Clifton	*
Haledon	*
Hawthorne	*
Little Falls Twp.	0

See footnotes at end of tables.

EXHIBIT E

RESIDENTIAL BUILDING PERMITS

THOMAS H. KEAN
Governor

CHARLES SERRAINO
Commissioner

Data for March 1985

Prepared in May 1985

Planned homebuilding in New Jersey was up in March 1985. The number of dwelling units authorized by building permits for the month totaled 2,937, an increase of nearly 1,100 from February. This was the highest March figure since 1974 when 3,401 new units were authorized.

During the first quarter of 1985 a total of 7,235 dwelling units were approved for construction statewide, approximately 39% above the comparative 1984 figure.

Based on three months of data, the state's leading centers of homebuilding in 1985 were Middlesex County with 1,149 authorized units, Ocean County with 863, Monmouth County with 701 units, and Cape May County with 484 units. Overall, 15 of New Jersey's 21 counties reported equal or higher levels of activity for the first quarter of 1985 compared to the same period of 1984.

RESIDENTIAL CONSTRUCTION AUTHORIZED BY BUILDING PERMITS
THE STATE OF NEW JERSEY

Type of Construction	MARCH 1985 [1]	FEBRUARY 1985 [2]	Year to Date [3]		
			1985	1984	% Change
Total Dwelling Units Authorized	2,937	1,865	7,235	5,207	+ 38.9
Private units	2,937	1,865	7,235	5,207	+ 38.9
Single family	1,920	1,345	4,930	3,437	+ 43.4
Two family	190	132	470	412	+ 14.1
Three or four family	88	17	206	108	+ 90.7
Five or more family	739	371	1,629	1,250	+ 30.3
Public units	0	0	0	0	-
Estimated Cost of Residential Construction (000's)	$217,129	$121,879	$490,953	$342,417	+ 43.4
New residential buildings	$182,453	$100,381	$412,019	$281,155	+ 46.5
Additions and alterations	$ 34,676	$ 21,498	$ 78,934	$ 61,262	+ 28.8

[1]Based on reports received from 412of 567 municipalities.
[2]Based on reports received from 431of 567 municipalities.
[3]Does not include late reports

Source: N.J. Department of Labor

DWELL. ; UNITS AUTHORIZED BY BUIL. .NG PERMITS
NEW JERSEY MUNICIPALITIES

MARCH 1985

MUNICIPALITY	UNITS	MUNICIPALITY	UNITS	MUNICIPALITY	UNITS	MUNICIPALITY	UNITS
MONMOUTH COUNTY	**228**						
ABERDEEN TWP.	4	FARMINGDALE BORO	0	MANASQUAN BORO	1	SEA GIRT BORO	*
ALLENHURST BORO	*	FREEHOLD BORO	0	MARLBORO TWP.	56	SHREWSBURY BORO	0
ALLENTOWN BORO	0	FREEHOLD TWP.	2	MATAWAN BORO	2	SHREWSBURY TWP.	*
ASBURY PARK CITY	*	HAZLET TWP.	1	MIDDLETOWN TWP.	10	SOUTH BELMAR BORO	*
ATLANTIC HIGHLANDS BORO	1	HIGHLANDS BORO	0	MILLSTONE TWP.	1	SPRING LAKE BORO	*
AVON-BY-THE-SEA BORO	0	HOLMDEL TWP.	18	MONMOUTH BEACH BORO	0	SPRING LAKE HEIGHTS BORO	0
BELMAR BORO	*	HOWELL TWP.	51	NEPTUNE TWP.	0	TINTON FALLS BORO	9
BRADLEY BEACH BORO	0	INTERLAKEN BORO	*	NEPTUNE CITY BORO	0	UNION BEACH BORO	1
BRIELLE BORO	1	KEANSBURG BORO	2	OCEAN TWP.	7	UPPER FREEHOLD TWP.	1
COLTS NECK TWP.	*	KEYPORT BORO	*	OCEANPORT BORO	1	WALL TWP.	12
DEAL BORO	*	LITTLE SILVER BORO	*	RED BANK BORO	*	WEST LONG BRANCH BORO	*
EATONTOWN BORO	1	LOCH ARBOUR VIL.	*	ROOSEVELT BORO	1		
ENGLISHTOWN BORO	0	LONG BRANCH CITY	13	RUMSON BORO	2		
FAIR HAVEN BORO	1	MANALAPAN TWP.	29	SEA BRIGHT BORO	*		
MORRIS COUNTY	**157**						
BOONTON TOWN	3	FLORHAM PARK BORO	1	MONTVILLE TWP.	13	PEQUANNOCK TWP.	*
BOONTON TWP.	5	HANOVER TWP.	4	MORRIS TWP.	18	RANDOLPH TWP.	*
BUTLER BORO	0	HARDING TWP.	13	MORRIS PLAINS BORO	7	RIVERDALE BORO	*
CHATHAM BORO	*	JEFFERSON TWP.	9	MORRISTOWN TOWN	24	ROCKAWAY BORO	0
CHATHAM TWP.	0	KINNELON BORO	4	MOUNTAIN LAKES BORO	*	ROCKAWAY TWP.	5
CHESTER BORO	0	LINCOLN PARK BORO	0	MT. ARLINGTON BORO	*	ROXBURY TWP.	7
CHESTER TWP.	5	MADISON BORO	*	MT. OLIVE TWP.	8	VICTORY GARDENS BORO	*
DENVILLE TWP.	5	MENDHAM BORO	4	NETCONG BORO	*	WASHINGTON TWP.	9
DOVER TOWN	*	MENDHAM TWP.	6	PARSIPPANY-TROY HILLS TWP.	6	WHARTON BORO	0
EAST HANOVER TWP.	0	MINE HILL TWP.	0	PASSAIC TWP.	1		
OCEAN COUNTY	**321**						
BARNEGAT TWP.	*	HARVEY CEDARS BORO	0	MANCHESTER TWP.	17	SEASIDE PARK BORO	*
BARNEGAT LIGHT BORO	4	ISLAND HEIGHTS BORO	0	MANTOLOKING BORO	1	SHIP BOTTOM BORO	1
BAY HEAD BORO	0	JACKSON TWP.	7	OCEAN TWP.	5	SOUTH TOMS RIVER BORO	*
BEACH HAVEN BORO	0	LACEY TWP.	87	OCEAN GATE BORO	*	STAFFORD TWP.	14
BEACHWOOOD BORO	*	LACKHURST BORO	0	PINE BEACH BORO	*	SURF CITY BORO	3
BERKELEY TWP.	*	LAKEWOOD TWP.	12	PLUMSTED TWP.	8	TUCKERTON BORO	1
BRICK TWP.	55	LAVALLETTE BORO	10	POINT PLEASANT BORO	11		
DOVER TWP.	43	LITTLE EGG HARBOR TWP	27	POINT PLEASANT BEACH BORO	0		
EAGLESWOOD TWP.	1	LONG BEACH TWP.	14	SEASIDE HEIGHTS BORO	0		

RESIDENTIAL BUILDING PERMITS

STATE OF NEW JERSEY

THOMAS H. KEAN
Governor

CHARLES SERRAINO
Commissioner

Data for April 1985

Prepared in June 1985

Over 3,900 new units were authorized for construction in April, approximately 1,000 more than in March 1985 and nearly twice the total of April 1984. For the first four months of 1985, total units planned were 55% higher than the comparable period in 1984. This sizable increase represents a continuation of the strong growth in planned housing since 1983 in New Jersey.

Included in the April figure were plans for 2,700 single-family homes and 600 apartment units. These two major categories continued to show strong gains compared to one year ago. The most dramatic increase occurred in the three or four family category--583 units in 1985 compared to 120 units in 1984, an increase of 463 units or 385.8%.

To date in 1985, the leading homebuilding areas of New Jersey were Middlesex County (1,683 units), Ocean County (1,265 units), and Monmouth County (1,237 units). In all three counties, total planned construction was well ahead of the 1984 levels. All but four of New Jersey's 21 counties reported higher levels of planned residential building through the first four months of 1985 compared to the same period in 1984.

RESIDENTIAL CONSTRUCTION AUTHORIZED BY BUILDING PERMITS
THE STATE OF NEW JERSEY

Type of Construction	APRIL 1985 [1]	MARCH 1985 [2]	Year to Date [3]		
			1985	1984	% Change
Total Dwelling Units Authorized	3,931	2,937	11,166	7,205	+ 55.0
Private units	3,861	2,937	11,096	7,205	+ 54.0
Single family	2,715	1,920	7,645	5,047	+ 51.5
Two family	132	190	602	522	+ 15.3
Three or four family	377	88	583	120	+385.8
Five or more family	637	739	2,266	1,516	+ 49.5
Public units	70	0	70	0	-
Estimated Cost of Residential Construction (000's)	$263,521	$217,129	$754,474	$495,349	+ 52.3
New residential buildings	$225,472	$182,453	$637,491	$401,181	+ 58.9
Additions and alterations	$ 38,049	$ 34,676	$116,983	$ 94,168	+ 24.2

[1]Based on reports received from 401of 567 municipalities.
[2]Based on reports received from 412of 567 municipalities.
[3]Does not include late reports.

Source: N.J. Department of Labor

DWELLING UNITS AUTHORIZED BY BUILDING PERMITS
NEW JERSEY MUNICIPALITIES

APRIL 1985

MUNICIPALITY	UNITS	MUNICIPALITY	UNITS	MUNICIPALITY	UNITS	MUNICIPALITY	UNITS
MONMOUTH COUNTY	**536**						
ABERDEEN TWP.	*	FARMINGDALE BORO	0	MANASQUAN BORO	1	SEA GIRT BORO	*
ALLENHURST BORO	*	FREEHOLD BORO	2	MARLBORO TWP.	53	SHREWSBURY BORO	0
ALLENTOWN BORO	0	FREEHOLD TWP.	63	MATAWAN BORO	1	SHREWSBURY TWP.	*
ASBURY PARK CITY	*	HAZLET TWP.	2	MIDDLETOWN TWP.	37	SOUTH BELMAR BORO	*
ATLANTIC HIGHLANDS BORO	*	HIGHLANDS BORO	0	MILLSTONE TWP.	12	SPRING LAKE BORO	*
AVON-BY-THE-SEA BORO	*	HOLMDEL TWP.	49	MONMOUTH BEACH BORO	3	SPRING LAKE HEIGHTS BORO	*
BELMAR BORO	1	HOWELL TWP.	87	NEPTUNE TWP.	*	TINTON FALLS BORO.	7
BRADLEY BEACH BORO	*	INTERLAKEN BORO	*	NEPTUNE CITY BORO	0	UNION BEACH BORO	1
BRIELLE BORO	1	KEANSBURG BORO	1	OCEAN TWP.	*	UPPER FREEHOLD TWP.	3
COLTS NECK TWP.	*	KEYPORT BORO	*	OCEANPORT BORO	*	WALL TWP.	8
DEAL BORO	*	LITTLE SILVER BORO	*	RED BANK BORO	0	WEST LONG BRANCH BORO	*
EATONTOWN BORO	66	LOCH ARBOUR VIL.	*	ROOSEVELT BORO	*		
ENGLISHTOWN BORO	37	LONG BRANCH CITY	43	RUMSON BORO	2		
FAIR HAVEN BORO	4	MANALAPAN TWP.	52	SEA BRIGHT BORO	*		
MORRIS COUNTY	**209**						
BOONTON TOWN	0	FLORHAM PARK BORO	1	MONTVILLE TWP.	10	PEQUANNOCK TWP.	*
BOONTON TWP.	4	HANOVER TWP.	7	MORRIS TWP.	2	RANDOLPH TWP.	*
BUTLER BORO	0	HARDING TWP.	24	MORRIS PLAINS BORO	3	RIVERDALE BORO	*
CHATHAM BORO	0	JEFFERSON TWP.	26	MORRISTOWN TOWN	37	ROCKAWAY BORO	0
CHATHAM TWP.	0	KINNELON BORO	*	MOUNTAIN LAKES BORO	1	ROCKAWAY TWP.	5
CHESTER BORO	0	LINCOLN PARK BORO	*	MT. ARLINGTON BORO	1	ROXBURY TWP.	8
CHESTER TWP.	2	MADISON BORO	*	MT. OLIVE TWP.	19	VICTORY GARDENS BORO	*
DENVILLE TWP.	3	MENDHAM BORO	5	NETCONG BORO	*	WASHINGTON TWP.	22
DOVER TOWN	3	MENDHAM TWP.	4	PARSIPPANY-TROY HILLS TWP	*	WHARTON BORO	*
EAST HANOVER TWP.	0	MINE HILL TWP.	3	PASSAIC TWP.	19		
OCEAN COUNTY	**403**						
BARNEGAT TWP.	*	HARVEY CEDARS BORO	1	MANCHESTER TWP.	4	SEASIDE PARK BORO	*
BARNEGAT LIGHT BORO	*	ISLAND HEIGHTS BORO	*	MANTOLOKING BORO	0	SHIP BOTTOM BORO	*
BAY HEAD BORO	1	JACKSON TWP.	25	OCEAN TWP.	2	SOUTH TOMS RIVER BORO	0
BEACH HAVEN BORO	0	LACEY TWP.	51	OCEAN GATE BORO	*	STAFFORD TWP.	22
BEACHWOOOD BORO	15	LACKHURST BORO	*	PINE BEACH BORO	*	SURF CITY BORO	0
BERKELEY TWP.	*	LAKEWOOD TWP.	8	PLUMSTED TWP.	*	TUCKERTON BORO	0
BRICK TWP.	174	LAVALLETTE BORO	9	POINT PLEASANT BORO	9		
DOVER TWP.	53	LITTLE EGG HARBOR TWP	10	POINT PLEASANT BEACH BORO	3		
EAGLESWOOD TWP.	0	LONG BEACH TWP.	16	SEASIDE HEIGHTS BORO	*		

RESIDENTIAL BUILDING PERMITS

STATE OF NEW JERSEY
THOMAS H. KEAN
Governor

CHARLES SERRAINO
Commissioner

Data for May 1985

Prepared in July 1985

Planned homebuilding in New Jersey was up in May 1985. The number of dwelling units authorized by building permits for the month totaled 4,263, an increase of nearly 300 from both April 1985 and May 1984. This was the highest May figure since 1972, when 4,706 new units were authorized.

The addition of May's statistics brought the year-to-date total for 1985 to 15,429 units, 38.1% above the number of authorizations for the same period of 1984. All types of construction, with the exception of public housing, have shown gains compared to one year ago. The overwhelming majority of planned units continue to be single-family dwellings.

With over 3,000 units authorized for the first five months of 1985, Middlesex County led the state in planned homebuilding followed by Ocean and Monmouth with 1,805 and 1,625, respectively. In fact, 17 of New Jersey's 21 counties registered equal or higher levels of planned homebuilding, while only four counties were unable to keep pace with their 1984 levels.

RESIDENTIAL CONSTRUCTION AUTHORIZED BY BUILDING PERMITS
THE STATE OF NEW JERSEY

Type of Construction	May[1] 1985	April[2] 1985	Year to Date[3]		
			1985	1984	% Change
Total Dwelling Units Authorized	4,263	3,931	15,429	11,169	+ 38.1
Private units	4,263	3,861	15,359	10,908	+ 40.8
Single family	3,007	2,715	10,652	7,103	+ 50.0
Two family	182	132	784	606	+ 29.4
Three or four family	50	377	633	150	+322.0
Five or more family	1,024	637	3,290	3,049	+ 7.9
Public units	0	70	70	261	- 73.2
Estimated Cost of Residential Construction (000's)	$293,907	$263,521	$1,048,381	$743,892	+ 40.9
New residential buildings	$252,176	$255,472	$ 889,667	$615,523	+ 44.5
Additions and alterations	$ 41,731	$ 38,049	$ 158,714	$128,369	+ 23.6

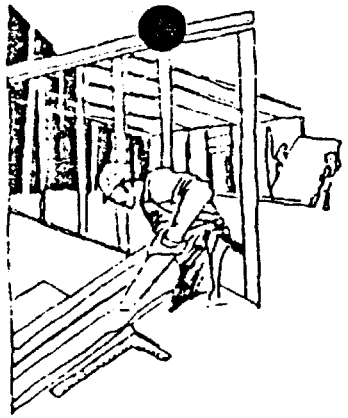
[1] Based on reports received from 396 of 567 municipalities.
[2] Based on reports received from 401 of 567 municipalities.
[3] Does not include late reports.

Source: NJ Department of Labor

DWEL 'NG UNITS AUTHORIZED BY BU DING PERMITS
NEW JERSEY MUNICIPALITIES

MAY 1985

MUNICIPALITY	UNITS	MUNICIPALITY	UNITS	MUNICIPALITY	UNITS	MUNICIPALITY	UNITS
MONMOUTH COUNTY	**388**						
ABERDEEN TWP.	*	FARMINGDALE BORO	*	MANASQUAN BORO	0	SEA GIRT BORO	*
ALLENHURST BORO	0	FREEHOLD BORO	2	MARLBORO TWP.	60	SHREWSBURY BORO	0
ALLENTOWN BORO	*	FREEHOLD TWP.	22	MATAWAN BORO	0	SHREWSBURY TWP.	*
ASBURY PARK CITY	*	HAZLET TWP.	6	MIDDLETOWN TWP.	63	SOUTH BELMAR BORO	0
ATLANTIC HIGHLANDS BORO	*	HIGHLANDS BORO	*	MILLSTONE TWP.	3	SPRING LAKE BORO	*
AVON-BY-THE-SEA BORO	0	HOLMDEL TWP.	16	MONMOUTH BEACH BORO	1	SPRING LAKE HEIGHTS BORO	0
BELMAR BORO	0	HOWELL TWP.	*	NEPTUNE TWP.	*	TINTON FALLS BORO.	14
BRADLEY BEACH BORO	0	INTERLAKEN BORO	0	NEPTUNE CITY BORO	0	UNION BEACH BORO	3
BRIELLE BORO	2	KEANSBURG BORO	2	OCEAN TWP.	31	UPPER FREEHOLD TWP.	6
COLTS NECK TWP.	*	KEYPORT BORO	*	OCEANPORT BORO	*	WALL TWP.	17
DEAL BORO	*	LITTLE SILVER BORO	*	RED BANK BORO	0	WEST LONG BRANCH BORO	*
EATONTOWN BORO	71	LOCH ARBOUR VIL.	0	ROOSEVELT BORO	0		
ENGLISHTOWN BORO	0	LONG BRANCH CITY	*	RUMSON BORO	1		
FAIR HAVEN BORO	0	MANALAPAN TWP.	68	SEA BRIGHT BORO	*		
MORRIS COUNTY	**192**						
BOONTON TOWN	3	FLORHAM PARK BORO	1	MONTVILLE TWP.	19	PEQUANNOCK TWP.	*
BOONTON TWP.	1	HANOVER TWP.	9	MORRIS TWP.	22	RANDOLPH TWP.	*
BUTLER BORO	*	HARDING TWP.	1	MORRIS PLAINS BORO	3	RIVERDALE BORO	*
CHATHAM BORO	*	JEFFERSON TWP.	10	MORRISTOWN TOWN	0	ROCKAWAY BORO	2
CHATHAM TWP.	0	KINNELON BORO	13	MOUNTAIN LAKES BORO	0	ROCKAWAY TWP.	16
CHESTER BORO	0	LINCOLN PARK BORO	1	MT. ARLINGTON BORO	*	ROXBURY TWP.	5
CHESTER TWP.	3	MADISON BORO	*	MT. OLIVE TWP.	30	VICTORY GARDENS BORO	*
DENVILLE TWP.	0	MENDHAM BORO	4	NETCONG BORO	*	WASHINGTON TWP.	30
DOVER TOWN	4	MENDHAM TWP.	4	PARSIPPANY-TROY HILLS TWP	*	WHARTON BORO	2
EAST HANOVER TWP.	3	MINE HILL TWP.	6	PASSAIC TWP.	*		
OCEAN COUNTY	**539**						
BARNEGAT TWP.	*	HARVEY CEDARS BORO	0	MANCHESTER TWP.	31	SEASIDE PARK BORO	*
BARNEGAT LIGHT BORO	2	ISLAND HEIGHTS BORO	1	MANTOLOKING BORO	1	SHIP BOTTOM BORO	4
BAY HEAD BORO	0	JACKSON TWP.	62	OCEAN TWP.	5	SOUTH TOMS RIVER BORO	*
BEACH HAVEN BORO	1	LACEY TWP.	44	OCEAN GATE BORO	*	STAFFORD TWP.	*
BEACHWOOOD BORO	0	LACKHURST BORO	0	PINE BEACH BORO	1	SURF CITY BORO	1
BERKELEY TWP.	193	LAKEWOOD TWP.	*	PLUMSTED TWP.	*	TUCKERTON BORO	1
BRICK TWP.	78	LAVALLETTE BORO	4	POINT PLEASANT BORO	31		
DOVER TWP.	66	LITTLE EGG HARBOR TWP	*	POINT PLEASANT BEACH BORO	3		
EAGLESWOOD TWP.	2	LONG BEACH TWP.	8	SEASIDE HEIGHTS BORO	*		



RESIDENTIAL BUILDING PERMITS

STATE OF NEW JERSEY
THOMAS H. KEAN
Governor

DEPARTMENT OF LABOR
CHARLES SERRAINO
Commissioner

Data for June 1985

Prepared in August 1985

A total of 3,260 new units were authorized for construction in June 1985, approximately 1,000 less than May 1985 but nearly 300 more than in June 1984. For the first six months of 1985, total planned units were 32.1% higher than the comparable period in 1984.

The two major categories of planned homebuilding--single family and apartments--accounted for nearly 95% of the current month's activity. A total of 2,283 single-family units were authorized, which represented 70% of all activity; a total of 796 apartment units, representing 25%, were planned.

Of the state's 21 counties, only Burlington, Cumberland, and Warren counties failed to keep pace with their year-to-date 1984 levels. Middlesex County (3,312 units) continues to be the leading homebuilding center in New Jersey followed by Ocean (2,342 units), Monmouth (1,921 units), Morris (1,041 units), and Bergen (1,009 units) counties.

RESIDENTIAL CONSTRUCTION AUTHORIZED BY BUILDING PERMITS

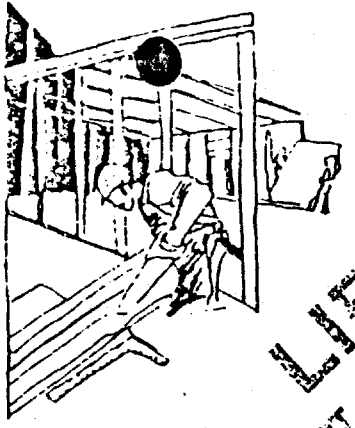
TYPE OF CONSTRUCTION	June[1] 1985	May[2] 1985	YEAR TO DATE[3] 1985	1984	PERCENT CHANGE
TOTAL DWELLING UNITS AUTHORIZED	3,260	4,263	18,689	14,152	+ 32.1
PRIVATE UNITS	3,260	4,263	18,619	13,791	+ 35.0
SINGLE FAMILY	2,283	3,007	12,935	9,370	+ 38.0
TWO FAMILY	142	182	926	758	+ 22.2
THREE OR FOUR FAMILY	39	50	672	181	+271.3
FIVE OR MORE FAMILY	796	1,024	4,086	3,482	+ 17.3
PUBLIC UNITS	0	0	70	361	- 80.6
ESTIMATED COST OF RESIDENTIAL CONSTRUCTION ($000'S)	$223,125	$293,907	$1,271,506	$956,571	+ 32.9
NEW RESIDENTIAL BUILDINGS	$186,632	$252,176	$1,076,299	$785,719	+ 37.0
ADDITIONS AND ALTERATIONS	$ 36,493	$ 41,731	$ 195,207	$170,852	+ 14.3

NOTES: 1 BASED ON REPORTS RECEIVED FROM 396 OF 567 MUNICIPALITIES.
2 BASED ON REPORTS RECEIVED FROM 396 OF 567 MUNICIPALITIES.
3 Does not include late reports.
SOURCE: N. J. DEPARTMENT OF LABOR

DWELLING UNITS AUTHORIZED BY BUILDING PERMITS
NEW JERSEY MUNICIPALITIES

JUNE 1985

MUNICIPALITY	UNITS	MUNICIPALITY	UNITS	MUNICIPALITY	UNITS	MUNICIPALITY	UNITS
MONMOUTH COUNTY	**296**						
ABERDEEN TWP.	*	FARMINGDALE BORO	0	MANASQUAN BORO	0	SEA GIRT BORO	*
ALLENHURST BORO	0	FREEHOLD BORO	1	MARLBORO TWP.	33	SHREWSBURY BORO	0
ALLENTOWN BORO	0	FREEHOLD TWP.	59	MATAWAN BORO	*	SHREWSBURY TWP.	*
ASBURY PARK CITY	*	HAZLET TWP.	25	MIDDLETOWN TWP.	31	SOUTH BELMAR BORO	0
ATLANTIC HIGHLANDS BORO	0	HIGHLANDS BORO	0	MILLSTONE TWP.	10	SPRING LAKE BORO	*
AVON-BY-THE-SEA BORO	0	HOLMDEL TWP.	31	MONMOUTH BEACH BORO	4	SPRING LAKE HEIGHTS BORO	5
BELMAR BORO	0	HOWELL TWP.	*	NEPTUNE TWP.	*	TINTON FALLS BORO.	25
BRADLEY BEACH BORO	0	INTERLAKEN BORO	0	NEPTUNE CITY BORO	0	UNION BEACH BORO	3
BRIELLE BORO	1	KEANSBURG BORO	0	OCEAN TWP.	7	UPPER FREEHOLD TWP.	3
COLTS NECK TWP.	*	KEYPORT BORO	*	OCEANPORT BORO	4	WALL TWP.	13
DEAL BORO	0	LITTLE SILVER BORO	*	RED BANK BORO	0	WEST LONG BRANCH BORO	*
EATONTOWN BORO	0	LOCH ARBOUR VIL.	*	ROOSEVELT BORO	0		
ENGLISHTOWN BORO	0	LONG BRANCH CITY	*	RUMSON BORO	1		
FAIR HAVEN BORO	3	MANALAPAN TWP.	37	SEA BRIGHT BORO	*		
MORRIS COUNTY	**234**						
BOONTON TOWN	0	FLORHAM PARK BORO	1	MONTVILLE TWP.	27	PEQUANNOCK TWP.	*
BOONTON TWP.	4	HANOVER TWP.	6	MORRIS TWP.	3	RANDOLPH TWP.	*
BUTLER BORO	0	HARDING TWP.	4	MORRIS PLAINS BORO	4	RIVERDALE BORO	*
CHATHAM BORO	*	JEFFERSON TWP.	21	MORRISTOWN TOWN	4	ROCKAWAY BORO	*
CHATHAM TWP.	4	KINNELON BORO	7	MOUNTAIN LAKES BORO	1	ROCKAWAY TWP.	46
CHESTER BORO	1	LINCOLN PARK BORO	1	MT. ARLINGTON BORO	*	ROXBURY TWP.	7
CHESTER TWP.	*	MADISON BORO	8	MT. OLIVE TWP.	60	VICTORY GARDENS BORO	*
DENVILLE TWP.	3	MENDHAM BORO	4	NETCONG BORO	4	WASHINGTON TWP.	*
DOVER TOWN	0	MENDHAM TWP.	5	PARSIPPANY-TROY HILLS TWP	*	WHARTON BORO	*
EAST HANOVER TWP.	2	MINE HILL TWP.	1	PASSAIC TWP.	6		
OCEAN COUNTY	**537**						
BARNEGAT TWP.	*	HARVEY CEDARS BORO	1	MANCHESTER TWP.	47	SEASIDE PARK BORO	*
BARNEGAT LIGHT BORO	2	ISLAND HEIGHTS BORO	*	MANTOLOKING BORO	0	SHIP BOTTOM BORO	0
BAY HEAD BORO	1	JACKSON TWP.	31	OCEAN TWP.	7	SOUTH TOMS RIVER BORO	*
BEACH HAVEN BORO	12	LACEY TWP.	113	OCEAN GATE BORO	0	STAFFORD TWP.	13
BEACHWOOOD BORO	5	LACKHURST BORO	0	PINE BEACH BORO	0	SURF CITY BORO	2
BERKELEY TWP.	123	LAKEWOOD TWP.	9	PLUMSTED TWP.	*	TUCKERTON BORO	0
BRICK TWP.	56	LAVALLETTE BORO	6	POINT PLEASANT BORO	9		
DOVER TWP.	77	LITTLE EGG HARBOR TWP	21	POINT PLEASANT BEACH BORO	1		
EAGLESWOOD TWP.	1	LONG BEACH TWP.	*	SEASIDE HEIGHTS BORO	0		



RESIDENTIAL BUILDING PERMITS

STATE OF NEW JERSEY
THOMAS H. KEAN
Governor

DEPARTMENT OF LABOR
CHARLES SERRAINO
Commissioner

Data for July 1985 | State of New Jersey | Prepared in September 1985

Local construction officials reported over 4,100 new units authorized for construction in July 1985, approximately 900 units more than June 1985 and 1,200 units above the July 1984 figure.

The addition of July's statistics brought the year-to-date total for 1985 to 22,827 units, 33.8% above the number of authorizations for the same period of 1984. This was the highest July total since 1973 when 4,240 new units were authorized. All types of private-unit construction have realized sizeable gains in 1985, with 3 or 4 family unit construction showing the greatest increase.

With nearly 4,000 units authorized for the first seven months of 1985, Middlesex County continues to be the overwhelming choice of homebuilders in New Jersey followed by Ocean and Monmouth with 2,781 and 2,481 respectively. In fact, 18 of New Jersey's 21 counties registered higher levels of planned homebuilding activity, while only Cumberland, Essex and Warren counties were unable to keep pace with their 1984 levels.

RESIDENTIAL CONSTRUCTION AUTHORIZED BY BUILDING PERMITS

TYPE OF CONSTRUCTION	JULY 1985	JUNE 1985	YEAR TO DATE 1985	YEAR TO DATE 1984	PERCENT CHANGE
TOTAL DWELLING UNITS AUTHORIZED	4,138	3,260	22,827	17,087	33.6
PRIVATE UNITS	4,138	3,260	22,757	16,726	36.1
SINGLE FAMILY	2,682	2,283	15,617	11,577	34.9
TWO FAMILY	146	142	1 072	838	27.9
THREE OR FOUR FAMILY	12	39	684	227	201.3
FIVE OR MORE FAMILY	1,298	796	5,384	4,084	31.8
PUBLIC UNITS	0	0	70	361	-80.6
ESTIMATED COST OF RESIDENTIAL CONSTRUCTION ($000'S)	277,917	223,125	1,549,423	1,129,924	37.1
NEW RESIDENTIAL BUILDINGS	223,374	186,632	1,299,673	923,993	40.7
ADDITIONS AND ALTERATIONS	54,543	36,493	249,750	205,931	21.3

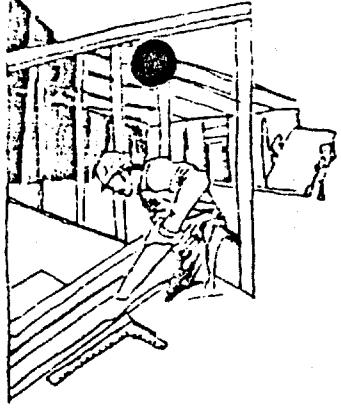
NOTES: BASED ON REPORTS RECEIVED FROM 406 OF 567 MUNICIPALITIES.
BASED ON REPORTS RECEIVED FROM 398 OF 567 MUNICIPALITIES.
DOES NOT INCLUDE LATE REPORTS.

SOURCE: N. J. DEPARTMENT OF LABOR

DWELLING UNITS AUTHORIZED BY BUILDING PERMITS
NEW JERSEY MUNICIPALITIES

JULY 1985

MUNICIPALITY	UNITS	MUNICIPALITY	UNITS	MUNICIPALITY	UNITS	MUNICIPALITY	UNITS
MONMOUTH COUNTY	**560**						
ABERDEEN TWP.	*	FARMINGDALE BORO	0	MANASQUAN BORO	2	SEA GIRT BORO	*
ALLENHURST BORO	0	FREEHOLD BORO	7	MARLBORO TWP.	35	SHREWSBURY BORO	0
ALLENTOWN BORO	0	FREEHOLD TWP.	79	MATAWAN BORO	0	SHREWSBURY TWP.	*
ASBURY PARK CITY	*	HAZLET TWP.	4	MIDDLETOWN TWP.	18	SOUTH BELMAR BORO	0
ATLANTIC HIGHLANDS BORO	3	HIGHLANDS BORO	0	MILLSTONE TWP.	26	SPRING LAKE BORO	*
AVON-BY-THE-SEA BORO	0	HOLMDEL TWP.	34	MONMOUTH BEACH BORO	3	SPRING LAKE HEIGHTS BORO	0
BELMAR BORO	1	HOWELL TWP.	167	NEPTUNE TWP.	*	TINTON FALLS BORO.	3
BRADLEY BEACH BORO	0	INTERLAKEN BORO	0	NEPTUNE CITY BORO	0	UNION BEACH BORO	6
BRIELLE BORO	10	KEANSBURG BORO	3	OCEAN TWP.	34	UPPER FREEHOLD TWP.	*
COLTS NECK TWP.	*	KEYPORT BORO	*	OCEANPORT BORO	1	WALL TWP.	13
DEAL BORO	0	LITTLE SILVER BORO	*	RED BANK BORO	0	WEST LONG BRANCH BORO	*
EATONTOWN BORO	47	LOCH ARBOUR VIL.	*	ROOSEVELT BORO	1		
ENGLISHTOWN BORO	0	LONG BRANCH CITY	*	RUMSON BORO	1		
FAIR HAVEN BORO	1	MANALAPAN TWP.	61	SEA BRIGHT BORO	*		
MORRIS COUNTY	**236**						
BOONTON TOWN	1	FLORHAM PARK BORO	2	MONTVILLE TWP.	36	PEQUANNOCK TWP.	*
BOONTON TWP.	3	HANOVER TWP.	5	MORRIS TWP.	33	RANDOLPH TWP.	40
BUTLER BORO	0	HARDING TWP.	2	MORRIS PLAINS BORO	4	RIVERDALE BORO	*
CHATHAM BORO	*	JEFFERSON TWP.	14	MORRISTOWN TOWN	42	ROCKAWAY BORO	0
CHATHAM TWP.	2	KINNELON BORO	4	MOUNTAIN LAKES BORO	0	ROCKAWAY TWP.	2
CHESTER BORO	0	LINCOLN PARK BORO	1	MT. ARLINGTON BORO	*	ROXBURY TWP.	6
CHESTER TWP.	7	MADISON BORO	1	MT. OLIVE TWP.	*	VICTORY GARDENS BORO	*
DENVILLE TWP.	5	MENDHAM BORO	2	NETCONG BORO	0	WASHINGTON TWP.	*
DOVER TOWN	1	MENDHAM TWP.	1	PARSIPPANY-TROY HILLS TWP	*	WHARTON BORO	0
EAST HANOVER TWP.	7	MINE HILL TWP.	14	PASSAIC TWP.	1		
OCEAN COUNTY	**439**						
BARNEGAT TWP.	*	HARVEY CEDARS BORO	2	MANCHESTER TWP.	32	SEASIDE PARK BORO	0
BARNEGAT LIGHT BORO	0	ISLAND HEIGHTS BORO	2	MANTOLOKING BORO	1	SHIP BOTTOM BORO	2
BAY HEAD BORO	0	JACKSON TWP.	19	OCEAN TWP.	12	SOUTH TOMS RIVER BORO	*
BEACH HAVEN BORO	1	LACEY TWP.	60	OCEAN GATE BORO	*	STAFFORD TWP.	*
BEACHWOOOD BORO	*	LACKHURST BORO	0	PINE BEACH BORO	*	SURF CITY BORO	0
BERKELEY TWP.	*	LAKEWOOD TWP.	4	PLUMSTED TWP.	*	TUCKERTON BORO	0
BRICK TWP.	21	LAVALLETTE BORO	58	POINT PLEASANT BORO	38		
DOVER TWP.	139	LITTLE EGG HARBOR TWP	15	POINT PLEASANT BEACH BORO	26		
EAGLESWOOD TWP.	1	LONG BEACH TWP.	*	SEASIDE HEIGHTS BORO	6		



RESIDENTIAL BUILDING PERMITS

STATE OF NEW JERSEY
THOMAS H. KEAN
Governor

DEPARTMENT OF LABOR
CHARLES SERRAINO
Commissioner

Data for August 1985 | State of New Jersey | Prepared in October 1985

Planned homebuilding in New Jersey continued to be strong in August 1985. The number of dwelling units authorized by building permits for the month totaled 4,373, nearly 250 more than July 1985 and about 1,450 higher than August 1984. For the first eight months of 1985, total planned units were 36% higher than the comparable period in 1984.

The two major components of planned homebuilding--single family and apartments accounted for 96% of the current month's activity. A total of 3,219 single family units were authorized, which represented 73.6% of all activity; a total of 978 apartment units, representing 22.4% were planned.

Of the state's 21 counties, only Cumberland and Warren Counties failed to keep pace with their 1984 levels. Middlesex County (4,439 units) continues to lead the state in new residential construction followed by Ocean (3,318 units), Monmouth (3,151 units), Morris (4,138 units), Atlantic (1,434 units), and Somerset (1,383 units) counties.

RESIDENTIAL CONSTRUCTION AUTHORIZED BY BUILDING PERMITS

TYPE OF CONSTRUCTION	AUGUST [1] 1985	JULY [2] 1985	YEAR TO DATE [3] 1985	1984	PERCENT CHANGE
TOTAL DWELLING UNITS AUTHORIZED	4,373	4,138	27,200	19,994	36.0
PRIVATE UNITS	4,373	4,138	27,130	19,633	38.2
SINGLE FAMILY	3,219	2,682	18,836	13,865	35.9
TWO FAMILY	120	146	1,192	912	30.7
THREE OR FOUR FAMILY	56	12	740	263	181.4
FIVE OR MORE FAMILY	978	1,298	6,362	4,084	31.8
PUBLIC UNITS	0	0	70	361	-80.6
ESTIMATED COST OF RESIDENTIAL CONSTRUCTION ($000'S)	267,124	277,917	1,816,547	1,324,238	37.2
NEW RESIDENTIAL BUILDINGS	233,985	223,374	1,533,658	1,088,098	40.9
ADDITIONS AND ALTERATIONS	33,139	54,543	282,889	236,140	19.8

NOTES: 1 BASED ON REPORTS RECEIVED FROM 401 OF 567 MUNICIPALITIES.
2 BASED ON REPORTS RECEIVED FROM 406 OF 567 MUNICIPALITIES.
3 DOES NOT INCLUDE LATE REPORTS.

SOURCE: N. J. DEPARTMENT OF LABOR

DWELLING UNITS AUTHORIZED BY BUILDING PERMITS
NEW JERSEY MUNICIPALITIES

AUGUST 1985

MUNICIPALITY	UNITS	MUNICIPALITY	UNITS	MUNICIPALITY	UNITS	MUNICIPALITY	UNITS
MONMOUTH COUNTY	**670**						
ABERDEEN TWP.	*	FARMINGDALE BORO	*	MANASQUAN BORO	0	SEA GIRT BORO	*
ALLENHURST BORO	0	FREEHOLD BORO	2	MARLBORO TWP.	41	SHREWSBURY BORO	0
ALLENTOWN BORO	0	FREEHOLD TWP.	40	MATAWAN BORO	0	SHREWSBURY TWP.	*
ASBURY PARK CITY	*	HAZLET TWP.	8	MIDDLETOWN TWP.	81	SOUTH BELMAR BORO	0
ATLANTIC HIGHLANDS BORO	1	HIGHLANDS BORO	1	MILLSTONE TWP.	7	SPRING LAKE BORO	*
AVON-BY-THE-SEA BORO	0	HOLMDEL TWP.	42	MONMOUTH BEACH BORO	0	SPRING LAKE HEIGHTS BORO	0
BELMAR BORO	0	HOWELL TWP.	296	NEPTUNE TWP.	*	TINTON FALLS BORO.	5
BRADLEY BEACH BORO	0	INTERLAKEN BORO	0	NEPTUNE CITY BORO	0	UNION BEACH BORO	1
BRIELLE BORO	24	KEANSBURG BORO	*	OCEAN TWP.	7	UPPER FREEHOLD TWP.	5
COLTS NECK TWP.	*	KEYPORT BORO	*	OCEANPORT BORO	1	WALL TWP.	15
DEAL BORO	0	LITTLE SILVER BORO	*	RED BANK BORO	0	WEST LONG BRANCH BORO	*
EATONTOWN BORO	18	LOCH ARBOUR VIL.	*	ROOSEVELT BORO	1		
ENGLISHTOWN BORO	0	LONG BRANCH CITY	3	RUMSON BORO	2		
FAIR HAVEN BORO	0	MANALAPAN TWP.	69	SEA BRIGHT BORO	*		
MORRIS COUNTY	**161**						
BOONTON TOWN	0	FLORHAM PARK BORO	1	MONTVILLE TWP.	18	PEQUANNOCK TWP.	*
BOONTON TWP.	6	HANOVER TWP.	4	MORRIS TWP.	2	RANDOLPH TWP.	26
BUTLER BORO	0	HARDING TWP.	1	MORRIS PLAINS BORO	1	RIVERDALE BORO	*
CHATHAM BORO	*	JEFFERSON TWP.	3	MORRISTOWN TOWN	8	ROCKAWAY BORO	0
CHATHAM TWP.	*	KINNELON BORO	12	MOUNTAIN LAKES BORO	1	ROCKAWAY TWP.	17
CHESTER BORO	2	LINCOLN PARK BORO	2	MT. ARLINGTON BORO	*	ROXBURY TWP.	14
CHESTER TWP.	7	MADISON BORO	12	MT. OLIVE TWP.	7	VICTORY GARDENS BORO	*
DENVILLE TWP.	0	MENDHAM BORO	5	NETCONG BORO	6	WASHINGTON TWP.	*
DOVER TOWN	*	MENDHAM TWP.	3	PARSIPPANY-TROY HILLS TWP	*	WHARTON BORO	*
EAST HANOVER TWP.	0	MINE HILL TWP.	3	PASSAIC TWP.	*		
OCEAN COUNTY	**537**						
BARNEGAT TWP.	*	HARVEY CEDARS BORO	0	MANCHESTER TWP.	47	SEASIDE PARK BORO	*
BARNEGAT LIGHT BORO	3	ISLAND HEIGHTS BORO	0	MANTOLOKING BORO	0	SHIP BOTTOM BORO	1
BAY HEAD BORO	0	JACKSON TWP.	42	OCEAN TWP.	14	SOUTH TOMS RIVER BORO	*
BEACH HAVEN BORO	1	LACEY TWP.	113	OCEAN GATE BORO	1	STAFFORD TWP.	20
BEACHWOOOD BORO	*	LACKHURST BORO	0	PINE BEACH BORO	2	SURF CITY BORO	0
BERKELEY TWP.	*	LAKEWOOD TWP.	3	PLUMSTED TWP.	*	TUCKERTON BORO	3
BRICK TWP.	179	LAVALLETTE BORO	0	POINT PLEASANT BORO	5		
DOVER TWP.	64	LITTLE EGG HARBOR TWP	29	POINT PLEASANT BEACH BORO	1		
EAGLESWOOD TWP.	3	LONG BEACH TWP.	*	SEASIDE HEIGHTS BORO	6		

RESIDENTIAL BUILDING PERMITS

STATE OF NEW JERSEY
THOMAS H. KEAN
Governor

DEPARTMENT OF LABOR
CHARLES SERRAINO
Commissioner

Data for September 1985 **State of New Jersey** **Prepared in November 1985**

A total of 3,148 new units were authorized for construction in September 1985, approximately 1,200 below the August 1985 figure but, 400 more units than in September 1984. Although new homebuilding slowed somewhat in September, the year-to-date totals are substantially higher than the comparable period of last year.

The addition of September's statistics brought the year-to-date total for 1985 to 30,348 units, 33.5% above the number of authorizations for the same period of 1984. All types of construction, with the exception of public housing, have shown gains compared to one year ago. The overwhelming majority of planned units continued to be single-family dwellings.

Based on nine months of data, the state's leading homebuilding centers in 1985 were Middlesex County with 5,033 authorized units, Ocean County with 3,757, and Monmouth County with 3,518 units. Of the state's 21 counties, 19 reported higher levels of activity in 1985. Only Camden County and Cumberland County have failed to keep pace with last year's level.

RESIDENTIAL CONSTRUCTION AUTHORIZED BY BUILDING PERMITS

TYPE OF CONSTRUCTION	SEPTEMBER[1] 1985	AUGUST[2] 1985	YEAR TO DATE[3] 1985	1984	PERCENT CHANGE
TOTAL DWELLING UNITS AUTHORIZED	3,146	4,373	30,346	22,738	33.5
PRIVATE UNITS	3,145	4,373	30,275	22,377	35.3
SINGLE FAMILY	2,111	3,219	20,947	15,925	31.5
TWO FAMILY	98	120	1,290	1,006	28.2
THREE OR FOUR FAMILY	48	56	788	295	167.1
FIVE OR MORE FAMILY	888	978	7,250	5,151	40.7
PUBLIC UNITS	1	0	71	361	-80.3
ESTIMATED COST OF RESIDENTIAL CONSTRUCTION ($000'S)	219,127	267,124	2,035,674	1,500,661	35.7
NEW RESIDENTIAL BUILDINGS	190,798	233,985	1,724,456	1,233,321	39.8
ADDITIONS AND ALTERATIONS	28,329	33,139	311,218	267,340	16.4

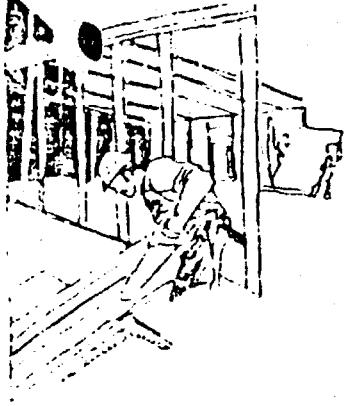
NOTES: 1 BASED ON REPORTS RECEIVED FROM 391 OF 567 MUNICIPALITIES.
2 BASED ON REPORTS RECEIVED FROM 401 OF 567 MUNICIPALITIES.
3 DOES NOT INCLUDE LATE REPORTS.

SOURCE: N. J. DEPARTMENT OF LABOR

DWELLING UNITS AUTHORIZED BY BUILDING PERMITS
NEW JERSEY MUNICIPALITIES

SEPTEMBER 1985

MUNICIPALITY	UNITS	MUNICIPALITY	UNITS	MUNICIPALITY	UNITS	MUNICIPALITY	UNITS
MONMOUTH COUNTY	**367**						
ABERDEEN TWP.	*	FARMINGDALE BORO	0	MANASQUAN BORO	2	SEA GIRT BORO	*
ALLENHURST BORO	0	FREEHOLD BORO	2	MARLBORO TWP.	22	SHREWSBURY BORO	*
ALLENTOWN BORO	0	FREEHOLD TWP.	14	MATAWAN BORO	1	SHREWSBURY TWP.	0
ASBURY PARK CITY	*	HAZLET TWP.	1	MIDDLETOWN TWP.	12	SOUTH BELMAR BORO	0
ATLANTIC HIGHLANDS BORO	*	HIGHLANDS BORO	0	MILLSTONE TWP.	8	SPRING LAKE BORO	*
AVON-BY-THE-SEA BORO	0	HOLMDEL TWP.	19	MONMOUTH BEACH BORO	1	SPRING LAKE HEIGHTS BORO	1
BELMAR BORO	0	HOWELL TWP.	199	NEPTUNE TWP.	*	TINTON FALLS BORO.	31
BRADLEY BEACH BORO	1	INTERLAKEN BORO	0	NEPTUNE CITY BORO	0	UNION BEACH BORO	2
BRIELLE BORO	0	KEANSBURG BORO	2	OCEAN TWP.	11	UPPER FREEHOLD TWP.	1
COLTS NECK TWP.	*	KEYPORT BORO	*	OCEANPORT BORO	1	WALL TWP.	12
DEAL BORO	*	LITTLE SILVER BORO	*	RED BANK BORO	0	WEST LONG BRANCH BORO	*
EATONTOWN BORO	2	LOCH ARBOUR VIL.	0	ROOSEVELT BORO	*		
ENGLISHTOWN BORO	0	LONG BRANCH CITY	4	RUMSON BORO	2		
FAIR HAVEN BORO	1	MANALAPAN TWP.	15	SEA BRIGHT BORO	*		
MORRIS COUNTY	**140**						
BOONTON TOWN	0	FLORHAM PARK BORO	2	MONTVILLE TWP.	32	PEQUANNOCK TWP.	*
BOONTON TWP.	*	HANOVER TWP.	3	MORRIS TWP.	17	RANDOLPH TWP.	*
BUTLER BORO	5	HARDING TWP.	0	MORRIS PLAINS BORO	0	RIVERDALE BORO	*
CHATHAM BORO	*	JEFFERSON TWP.	8	MORRISTOWN TOWN	0	ROCKAWAY BORO	0
CHATHAM TWP.	2	KINNELON BORO	9	MOUNTAIN LAKES BORO	0	ROCKAWAY TWP.	18
CHESTER BORO	0	LINCOLN PARK BORO	2	MT. ARLINGTON BORO	*	ROXBURY TWP.	15
CHESTER TWP.	7	MADISON BORO	0	MT. OLIVE TWP.	10	VICTORY GARDENS BORO	*
DENVILLE TWP.	4	MENDHAM BORO	2	NETCONG BORO	*	WASHINGTON TWP.	*
DOVER TOWN	*	MENDHAM TWP.	4	PARSIPPANY-TROY HILLS TWP	*	WHARTON BORO	*
EAST HANOVER TWP.	*	MINE HILL TWP.	0	PASSAIC TWP.	*		
OCEAN COUNTY	**439**						
BARNEGAT TWP.	*	HARVEY CEDARS BORO	1	MANCHESTER TWP.	73	SEASIDE PARK BORO	1
BARNEGAT LIGHT BORO	2	ISLAND HEIGHTS BORO	*	MANTOLOKING BORO	0	SHIP BOTTOM BORO	0
BAY HEAD BORO	0	JACKSON TWP.	*	OCEAN TWP.	31	SOUTH TOMS RIVER BORO	*
BEACH HAVEN BORO	0	LACEY TWP.	44	OCEAN GATE BORO	4	STAFFORD TWP.	36
BEACHWOOOD BORO	14	LACKHURST BORO	0	PINE BEACH BORO	0	SURF CITY BORO	2
BERKELEY TWP.	*	LAKEWOOD TWP.	12	PLUMSTED TWP.	*	TUCKERTON BORO	1
BRICK TWP.	118	LAVALLETTE BORO	0	POINT PLEASANT BORO	4		
DOVER TWP.	69	LITTLE EGG HARBOR TWP	13	POINT PLEASANT BEACH BORO	1		
EAGLESWOOD TWP.	1	LONG BEACH TWP.	*	SEASIDE HEIGHTS BORO	12		



RESIDENTIAL BUILDING PERMITS

STATE OF NEW JERSEY
THOMAS H. KEAN
Governor

DEPARTMENT OF LABOR
CHARLES SERRAINO
Commissioner

Data for October 1985 | State of New Jersey | Prepared in December 1985

Local construction officials reported over 3,900 new units authorized for construction in Octoberr 1985, approximately 800 units more than September 1985 and 1,100 above the October 1984 figure. For the first ten months of 1985, total planned units were 34% higher than the comparable period in 1984.

Authorizations for single-family units, which represented 69% of all activity, were up almost 32% during the first ten months of 1985 compared to the same period for 1984. Planned apartments, which accounted for 24% of all activity were up by 43% during the same period.

Of the state's 21 counties, Camden and Cumberland remain the only counties unable to keep pace with their 1984 levels. Middlesex County with 5,737 authorized units continues to be the top choice of new homebuilders in the state, followed by Ocean County with 4,451, Monmouth County with 4,091, Mercer County with 1,901, Morris County with 1,813, and Atlantic County with 1,737 units.

RESIDENTIAL CONSTRUCTION AUTHORIZED BY BUILDING PERMITS

TYPE OF CONSTRUCTION	OCTOBER[1] 1985	SEPTEMBER[2] 1985	YEAR TO DATE[3] 1985	YEAR TO DATE[3] 1984	YEAR TO DATE[3] PERCENT CHANGE
TOTAL DWELLING UNITS AUTHORIZED	3,932	3,146	34,278	25,576	34.0
PRIVATE UNITS	3,882	3,145	34,157	25,215	35.5
SINGLE FAMILY	2,861	2,111	23,808	18,090	31.6
TWO FAMILY	168	98	1,458	1,172	24.4
THREE OR FOUR FAMILY	36	48	824	324	154.3
FIVE OR MORE FAMILY	817	888	8,067	5,629	43.3
PUBLIC UNITS	50	1	121	361	-66.5
ESTIMATED COST OF RESIDENTIAL CONSTRUCTION ($000'S)	262,543	219,127	2,298,217	1,689,295	36.0
NEW RESIDENTIAL BUILDINGS	222,904	190,798	1,947,360	1,392,843	39.8
ADDITIONS AND ALTERATIONS	39,639	28,329	350,857	296,452	18.4

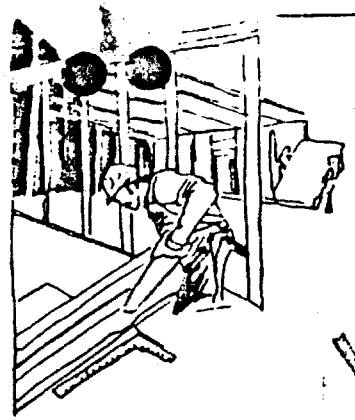
NOTES: [1] BASED ON REPORTS RECEIVED FROM 402 OF 567 MUNICIPALITIES.
[2] BASED ON REPORTS RECEIVED FROM 391 OF 567 MUNICIPALITIES.
[3] DOES NOT INCLUDE LATE REPORTS

SOURCE: N. J. DEPARTMENT OF LABOR

DWELLING UNITS AUTHORIZED BY BUILDING PERMITS
NEW JERSEY MUNICIPALITIES

OCTOBER 1985

MUNICIPALITY	UNITS	MUNICIPALITY	UNITS	MUNICIPALITY	UNITS	MUNICIPALITY	UNITS
MONMOUTH COUNTY	**573**						
ABERDEEN TWP.	0	FARMINGDALE BORO	0	MANASQUAN BORO	0	SEA GIRT BORO	*
ALLENHURST BORO	1	FREEHOLD BORO	3	MARLBORO TWP.	51	SHREWSBURY BORO	0
ALLENTOWN BORO	0	FREEHOLD TWP.	*	MATAWAN BORO	0	SHREWSBURY TWP.	*
ASBURY PARK CITY	*	HAZLET TWP.	1	MIDDLETOWN TWP.	51	SOUTH BELMAR BORO	0
ATLANTIC HIGHLANDS BORO	*	HIGHLANDS BORO	0	MILLSTONE TWP.	8	SPRING LAKE BORO	*
AVON-BY-THE-SEA BORO	0	HOLMDEL TWP.	32	MONMOUTH BEACH BORO	0	SPRING LAKE HEIGHTS BORO	0
BELMAR BORO	0	HOWELL TWP.	233	NEPTUNE TWP.	*	TINTON FALLS BORO.	31
BRADLEY BEACH BORO	3	INTERLAKEN BORO	0	NEPTUNE CITY BORO	2	UNION BEACH BORO	4
BRIELLE BORO	24	KEANSBURG BORO	3	OCEAN TWP.	12	UPPER FREEHOLD TWP.	4
COLTS NECK TWP.	*	KEYPORT BORO	*	OCEANPORT BORO	*	WALL TWP.	32
DEAL BORO	*	LITTLE SILVER BORO	*	RED BANK BORO	0	WEST LONG BRANCH BORO	*
EATONTOWN BORO	5	LOCH ARBOUR VIL.	0	ROOSEVELT BORO	3		
ENGLISHTOWN BORO	0	LONG BRANCH CITY	4	RUMSON BORO	2		
FAIR HAVEN BORO	2	MANALAPAN TWP.	62	SEA BRIGHT BORO	*		
MORRIS COUNTY	**235**						
BOONTON TOWN	1	FLORHAM PARK BORO	2	MONTVILLE TWP.	33	PEQUANNOCK TWP.	*
BOONTON TWP.	2	HANOVER TWP.	8	MORRIS TWP.	1	RANDOLPH TWP.	*
BUTLER BORO	1	HARDING TWP.	5	MORRIS PLAINS BORO	2	RIVERDALE BORO	*
CHATHAM BORO	*	JEFFERSON TWP.	10	MORRISTOWN TOWN	4	ROCKAWAY BORO	0
CHATHAM TWP.	45	KINNELON BORO	5	MOUNTAIN LAKES BORO	0	ROCKAWAY TWP.	4
CHESTER BORO	1	LINCOLN PARK BORO	0	MT. ARLINGTON BORO	*	ROXBURY TWP.	16
CHESTER TWP.	4	MADISON BORO	*	MT. OLIVE TWP.	5	VICTORY GARDENS BORO	*
DENVILLE TWP.	9	MENDHAM BORO	5	NETCONG BORO	*	WASHINGTON TWP.	28
DOVER TOWN	2	MENDHAM TWP.	2	PARSIPPANY-TROY HILLS TWP	*	WHARTON BORO	0
EAST HANOVER TWP.	27	MINE HILL TWP.	12	PASSAIC TWP.	1		
OCEAN COUNTY	**694**						
BARNEGAT TWP.	*	HARVEY CEDARS BORO	3	MANCHESTER TWP.	68	SEASIDE PARK BORO	*
BARNEGAT LIGHT BORO	5	ISLAND HEIGHTS BORO	2	MANTOLOKING BORO	0	SHIP BOTTOM BORO	2
BAY HEAD BORO	1	JACKSON TWP.	86	OCEAN TWP.	10	SOUTH TOMS RIVER BORO	0
BEACH HAVEN BORO	1	LACEY TWP.	161	OCEAN GATE BORO	2	STAFFORD TWP.	6
BEACHWOOOD BORO	16	LACKHURST BORO	1	PINE BEACH BORO	0	SURF CITY BORO	2
BERKELEY TWP.	*	LAKEWOOD TWP.	6	PLUMSTED TWP.	*	TUCKERTON BORO	1
BRICK TWP.	149	LAVALLETTE BORO	2	POINT PLEASANT BORO	5		
DOVER TWP.	97	LITTLE EGG HARBOR TWP	47	POINT PLEASANT BEACH BORO	5		
EAGLESWOOD TWP.	0	LONG BEACH TWP.	*	SEASIDE HEIGHTS BORO	16		



RESIDENTIAL BUILDING PERMITS

STATE OF NEW JERSEY
THOMAS H. KEAN
Governor

DEPARTMENT OF LABOR
CHARLES SERRAINO
Commissioner

Data for November 1985 | State of New Jersey | Prepared in January 1986

New Jersey's building boom continued in November. Although down seasonally by about 550 units from October, new dwelling units authorized for construction in November registered 3,375 -- the second highest November total since 1978.

The addition of November's statistics brought the year-to-date total for 1985 to 37,653 units, 26.2% above the number of authorizations for the same period of 1984. All types of private construction have shown gains compared to one year ago. The overwhelming majority of planned units continue to be single-family dwellings.

Based on eleven months of data, the state's leading homebuilding centers in 1985 were Middlesex County with 5,915 units, Ocean County with 4,947, Monmouth County with 4,479, Mercer County with 2,139, and Morris County with 2,105 units. In fact, 18 of New Jersey's 21 counties registered higher levels of planned homebuilding activity while only Camden, Cumberland and Salem counties were unable to keep pace with their 1984 levels.

RESIDENTIAL CONSTRUCTION AUTHORIZED BY BUILDING PERMITS

TYPE OF CONSTRUCTION	NOVEMBER [1] 1985	OCTOBER [2] 1985	YEAR TO DATE [3] 1985	YEAR TO DATE [3] 1984	PERCENT CHANGE
TOTAL DWELLING UNITS AUTHORIZED	3,375	3,932	37,653	29,839	26.2
PRIVATE UNITS	3,375	3,882	37,532	29,478	27.3
SINGLE FAMILY	2,679	2,861	26,487	20,328	30.3
TWO FAMILY	110	168	1,568	1,270	23.5
THREE OR FOUR FAMILY	3	36	827	351	135.6
FIVE OR MORE FAMILY	583	817	8,650	7,529	14.9
PUBLIC UNITS	0	50	121	361	-66.5
ESTIMATED COST OF RESIDENTIAL CONSTRUCTION ($000'S)	234,852	262,543	2,533,069	1,914,153	32.3
NEW RESIDENTIAL BUILDINGS	203,145	222,904	2,150,505	1,589,471	35.3
ADDITIONS AND ALTERATIONS	31,707	39,639	382,564	324,682	17.8

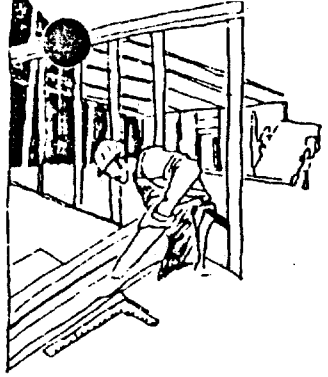
NOTES: [1] BASED ON REPORTS RECEIVED FROM 403 OF 567 MUNICIPALITIES.
[2] BASED ON REPORTS RECEIVED FROM 402 OF 567 MUNICIPALITIES
[3] DOES NOT INCLUDE LATE REPORTS.

SOURCE: N. J. DEPARTMENT OF LABOR

DWELLING UNITS AUTHORIZED BY BUILDING PERMITS
NEW JERSEY MUNICIPALITIES

NOVEMBER 1985

MUNICIPALITY	UNITS	MUNICIPALITY	UNITS	MUNICIPALITY	UNITS	MUNICIPALITY	UNITS
MONMOUTH COUNTY	**388**						
ABERDEEN TWP.	*	FARMINGDALE BORO	0	MANASQUAN BORO	2	SEA GIRT BORO	*
ALLENHURST BORO	*	FREEHOLD BORO	5	MARLBORO TWP.	43	SHREWSBURY BORO	0
ALLENTOWN BORO	1	FREEHOLD TWP.	*	MATAWAN BORO	*	SHREWSBURY TWP.	0
ASBURY PARK CITY	0	HAZLET TWP.	4	MIDDLETOWN TWP.	41	SOUTH BELMAR BORO	0
ATLANTIC HIGHLANDS BORO	0	HIGHLANDS BORO	*	MILLSTONE TWP.	4	SPRING LAKE BORO	*
AVON-BY-THE-SEA BORO	0	HOLMDEL TWP.	20	MONMOUTH BEACH BORO	0	SPRING LAKE HEIGHTS BORO	11
BELMAR BORO	2	HOWELL TWP.	148	NEPTUNE TWP.	*	TINTON FALLS BORO.	15
BRADLEY BEACH BORO	*	INTERLAKEN BORO	0	NEPTUNE CITY BORO	0	UNION BEACH BORO	1
BRIELLE BORO	2	KEANSBURG BORO	0	OCEAN TWP.	10	UPPER FREEHOLD TWP.	0
COLTS NECK TWP.	*	KEYPORT BORO	*	OCEANPORT BORO	*	WALL TWP.	30
DEAL BORO	1	LITTLE SILVER BORO	*	RED BANK BORO	0	WEST LONG BRANCH BORO	*
EATONTOWN BORO	1	LOCH ARBOUR VIL.	0	ROOSEVELT BORO	2		
ENGLISHTOWN BORO	0	LONG BRANCH CITY	1	RUMSON BORO	1		
FAIR HAVEN BORO	0	MANALAPAN TWP.	43	SEA BRIGHT BORO	*		
MORRIS COUNTY	**292**						
BOONTON TOWN	1	FLORHAM PARK BORO	0	MONTVILLE TWP.	10	PEQUANNOCK TWP.	*
BOONTON TWP.	2	HANOVER TWP.	5	MORRIS TWP.	3	RANDOLPH TWP.	31
BUTLER BORO	5	HARDING TWP.	1	MORRIS PLAINS BORO	0	RIVERDALE BORO	*
CHATHAM BORO	*	JEFFERSON TWP.	10	MORRISTOWN TOWN	0	ROCKAWAY BORO	1
CHATHAM TWP.	2	KINNELON BORO	13	MOUNTAIN LAKES BORO	*	ROCKAWAY TWP.	7
CHESTER BORO	0	LINCOLN PARK BORO	136	MT. ARLINGTON BORO	*	ROXBURY TWP.	13
CHESTER TWP.	0	MADISON BORO	2	MT. OLIVE TWP.	6	VICTORY GARDENS BORO	*
DENVILLE TWP.	3	MENDHAM BORO	1	NETCONG BORO	*	WASHINGTON TWP.	9
DOVER TOWN	0	MENDHAM TWP.	2	PARSIPPANY-TROY HILLS TWP	*	WHARTON BORO	*
EAST HANOVER TWP.	0	MINE HILL TWP.	0	PASSAIC TWP.	29		
OCEAN COUNTY	**496**						
BARNEGAT TWP.	*	HARVEY CEDARS BORO	2	MANCHESTER TWP.	184	SEASIDE PARK BORO	0
BARNEGAT LIGHT BORO	2	ISLAND HEIGHTS BORO	2	MANTOLOKING BORO	0	SHIP BOTTOM BORO	0
BAY HEAD BORO	0	JACKSON TWP.	93	OCEAN TWP.	7	SOUTH TOMS RIVER BORO	*
BEACH HAVEN BORO	2	LACEY TWP.	41	OCEAN GATE BORO	*	STAFFORD TWP.	23
BEACHWOOOD BORO	17	LACKHURST BORO	0	PINE BEACH BORO	1	SURF CITY BORO	4
BERKELEY TWP.	*	LAKEWOOD TWP.	11	PLUMSTED TWP.	*	TUCKERTON BORO	0
BRICK TWP.	56	LAVALLETTE BORO	0	POINT PLEASANT BORO	10		
DOVER TWP.	29	LITTLE EGG HARBOR TWP	5	POINT PLEASANT BEACH BORO	1		
EAGLESWOOD TWP.	1	LONG BEACH TWP.	*	SEASIDE HEIGHTS BORO	5		



RESIDENTIAL BUILDING PERMITS

STATE OF NEW JERSEY
THOMAS H. KEAN
Governor

DEPARTMENT OF LABOR
CHARLES SERRAINO
Commissioner

Data for December 1985 | State of New Jersey | Prepared in February 1986

Planned residential construction activity in New Jersey for 1985 exceeded last year's level by approximately 10,500 units or 32.5%, based on preliminary reports received from municipal construction officials. Historically, 1985 with 42,785 new units authorized is the most active year in new construction since 1973 when more than 52,100 new authorizations were reported.

Over 5,100 new dwelling units were authorized by building permits in December 1985, approximately 1,760 units higher than November 1985 and more than twice the number of authorizations (2,443) in December 1984. This represents the most activity reported for any month since August 1973 and the highest December total since 1971 when 5,134 and 5,638 units were authorized respectively. December 1985's figure was bolstered by a major project of 1,504 units in Jersey City, Hudson County, representing the largest monthly municipal total on record. The previous high was 1,200 units reported by Guttenberg in Hudson County in March 1974.

Preliminary 12-month figures showed a statewide total of nearly 42,800 units authorized in 1985 compared to 32,300 a year earlier but neither number includes late reports. Tabulations of late reports raised the 1984 figure from 32,282 to 43,925. Only after a similar tabulation for 1985 becomes available can an accurate comparison of 1984 and 1985 homebuilding activity be made.

A geographic breakdown of end-of-year statistics for 1985 revealed that Middlesex County with 6,370 units was the leader in new residential construction for the fifth consecutive year, followed by Ocean (5,518 units) and Monmouth (4,961 units) counties. The largest increase in activity between 1984 and 1985 occurred in Hudson County--up by 2,146 units.

RESIDENTIAL CONSTRUCTION AUTHORIZED BY BUILDING PERMITS

TYPE OF CONSTRUCTION	DECEMBER [1] 1985	NOVEMBER [2] 1985	YEAR TO DATE [3] 1985	YEAR TO DATE [3] 1984	YEAR TO DATE [3] PERCENT CHANGE
TOTAL DWELLING UNITS AUTHORIZED	5,132	3,375	42,785	32,282	32.5
PRIVATE UNITS	5,132	3,375	42,664	31,920	33.7
SINGLE FAMILY	2,631	2,679	29,118	22,088	31.8
TWO FAMILY	162	110	1,730	1,382	25.2
THREE OR FOUR FAMILY	14	3	841	401	109.7
FIVE OR MORE FAMILY	2,325	583	10,975	8,049	36.4
PUBLIC UNITS	0	0	121	361	-66.5
ESTIMATED COST OF RESIDENTIAL CONSTRUCTION ($000'S)	317,665	234,852	2,850,734	2,083,268	36.8
NEW RESIDENTIAL BUILDINGS	287,805	203,145	2,438,310	1,725,634	41.3
ADDITIONS AND ALTERATIONS	29,860	31,707	412,424	357,634	15.3

NOTES: [1] BASED ON REPORTS RECEIVED FROM 438 OF 567 MUNICIPALITIES.
[2] BASED ON REPORTS RECEIVED FROM 403 OF 567 MUNICIPALITIES.
[3] DOES NOT INCLUDE LATE REPORTS.

SOURCE: N. J. DEPARTMENT OF LABOR

DWELLING UNITS AUTHORIZED BY BUILDING PERMITS
NEW JERSEY MUNICIPALITIES

DECEMBER 1985

MUNICIPALITY	UNITS	MUNICIPALITY	UNITS	MUNICIPALITY	UNITS	MUNICIPALITY	UNITS
MONMOUTH COUNTY	**482**						
ABERDEEN TWP.	5	FARMINGDALE BORO	0	MANASQUAN BORO	2	SEA GIRT BORO	*
ALLENHURST BORO	*	FREEHOLD BORO	1	MARLBORO TWP.	86	SHREWSBURY BORO	0
ALLENTOWN BORO	0	FREEHOLD TWP.	24	MATAWAN BORO	2	SHREWSBURY TWP.	2
ASBURY PARK CITY	0	HAZLET TWP.	3	MIDDLETOWN TWP.	46	SOUTH BELMAR BORO	0
ATLANTIC HIGHLANDS BORO	0	HIGHLANDS BORO	*	MILLSTONE TWP.	4	SPRING LAKE BORO	*
AVON-BY-THE-SEA BORO	0	HOLMDEL TWP.	28	MONMOUTH BEACH BORO	*	SPRING LAKE HEIGHTS BORO	0
BELMAR BORO	2	HOWELL TWP.	240	NEPTUNE TWP.	*	TINTON FALLS BORO.	2
BRADLEY BEACH BORO	*	INTERLAKEN BORO	*	NEPTUNE CITY BORO	0	UNION BEACH BORO	1
BRIELLE BORO	3	KEANSBURG BORO	1	OCEAN TWP.	4	UPPER FREEHOLD TWP.	2
COLTS NECK TWP.	*	KEYPORT BORO	*	OCEANPORT BORO	3	WALL TWP.	8
DEAL BORO	*	LITTLE SILVER BORO	*	RED BANK BORO	0	WEST LONG BRANCH BORO	*
EATONTOWN BORO	4	LOCH ARBOUR VIL.	0	ROOSEVELT BORO	0		
ENGLISHTOWN BORO	0	LONG BRANCH CITY	7	RUMSON BORO	1		
FAIR HAVEN BORO	1	MANALAPAN TWP.	*	SEA BRIGHT BORO	*		
MORRIS COUNTY	**320**						
BOONTON TOWN	0	FLORHAM PARK BORO	0	MONTVILLE TWP.	5	PEQUANNOCK TWP.	*
BOONTON TWP.	2	HANOVER TWP.	1	MORRIS TWP.	35	RANDOLPH TWP.	*
BUTLER BORO	0	HARDING TWP.	3	MORRIS PLAINS BORO	0	RIVERDALE BORO	*
CHATHAM BORO	*	JEFFERSON TWP.	2	MORRISTOWN TOWN	0	ROCKAWAY BORO	0
CHATHAM TWP.	169	KINNELON BORO	4	MOUNTAIN LAKES BORO.	4	ROCKAWAY TWP.	5
CHESTER BORO	0	LINCOLN PARK BORO	49	MT. ARLINGTON BORO	*	ROXBURY TWP.	10
CHESTER TWP.	4	MADISON BORO	*	MT. OLIVE TWP.	6	VICTORY GARDENS BORO	*
DENVILLE TWP.	1	MENDHAM BORO	3	NETCONG BORO	0	WASHINGTON TWP.	7
DOVER TOWN	2	MENDHAM TWP.	4	PARSIPPANY-TROY HILLS TWP	*	WHARTON BORO	*
EAST HANOVER TWP.	3	MINE HILL TWP.	0	PASSAIC TWP.	1		
OCEAN COUNTY	**571**						
BARNEGAT TWP.	*	HARVEY CEDARS BORO	2	MANCHESTER TWP.	59	SEASIDE PARK BORO	0
BARNEGAT LIGHT BORO	5	ISLAND HEIGHTS BORO	0	MANTOLOKING BORO	0	SHIP BOTTOM BORO	4
BAY HEAD BORO	0	JACKSON TWP.	118	OCEAN TWP.	6	SOUTH TOMS RIVER BORO	*
BEACH HAVEN BORO	3	LACEY TWP.	35	OCEAN GATE BORO	*	STAFFORD TWP.	32
BEACHWOOOD BORO	10	LACKHURST BORO	0	PINE BEACH BORO	2	SURF CITY BORO	3
BERKELEY TWP.	106	LAKEWOOD TWP.	3	PLUMSTED TWP.	4	TUCKERTON BORO	0
BRICK TWP.	79	LAVALLETTE BORO	0	POINT PLEASANT BORO	5		
DOVER TWP.	64	LITTLE EGG HARBOR TWP	26	POINT PLEASANT BEACH BORO	0		
EAGLESWOOD TWP.	1	LONG BEACH TWP.	*	SEASIDE HEIGHTS BORO	4		

DRAFT

EXHIBIT F

TOWNSHIP OF DENVILLE

MORRIS COUNTY, NEW JERSEY

SUMMARY REPORT

AREA-WIDE SEWER SYSTEM CAPABILITIES

MT. LAUREL II CONSIDERATIONS

MAY 23, 1985

LEE T. PURCELL ASSOCIATES
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TOWNSHIP OF DENVILLE

AREA-WIDE SEWER SYSTEM CAPABILITIES

MT. LAUREL II CONSIDERATIONS

MAY 23, 1985

GENERAL

The Township of Denville, a municipality in the Upper Rockaway River Basin is a member community in the Rockaway Valley Regional sewerage Authority (RVRSA). RVRSA has been structured to provide sewage treatment at its facilities located close to the foot of the dam of the Boonton Reservoir, at a site in Boonton Township. New major facilities of RVRSA include its 12 MGD facility now under construction, and its regional interceptor sewer. Essentially, the latter parallels the Rockaway River in its upstream routing through the tributary municipalities. Pipe size is substantial for the interceptor with a 60-inch line in Denville, with reductions to 54-inch, 48-inch and 42-inch between the Denville-Rockaway Borough border and the Rockaway Township-Dover line.

Denville, as a contributing community, has been subject to a long-term court imposed and regulated building ban that has been in force some 14-15 years.

CONTROL OF SEWER CONNECTIONS

In its present situation, local connections to sewers must be reviewed for acceptance by RVRSA and the court under Judge Gasgoyne. Additionally, sewer extensions for developers or existing streets demonstrating need are subjected to review and comment of NJDEP prior to gaining approval for construction and activation. Details of

same and allocation under the court-imposed ban is felt to be beyond the scope of this evaluation, at this time.

RECENT LTPA STUDIES FOR THE TOWNSHIP OF DENVILLE

LTPA has provided Township-wide sewer system consultation from the inception and construction of area-wide sewers in the early 1960's. In recent years, and with cognizance of the planning guides of P.L. 92-500 and amendments thereto, this office has prepared:

a. 201 Facilities Plan - 1979
   (Approval by NJDEP of Addendum No. 4)
   EPA Project No. C-340-466-01

b. Regional Collector Sewer Step II Planning - 1982
   Contract 41 (A - F Inclusive)

c. Segmented Implementation Schemes to Alleviate Local Health Conditions and to provide Mechanical Upgrading:
   - o Meadow St. - Dickerson Rd. (Contract No. 41A)
   - o Upgrade Riverside Dr. Sewage Pumping Station (Contract No. 42)
   - o Front St. Sanitary Sewer (Contract No. 43)

ASSESSMENT OF RVRSA

A review of the Environmental Impact Statement on the Upper Rockaway River Basin, 201 Facility Plan, January 1981 Draft, indicates

the following data pertinent to land use planning for the Township of Denville:

Population Analysis, Table 2-3

Present Population (1977) Served	8,000
Predicted Growth 1980-2000	4,270
Presently Unsewered Population	3,770
Total Year 2000 Population	16,040

Constrained Saturation population, as per the EIS was calculated as 18,750, Table F-7 of the EIS.

Future Flows as Summarized in EIS Table 2-4

Present Flow	1.06 MGD
Year 2000	1.36 MGD

In-town share of industrial and institutional allowances would be superimposed upon the above-stated sewage flows.
Each of the cited tables are attached for perusal purposes.

From the above, sewage generation by community appears to present a format for allocation. However, in discussion with RVRSA technical personnel. Service Agreements were executed to represent "FIRST COME, FIRST SERVE" distribution of sewage plant capacity. Recent developments pertinent to the existing Rockaway Valley building ban indicate that the courts of New Jersey under Judge Gasgoyne may be a participant in future flow allocation in some form.

TOWNSHIP OF DENVILLE - COLLECTOR SEWER PLANNING

The 201 Facilities Plan for the Township of Denville, including all supplements and amendments thereto was completed in 1981. Approval of the Plan was made by USEPA and a Step 2 Planning Grant was tendered to the Township on July 8, 1981.

The Plan due to its early completion did not undertake a "needs survey", but it did define the known septic tank malfunctions for the period of 1971 - 1977, including the existing development in the Den Brook Area. It should be noted that the EPA review found that areas of existing development experiencing such problems in the Franklin Road Area and the Union Hill - Openaki Road Area, were ineligible for funding for improvements due to the low density (units per acre) development. Construction without benefit of Federal funds could be undertaken by the Township.

The Township, although not able to sewer these properties at the present, intends to maintain appropriate allocation for future alleviation of the septic system problems, especially where the land form is not condusive to successful on-site disposal of sewage.

In accordance with the precepts of P.L. 92-500, USEPA funded collector sewer construction was developed to assure service to those areas where two-thirds of the households were in existence prior to October 18, 1972. NJDEP approved plans prepared by LTPA under Contract 41 complied with said regulation, and designated those areas of demonstrated need for the implementation of central collector sewers. Upon completion of these lines, additional quanitites of carry domestic wastewater would be transported to the RVRSA

interceptor sewer. Included in this planning were six (6) major sub-areas (or contracts) as follows:

Segment No.	Contract No.	Area Description
1	41-A	Lake Arrowhead/Route 46
2	41-B	Meadow Street to Industrial Rd.
3	41-C	Hall Ave., Richwood Pl., Cook's Rd. Vicinity near Conrail R.O.W. and Route 80.
4	41-D	Cisco Tract off Board St. Between Route 46 and Route 80.
5	41-E	Harriman St. Vicinity Between Savage Rd. and Route 80.
6	41-F	Cedar Lake - Cook's Pond locality, northward of Morris Avenue.

All of the above have been identified and mapped in detailed plans, including environmentally acceptable routes and connections to RVRSA. LTPA map, Drawing No. 3677, Sheet 1 of 109 on file with the Township would identify same. Based on the level of planning of the 201, some 1,025 individual residences eligible under the guidelines of P.L. 92-500 would receive service, should federal funds become available, under the combined planning for Contract 41. It should be noted, that with or without financial aid, such areas are of sufficient density and have experienced frequent septic system failure to warrant further consideration for central sewer construction.

Physical Connections to RVRSA

201 Facilities Plan localities were to be connected to RVRSA as per the following schedule:

Segment No.	Point of Connection
1	At Savage Rd. via Pumping Station and 6,900 feet of 8-inch force main.
2	Via Peak Meadow Brook Trunk Sewer (Exist.) to Savage Rd.
3	Via Savage Rd. Peck Meadow Brook Trunk Sewer (Exist.) to Savage Rd.
4	River crossing near Rockaway Borough Boundary.
5	At Savage Road
6	Cedar Lake Rd. (Portion of Service Area; Cedar Lake, Cooks Pond at Diamond Spring Rd.).

DEN BROOK/FRANKLIN ROAD SYSTEM

A study of the capacity of certain major facilities identified as the Den Brook/Franklin Road System to accept flow from Randolph Township, and the tributary areas within Denville that connect to the Den Brook interceptor from its upstream origin at the Randolph Boundary to the Forest Trail Sewage Pumping Station. A house count based on mapping and Township sewer information indicates that 3,499 existing sewered and unsewered units were tributary to said trunk sewer without consideration of the Brill Tract (Affordable Living Corporation). Also, vacant land areas westerly of Franklin Rd. but lying in the Den Brook Drainage Basin were not initially accounted for. One constraint placed upon the initial study of the Den Brook/Franklin Road System was the requirement that intensive

development on large vacant tracts, with or without the need to satisfy Mt. Laurel II, would be separately diverted over the ridge to join the RVRSA interceptor sewer through the Rockaways. Such planning would avert severe impacts upon facilities known to be undersized based on present operations.

DEN BROOK/FRANKLIN ROAD SEWAGE SYSTEM ANALYSIS

A sanitary sewage system exists within the Township that has been constructed to serve the residential, commercial and industrial properties of the Township. With few exceptions, all such properties are conected to the RVRSA trunk sewer system, with treatment provided at the RVRSA facilities.

A major segment of the Township's collector system serves the portions of the Township lying southward of the Route 80 ROW. The purpose of this analysis is to address the major elements of the infrastructure that serve as the trunk or interceptor system for this area.

The southerly portion of the municipality that are sewered include the combined valleys of Peck Meadow Brook and Den Brook, including the Indian Lake section of the Township. The major components of the Den Brook/Franklin Road system serve portions of the Township as well as segments of Randolph Township. With only minor exceptions, all sewage generated in the drainage basin passes through the Forest Trail Sewage Pumping Station (SPS). Of primary interest for this document is the Den Brook/Franklin Road system which must provide service (by Contractual Agreement) to Randolph and to Denville residents as well; see attached schematic diagram.

It is the intent of this document to identify the major components of the infrastructure (sewer system) and their relative capacities. Additionally, the said capacities will then be converted to allowable connection units, whether existing or proposed. It will be necessary that the Township verify thereafter, the existing connections, allocated connections via the planning board and/or court-mandated (building ban) decisions, and available connections which could be reserved for the intense development now envisioned for the Brill Tract on Shongum Mountain.

Tributary Units to the Study Area

For the purpose of ascertaining the growth potential, the housing mapping developed by Catlin Associates, dated September 30, 1981, was utilized. Lots approved for subdivision growth were marked based on the current status of use or construction. This information is reflected in Table S-1.

Included within this summary are:

a. 1200 contracted-for units in Randolph;

b. allowance for residential units actually being served;

c. allowance for 2 schools, with each one taken to be equivalent to 20 residential units;

d. units approved for subdivision construction;

e. residential units existing in the Den Brook Drainage Basin with reasonable density but currently without a central sewer system;

f. allowance in the amount of 417 existing (1979 value) plus 50 additional to care for recent sewer construction in the Peck

TOWNSHIP OF DENVILLE

TABLE S-1

TRIBUTARY UNITS TO THE SANITARY SEWER SYSTEM

DEN BROOK/FRANKLIN ROAD

SYSTEM SEGMENT	SEWERED UNITS	UNITS APPROVED OR UNDER CONST.	EXISTING NON-SEWERED UNITS
Den Brook/Randolph	1200	--	--
Den Brook/South of Rte 10	217	221	180
Den Brook, North of Rte 10	225	--	58
Estling Lake Community	--	--	62
Indian Lake to South Shore SPS	193	--	58
Franklin Rd. Trunk Sewer	618	--	--
Hall Ave. to Franklin Rd.	417	50	--
SUBTOTALS	2870	271	358
GRAND TOTAL		3499[1]	

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1. Does not include any units on the Brill Tract.

Meadow basin along Luger Drive, Meadow Street and the Front Street project (HUD approved); and

g. allowance for Rte. 10 commercial strip for future connections in the amount of 30 equivalent units.

Specifically excluded from the analyses of anticipated needs at this time is any future development on the Brill Tract, since this land is currently vacant and, further, the capability of serving same is to be developed by this study.

Existing Capacities

Table S-2 represents the summary of capacities for the major lines of the conveyance system tributary to the RVRSA trunk sewer at Savage Road, just north of Route 46. The values shown for pipe lines are based on the slopes shown on engineering documents for the gravity lines and a Kutter's "n" of 0.013. The capacity as noted represents the quantity in millions of gallons per day (MGD) that the pipeline could carry when flowing full, but without surcharge. This is the PEAK FLOW value and the average flow can then be developed by dividing by the peaking factor of 2.9[1] for the trunk sewerage system. The AVERAGE FLOW OR design capacity is also listed for each

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1. Peak to average flow ratio of 2.9 utilized based on design of improvements for Forest Trail SPS and related facilities. Source: ASCE MANUAL 37, Design and Construction of Sanitary and Storm Sewers, Fig. 4, Curve A, "Ratio of extreme flows to average daily flow compiled from various sources". It is presumed that this value will care for diurnal variations and moderate inflow to the system.

segment of the system.

Based on the AVERAGE FLOW, the theoretical number of allowable connection units can be ascertained. This effort was undertaken for this study so that the tributary equivalent residential units (existing and new) can be compared to allocation needs within the basin. The means to develop same must recognize that infiltration/inflow management must be included. The most current standards of EPA regarding infiltration allowance, where this is considered to be non-excessive in existing sewers, permits calculations to include 70 gal/capita/day (gcd) for sewage flow plus 50 gcd for a total 120 gcd. For the purposes of this initial analysis, the overall contribution per household was taken as the Allowable set by USEPA as follows:

120 gcd x 3.2 persons/unit = 384

Say 385 gal/unit/day or 0.000385 MGD/unit

Reduction in system capacity to allow for excessive inflow has not been made part of this analysis at this time.

In Table S-2, Gross Connection Units based on Average Flow have been computed. For Forest Trail and northward to the existing RVRSA trunk sewer, there appears that with future modification as per proposed planning of January 1980, it will be possible to continue to serve new and existing dwelling units at the Forest Trail SPS, including tributary flow from:

a. Den Brook/Franklin Rd. for Denville

b. Den Brook/Franklin Rd. for Randolph

c. Peck Meadow Brook Intercepting system via Hall Avenue (Railroad Avenue) SPS.

TOWNSHIP OF DENVILLE

TABLE S-2

INTERCEPTING SEWER SYSTEM

DEN BROOK/FRANKLIN ROAD

MAY 1985

System Element	Exist Peak Cap (MGD)	Ave Flow (MGD)	Planning Remarks	Gross Connection (Units)	Randolph Allocation (Units)	Denville Allotment (Units) Total	Exist & Allocated	Existing Unsewered	Available
RVRSA Trunk Sewer	--	--	Tie-in at Savage Rd.	--	--	--	--	--	--
Inverted Siphon	4.3	1.48	None	3844	1200	2644	1941	358	345[1]
24" Ø, N/S Rte 46	3.8	1.31	Bypass w/14" F.M., Plans Exist	3402	1200	2202	1941	358	None[1]
18" Ø, Crossing Rte 46	2.65	0.91	Bypass w/14" F.M., Plans Exist	2364	1200	1164	1941	358	None[1]
10" Ø, F.M. from Forest Trail SPS	--	--	Parallel w/14" F.M., Plans Exist	--	--	--	--	--	None[1]
Forest Trail SPS	3.5	1.21	Upgrade Station by Adding Redundant Pump/Station Improvements	3116	1200	1916	1941	358	None[1]
24" Ø, Franklin Rd.	5.0	1.72	S=0.11%, Picks up Hall Ave. P.S.	4468	1200	3268	1941	358	969
24" Ø, Franklin Rd.	4.2	1.45	S=0.08%	3766	1200	2566	1474	358	734
18" Ø, Franklin Rd.	3.9	1.34	S=0.32%	3481	1200	2281	1174	358	749
South Shore SPS	2.7	0.93	Collects Den Brook, Part Indian Lake	2415	1200	1215	856	358	1
18" Ø Den Brook Interceptor	2.4	0.83	North of Rte 10, S=0.12%	2078	1200	878	663	300	None
18" Ø Den Brook Interceptor	2.4	0.83	South of Rte 10, S=0.12%	2078	1200	878	438	150	290

1. 3.50 MGD Limitation w/10" F.M. & Exist. Downstream Conditions. With 14 in. F.M., capacity will increase to 4.39 MGD Peak, 1.51 MGD Average. 1.51 MGD is equivalent to 3922 units with available units equal to 450 once improvements are on-line.

Portions of the Indian Lake Area are directly tributary to the Franklin Road trunk sewer, while other portions in the Den Brook drainage basin enter the sytem through the South Shore Sewage Pumping Station. Randolph tributary areas also flow through the South Shore SPS.

Connection Unit Information

Based on current mapping, and sewer department records, the distribution of existing and future connection units amounts to the following:

	DENVILLE & RANDOLPH	DENVILLE ONLY
Forest Trail SPS	3499	2299
Hall Ave. SPS	--	467
South Shore SPS	2414	1214

Deficiency in Capacity

Examination of the data shown in Table S-2 reveals that the allotment of units within Denville indicates that capacity will not be available in portions of the Den Brook/Franklin Rd. system to allow for the Brill Tract. This occurs in the following reaches of the system:

a) Sections of 18 in. Den Brook Interceptor above Rte 10 to Openaki Road;

b) Sections of 18 in. Den Brook Interceptor between Rte 10 and the South Shore Sewage Pumping Station;

c) The South Shore Sewage Pumping Station; and

d) The Forest Trail Sewage Pumping Station and the Conveyance System to the RVRSA trunk.[1]

Deficient capacity would require upgrade of the above-indicated elements (off-tract improvements) so that sufficient capacity was available in the trunk and interceptor sewers of the municipality to carry additional subdivision development beyond that currently planned for. It is projected at this time that the off-tract improvements would include the following work elements and estimated costs therefor are shown in Table S-3. The work includes the reinforcement of approximately 6000 l.f. of the Den Brook interceptor, beginning at the South Shore SPS and proceeding upstream along, and parallel to the existing Den Brook Interceptor to upgrade the lower portions of this line that is at maximum slope (s = 0.12%). For the purposes of this study, a minimum of 6000 l.f. has been proposed for upgrading along Estling Lake (Estling Lake Road). The exact configuration and exact final length of pipe requiring reinforcement would have to be determined on the basis of final, detailed engineering study and field investigation. Since there was identified capacity of 290 homes in the 18-inch Den Brook Interceptor south of Route 10, consideration for upgraidng same has been held in abeyance until such time that upstream users are better identified.

Environmental Considerations

The above proposed upgrade does not reflect the approval of environmental considerations. It appears that this would directly

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1. Plans exist for the upgrade of this segment of the existing infrastructure.

TOWNSHIP OF DENVILLE

TABLE S-3

ESTIMATED COSTS FOR IMPROVEMENTS

TO THE DEN BROOK/FRANKLIN ROAD SEWER SYSTEM OF THE TOWNSHIP

ITEM	COSTS (1984) CONSTRUCTION	PROJECT[1]
Forest Trail SPS and Coveyance System to RVRSA	$ 997,000	$1,371,000
6000 l.f. 18" Ø Den Brook Parallel Interceptor	750,000	1,031,000
South Shore SPS Upgrade	200,000	300,000
	$1,947,000	$2,702,000

1. Project Costs include additional monies for contingencies, financing and bonding costs, and fees for engineering, legal and administrative services.

relate to the final routing of the parallel interceptor for Den Brook. At such time that the project becomes available for detailed planning and the preparation of Contract Documents, an environmental assessment of the project should be undertaken.

Financial Consdierations - In-Basin Solution

An initial evaluation and assessment of growth potentials in the upper reaches of the Den Brook Drainage Basin and the Peck Meadow Brook Drainage Basin was made, and the extent of development was compared to the apparent capacity of the trunk and intercepting sewer system. The evaluation was made on the basis of equivalent residential units, including the need for continued service in Denville and Randolph Townships. Based on this first level assessment, it appears that the Township, in order to satisfy development pressures in the upper reaches of the Den Brook basin on the Brill Tract, must consider a means to construct and finance the following off-tract improvements to increase capacity:

a. Upgrade Forest Trail SPS and downstream conveyance system to reach RVRSA interceptor at Savage Road.

b. Upgrade South Shore Sewage Pumping Station.

c. Upgrade the interceptor by providing a parallel line 6000 l.f., 18 in. dia., southward from South Shore SPS.

It is projected that such improvements if undertaken to accommodate the needs for serving additional, intense development on the Brill Tract, will require the input of an estimated $1,947,000 in construction costs and $2,702,000 in project costs.

PROPOSED IMPROVEMENTS - DIVERSION TO RVRSA IN ROCKAWAY BOROUGH

Initial assessments of the Den Brook/Franklin Road system were confined to improvements within the basin to accommodate new growth in the upstream segments of the Township. It was the purpose of this work to identify the shorcomings in the major components of the Infrastructure and identify the available capacity of various component in terms of equivalent residential units, using an allowance of 385 gal/unit/day for the purpose of conversion of capacity to units (see Table S-2).

Reevaluation of the Den Brook System, with recognition of the proximity of Mt. Laurel II Sites 1-6 inclusive plus Site 8 (Brill), indicated that an alternate scheme appeared viable for upgrading the infrastructure. A major system modification could be constructed wherein the entire Den Book tributary area would be intercepted at a new major sewage pumping station located at the upstream (or southerly end of Estling Lake). The trunkated basin, including upstream segments of the Mt. Laurel sites between ther ridge line and Franklin Road could be routed to this same location. Flow would be diverted via force main along the adjacent railroad R.O.W. in combination with Franklin Avenue to bring all systems to the Rockaway Valley interceptor sewer within the Borough of Rockaway. Such a scheme would avert upgrading of the lower segments of the Den Brook sewerage system.

Preliminary Design of Sewer Diversion for Den Brook

The construction of a new sewage pumping station at the head end of Estling Lake, 14 in. force main, 24 in. gravity sewer, and 30 in. gravity sewer to RVRSA in Rockaway Borough were preliminary developed to care for the following existing and projected segments of equivalent residential units:

1.	Upper portions of Den Brook (Above Estling Lake)		
	a)	Sewered Exist & Unsewered Exist (Includes 1200 Randolph Units)	1826
	b)	Brill Tract (Affordable Living)	360
	c)	Sites 1-6 Mt. Laurel II @ 3000 Assume 1/2 in Basin	1500
	d)	Addition: In-Fill Units in Basin (Allowance)	200
			3886
		Say	3900

Additional connections would be added to this system in the Rockaway Valley between the ridge line and Franklin Avenue. This has been assumed to amount to an additional 1500 units at this level. In all, a system has been suggested herein by Lee T. Purcell Associates to provide alternate modifications to infrastructure, using a direct outlet through the planning area for new Mt. Laurel II proposed sites, and based on preliminary distribution of potential units under the Builders' Remedy, to evolve the potential cost for such an alternative, with the ability to serve up to 5400 total units.

Estimated cost for this consideration, and the responsibility for financing a project of this nature have been preliminary identified at the time of this writing. The estimated value for such a solution

would amount to $3,174,000 in construction costs and $4,404,000 in project costs.

Final configurations and size adjustments once Mt. Laurel site specific arrangements are known would then be utilized to adjust final improvements and their costs.

FUTURE SITUATION

The number of connections to the sewer system and the anticipated flows resulting therefrom could amount to the following for the Township of Denville. The values as noted are the combination of previously anticipated levels of development with impact of Mt. Laurel II, as follows:

	Population	Equivalent Dwelling Units
Existing Service (EIS)	8,000	2,500
Mt. Laurel II	13,000	4,400
201 Identified Need (LTPA)	3,280*	1,025
TOTAL	24,280	7,925

Existing service conversion between population and EDU is based on 3.2 persons/unit. Mt. Laurel II data represents the projected maximum solution under the "Builders' Remedy". 201 identified need utilizes the relationship of 3.2 persons per unit in the above table. The overall density would then amount to 3.06 persons/dwelling.

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* EIS indicates a presently unsewered population of 3,770 which would encompass a small number of persons beyond those LTPA has identified from 201 planning.

TOWNSHIP OF DENVILLE

TABLE S-4

ESTIMATED COST TO DIVERT

SEWAGE TO RVRSA

VIA ROCKAWAY BOROUGH

	COSTS (1985)	
	CONSTRUCTION	PROJECT
NPW Estling Lake SPS	$2,000,000	$2,776,000
2000 L.F., 14 in. Ø F.M.	150,000	208,000
1800 L.F., 24 in. Ø Grav. Sewer	234,000	325,000
3600 L.F., 30 in. Ø Grav. Sewer	540,000	749,000
Rockaway River Siphon	250,000	346,000
TOTAL	$3,174,000	$4,404,000

In addition to the above connections, allowances for future growth in the Township beyond the level of Mt. Laurel II must be recognized. The EIS projected a constrained saturation population of 18,740, and a year 2000 service population of 16,040. Of the latter 4,270 were predicted growth, and if realized over and above those shown in the above-stated summary, a design population in the magnitude of 24,380 + 4,270 or 28,650 should be considered for the year 2000. This is above the constrained saturation poulation by almost 10,000 persons. If Denville is allotted only 1.36 MGD of the current plant upgrade (12 MGD) by RVRSA, it would appear that this flow would be equivalent to the following number of potential equivalent dwelling units and population:

a)	Plant Capacity:	1,360,000 gal/day
b)	Equiv. Resid. Units @ 300 gal/unit/day	4533
c)	Equiv. Resid. Population @ 3.06 persons/unit	13,870

From the above, there is a question as to the magnitude of permissible growth due to the level of allocation to Denville, if the proportioning of flow is to prevail in accordance to the suggestions of the EIS distribution of potential flow.

The comparison of the Tables of this section indicate that a limiting factor in the expansion of the Township lies with the RVRSA and the administration of future allocation. This element may well be beyond the control of the Township, and may remain with the counts if the sewer ban is extended beyond the start-up of the new RVRSA wastewater treatment plant.

WASTE LOAD ALLOCATION

RVRSA is responsible to operate its wastewater treatment facilities under the administration of the NJPDES Permit issued by NJDEP to the Authority. In investigation of the maximum growth constraints that may be placed on the Upper Rockaway Valley Region by the capacity of the River to assimilate treated wastewater.

Currently, due to the fact that the Authority is in the midst of construction, it must only meet interim acceptable standards of NJDEP.

From our efforts in this regard, it was determined that the final levels of treatment are still in contention at this time. The question as to whether the RVRSA is required to Level 4 treatment without primary clarifiers preceding the oxidation ditch biological treatment, or whether the Authority can be required to perform to the less stringent Level 3 is the subject of a forthcoming Ajudicatory Hearing for the NJPDES Permit.

Additionally, the ability to maintain the 7.0 MGD letdown at the Boonton Reservoir to the lower portions of the Rockaway-Passaic Basin will be a factor in determining the degree of treatment that must be in place to satisfy 7 day - 10 year low flow criteria.

Waste load allocation may, once this is resolved for the River regime, become a limiting factor in the allowable development within the area of jurisdiction of RVRSA.

Elements of this nature are beyond the control of the Township of Denville, and should be a subject of detailed discussion with the Authority and NJDEP.

SUMMARY

The study of the major segments of the infrastructure of the Den Brook/Franklin Road sanitary sewer system was undertaken by this office to demonstrate the ability of such facilities to care for future growth in the Township, including the impact of Mt. Laurel II, Builders' Remedy, upon the pipelines and pumping stations of the Township.

Table S-2 includes data which shows deficiencies in capacity within the existing facilities to care for equivalent connection units representing existing sewered, allocated for sewers, and existing unsewered. Available capacity translated to connection units is carried in this table for each significant segment of the system.

Means to upgrade the infrastructure of Den Brook/Franklin Road have been included herein as follows:

- Facilities within the Basin to meet the needs of the Township exclusive of Mt. Laurel Sites 1-6. This could include the Affordable Living Tract and would require capital improvements estimated to amount to $1,947,000 in Construction Costs, and $2,702,000 in Project Costs.
- Facilities to divert flows generated above Estling Lake in concert with Mt. Laurel II Sites 1-6 directly to RVRSA through Rockaway Borough at estimated costs of $3,174,000 in Construction Costs, and $4,404,000 in Project Costs.

There appears to be insufficient proportioning of flow for the new 12 MGD RVRSA plant to accommodate existing and projected equivalent dwelling units. From the EIS prepared by USEPA, 1.36 MGD was considered for Denville through the 2000. This was shown to translate

into 4533 total units. However, the equivalent dwelling units, when combining existing service, Mt. Laurel II needs (Builders' Remedy), and the approved 201 Facilities Plan areas has been shown to encompass 7925 units. If flow is to be allocated according to a formula similar to that of the EIS, the Township could not accommodate all potential connections to the central sewer system.

Without specific aliocation guidelines imposed to parallel community needs, the "FIRST COME, FIRST SERVE" basis of management could prevail, unless the sewer ban is extended to permit court-imposed distribution of excess capacity in RVRSA. It appears that a growiong concern is materializing to assure a balanced regional plan that would incorporate single family, multiple family, and Mt. Laurel II needs as may be witnessed by the April 18, 1985 questionnaire of RVRSA.

Waste Load Allocations, and the degree of treatment to be rendered by RVRSA could limit the extent of growth for the currently-sized 12 MGD new RVRSA treatment plant. The NJPDES is still undergoing revision and discussion. It appears unresolved at this time and is scheduled to be the subject of an Ajudicatory Hearing at the time of preparation of this document.

LIMITATIONS

The information and conclusions contained in this report represent our best professional judgement regarding the generation of sewage flow, the capacities of the existing facilities, and the accuracies in construction of the facilities in accordance with the original design criteria and contract documents previously prepared by your office. There can be modified conditions created by others in making connections to the existing pipe, pumping stations, etc.,

of which Lee T. Purcell Associates and the undersigned have no knowledge of. This report has been prepared in accordance with generally accepted sanitary engineering practices and represents, to the best knowledge of the firm and the signatory, a correct estimation of the conditions as they presently appear to exist, and the cost to correct and/or upgrade deficient facilities.

Respectfully Submitted,

LEE T. PURCELL ASSOCIATES

Jerome Watman, P.E.
Associate

JW:tk

LEE T. PURCELL ASSOCIATES
CONSULTING ENGINEERS
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Paterson, New Jersey 07505

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Franklin, New Jersey 07416

ATTACHMENTS

proposed mt. laurel II sites

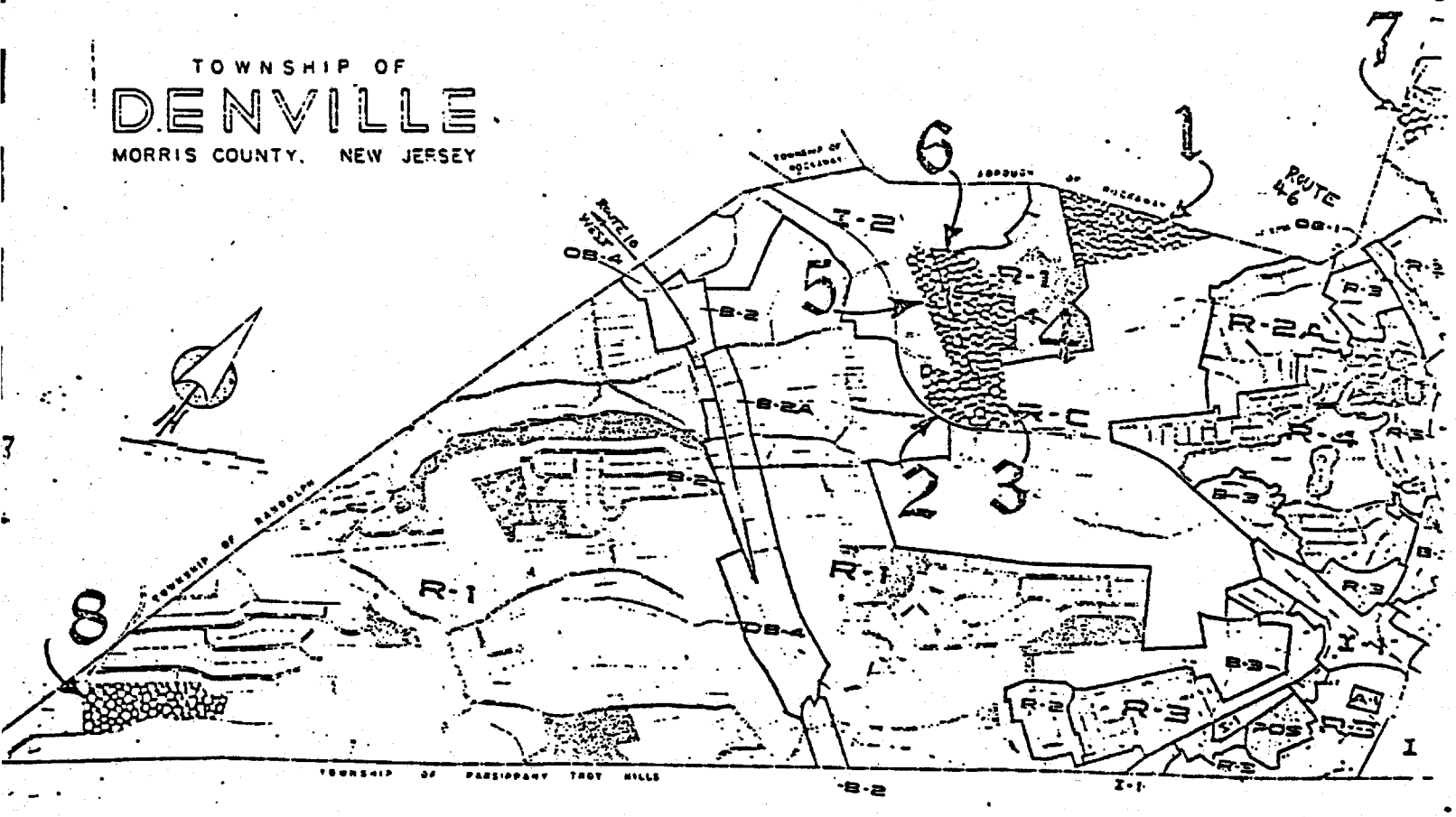


Table 2-3

Present and Future Populations To Be Served at RVRSA

Municipality[1]	Present[2] Population Served	Predicted[4] Growth 1980-2000	Percent of[5] Incremental Population Served By RVRSA	Present Unserved Population to be Served by Planned System Expansion	Total 2000 Population to be Served By RVRSA
Boonton Town	7,000	520	100	0	7,520
Dover Town	14,450[3]	160	100	0	14,610
Rockaway Borough	6,340[3]	510	100	0	6,850
Victory Gardens Borough	1,210[3]	120	100	0	1,330
Wharton Borough	5,200	570	100	0	5,770
Boonton Township	620	1,540	67	0	1,650
Denville Township	8,000	4,270	100	3,770	16,040
Mine Hill Township	0	1,370	100	1,360	2,730
Randolph Township	5,510	3,930	90	1,210	10,260
Rockaway Township	9,000	11,390	80	7,210	25,320
Montville Township	0	730	67	230	720
Total[6]	57,330	25,110	NA[7]	13,780	92,800

Notes:
1. Only municipalities to be served by RVRSA are shown.
2. Killam, 1977.
3. Entire estimated population served.
4. See Chapter 4.
5. Based on estimates of development.
6. Sums may not be precise due to rounding.
7. NA = Not applicable.

Table 2-4

Present and Future Flows to the RVRSA Plant

Domestic and Commercial Flows by Municipality	Present Flow Including Immediate System Expansion		Expected Year 2000 Flow cu m/d (mgd)	
Boonton Town	2,390	(0.63)	2,530	(0.67)
Dover Town	4,920	(1.30)	4,920	(1.30)
Rockaway Borough	2,160	(0.57)	2,310	(0.61)
Victory Gardens Borough	420	(0.11)	450	(0.12)
Wharton Borough	1,780	(0.47)	1,930	(0.51)
Boonton Township	230	(0.06)	490	(0.13)
Denville Township	4,010	(1.06)	5,150	(1.36)
Mine Hill Township	450	(0.12)	830	(0.22)
Randolph Township	2,270	(0.60)	3,220	(0.85)
Rockaway Township	5,530	(1.46)	8,020	(2.12)
Montville Township	0	(0)	230	(0.06)
Subtotal	24,150	(6.38)	30,090	(7.95)
Industrial Process Wastewater[1]	NA[2]		2,270	(0.6)
Industrial Sanitary Wastewater	1,890	(0.5)	1,890	(0.5)
Piccatiny Arsenal	1,140	(0.3)	1,140	(0.3)
Hospitals & Colleges	1,140	(0.3)	1,140	(0.3)
Infiltration/Inflow	3,790	(1.0)[3]	3,790	(1.0)[4]
Industrial Reserve Capacity	NA		3,410	(0.9)
Total[5]	32,170	(8.5)	43,900	(11.6)

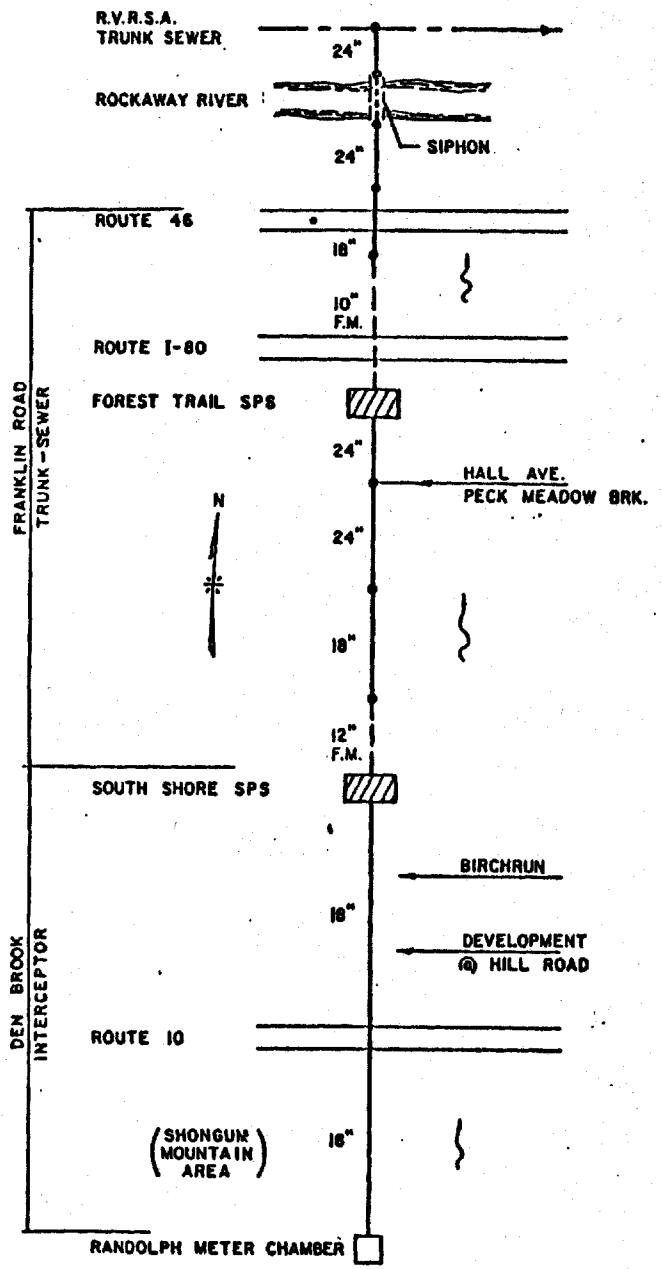
Notes:
1. See Table III-D-2 of Killam, 1977 for breakdown of industries contributing to this flow.
2. NA = Not applicable.
3. After implementation of I/I controls.
4. Based on total I/I of 2.5 mgd of which 0.5 is non excessive. It is also assumed that approximately 80% of the excessive I/I can be controlled.
5. Sums may not be precise due to rounding and metric conversions.

Table F-7 (continued)

Computation of Constrained Saturation Population

Municipality	Existing Housing Units (1975)	Maximum Potential Housing Units on Total Developable Vacant Land (Excluding Environmentally Constrained Land)				Total Potential Housing Units	Average Household Size	Constrained Saturation Population
		Zoning Category	Maximum Development Density hu/ha (hu/a)	Net Vacant Land ha(a)	Potential New Housing Units			
Column A	Column B	Column C	Column D	Column E	Column F (Col. DxE)	Column G (Col. B+E)	Column H	Column I (Col. GxH)
Boonton Township		R-1	1.2 (0.5)	376 (930)	465			
		R-2	2.7 (1.1)	42 (105)	116			
		R-3	3.7 (1.5)	36 (89)	134			
		R-4	5.4 (2.2)	31 (76)	167			
	1011	Subtotal		485 (1200)	882	1893	3.00	5679
Denville Township		R-C	2.7 (1.1)	164 (404)	444			
		R-1	2.7 (1.1)	233 (575)	633			
		R-2	7.2 (2.9)	30 (73)	212			
		R-2A	9.6 (3.9)	8 (20)	78			
		R-3	14.3 (5.8)	0 (1)	6			
		R-4	21.5 (8.7)	1 (3)	26			
		C	1.2 (0.5)	158 (391)	196			
	4473	Subtotal		594 (1467)	1595	6068	3.09	18,730
Jefferson Township*		R-E	0.7 (0.3)	700 (1730)	519			
		R-1	1.7 (0.7)	353 (873)	611			
		R-2	2.7 (1.1)	172 (424)	466			
		R-3	3.5 (1.4)	338 (836)	1170			
	3130	Subtotal		1563 (3863)	2766	5896	3.00	17,688

NOTE: *RVTPA portion.



	SEWERED & EXIST. UNITS TRIBUTARY	SEWERED & EXIST. UNITS AGGREGATE	UNSEWERED EXIST. UNITS	SUM OF ALL UNITS *
R.V.R.S.A. TRUNK SEWER		3141 (1941)		3499 (2299)
HALL AVE. PECK MEADOW BRK.	467	3141 (1941)		3499 (2299)
	618	2674 (1474)		3032 (1832)
SOUTH SHORE SPS	193	2056 (856)	58	2414 (1214)
BIRCHRUN	217	1863 (663)	120	2163 (963)
DEVELOPMENT @ HILL ROAD	8	1646 (446)		1826 (626)
ROUTE 10		1638 (438)	30	1818 (618)
(SHONGUM MOUNTAIN AREA)	438	1638 (438)	150	1788 (588)
RANDOLPH METER CHAMBER	1200	1200 (0)		1200 (0)

AUGUST 1984

* - DOES NOT INCLUDE THE BRILL TRACT
( ) - VALUE FOR DENVILLE ONLY

TOWNSHIP OF DENVILLE
MORRIS COUNTY NEW JERSEY

DEN BROOK/FRANKLIN ROAD TRUNK SEWER SCHEMATIC

LEE T. PURCELL ASSOCIATES
CONSULTING ENGINEERS
PATERSON NEW JERSEY
FRANKLIN NEW JERSEY

plaintiffs' argument that transfer to the Council will result in undue delay in the actual construction of affordable housing is meritless. The reality in Denville is that even should the court deny defendant's request to transfer this matter to the Council, low-income housing will not soon be built. Denville does not have the infrastructure to support large numbers of new housing units. A moratorium on sewer connections was imposed in 1967 and continues in effect today. The Rockaway Valley Regional Sewer Authority has been required to receive permission from Judge Jacques Gascoyne for each new connection with its member municipalities, and although it is now building new facilities, it is likely that these will be at capacity upon opening. At present, the R.V.R.S.A. does not plan further expansion. See letters from Fletcher N. Platt, Jr. to John Whalen, August 12, 1985, outlining current expansion plans and the history of sewer ban. (Aa 81-97). The provision for consideration of infrastructure limitations is thus one more instance of the Legislature's concern for the reality of circumstances in the determination and implementation of fair share obligations.

The examination of past pattern of development is similarly an acknowledgement of reality. It is not as the plaintiffs assert, an unconstitutional reward for past exclusionary zoning practices. In Mount Laurel II the Supreme Corut expressed concern that its opinion should not lead to "drastic" and uncontrollable growth. Thus:

EXHIBIT G

MORRIS COUNTY FAIR HOUSING COUNCIL, et al,

Plaintiff/Respondent

v.

BOONTON TOWNSHIP, et al,

Defendant/Appellant

SUPREME COURT OF NEW JERSEY
Docket No. A-125 (24,783)
Civil Action

ON APPEAL FROM:
SUPERIOR COURT OF NEW JERSEY
LAW DIVISION: MORRIS/MIDDLESEX COUNTY

SAT BELOW:
STEPHEN SKILLMAN, J.S.C.

BRIEF IN SUPPORT OF APPLICATION TO TRANSFER TO THE AFFORDABLE HOUSING COUNCIL

HARPER & HANSBURY, P.A.
736 Speedwell Avenue
P.O. Box 198
Morris Plains, N.J. 07960
(201) 540-9500

On the Brief:
Stephan C. Hansbury, Esq.

Attorneys For:

MAYOR & COUNCIL OF THE TOWNSHIP OF DENVILLE

RESOLUTION ADOPTING POLICY TO BE RECOMMENDED TO THE SUPERIOR COURT OF NEW JERSEY REGARDING CONNECTION TO THE RVRSA SYSTEM

WHEREAS, in 1968, the Superior Court of New Jersey issued Orders(1) to require the City of Jersey City to construct a new wastewater treatment system to replace the facilities constructed 50 years earlier, which no longer functioned properly and were operating in violation of law and (2) to prohibit new connections to the sewer system (without the prior approval of the court), until new facilities were constructed (i.e. the"building ban") and

WHEREAS, as the result of concerted efforts since 1968, a new interceptor sewer was constructed and has been in operation for several years and a 12 million gallon per day (MGD) wastewater treatment facility has recently been completed and placed in operation, and

WHEREAS, as part of the facility planning process, the United States Environmental Protection Agency (EPA) determined to "down size" the capacity of the new treatment plant from 24 MGD to 12 MGD and

WHEREAS, in anticipation of the completion of the construction phase of the treatment plant, the Honorable Jacques H. Gascoyne last year requested the Rockaway Valley Regional Sewerage Authority to undertake an effort to determine, as accurately as possible, the extent of both the available capacity in the new plant and the demand for gallonage therein from the

Authority's service area and

WHEREAS, the Authority has determined that the new facility will provide sufficient capacityto accommodate additional flow totaling 3.7 MGD and

WHEREAS, in order to estimate the capacity demand, the Authority submitted three rounds of questionnaires to the municipalities and sewer authorities which comprise the service area. Reports of the results of each questionnaire were provided Judge Gascoyne and representatives of the parties, in open Court on three separate occasions; and

WHEREAS, the Authority has determined that a portion of the additional capacity is committed to service connections approved by Court Order, but not yet connected. (approximately 160,000 gpd) and CP-1 Permits previously granted (approximately 750,000 gpd) (Schedule B) and

WHEREAS, the member Municipalities and Authorities reported that approximately 1.2 MGD is required to service structures now served by septic systems through 1990 (Schedule B) and

WHEREAS, demand for new development as measured by applications pending or approved before Municipal Planning Boards and "Mt. Laurel" considerations total approximately 3.50 MGD (Schedule A) and

WHEREAS, the final report to the Court, which was submitted on January 10, 1986, concluded that identified demand exceeds available capacity by approximately 2.53 MGD, (Schedule A) and

WHEREAS, given the projected inability of the plant to accomodate all flows, the Authority has considered various proposals regarding the adoption of a policy to be recommended to the Court.

WHEREAS, the Authority has also recognized several fundamental factors in formulating its policy, including the following:

(a) the new interceptor and 12 MGD treatment facilities were constructed to accomplish several goals: (1) the relief of pollution of the Lower Rockaway River, which resulted from the discharge of inadequately treated sewerage into the river. (2) the relief of present and potential surface and groundwater pollution within the service area resulting from discharges and overflows from septic systems in areas unsuitable for such systems and exfiltration from the former interceptor and (3) to provide capacity for modest growth.

(b) a method must be provided to assure a reasonable opportunity to construct local collection systems and connect existing structures now served by septic systems, in areas inappropriate for such systems.

(c) the reservation of capacity allocations for an extended time would have financial impacts, which may impose unfair economic burdens on current users.

(d) sudden change from the unnatural limitation on normal growth and development resulting from the existence of the "building ban" for eighteen years to a total absence of any control on development could cause chaos and disruption and result in the distortion of the goals to be achieved by the construction of the project.

(e) a transition period from total control to unrestricted connections would be in the public interest and would assure an opportunity for the timely connection of existing structures on septic systems and would promote the orderly and planned development of the service area.

(f) some member municipalities are impacted by "Mt. Laurel" considerations and others are not.

(g) the allocation of gallonage to each municipality to be used for new construction will not only permit the municipalities to exercise their discretion regarding the use of available gallonage but will also allow each municipality an opportunity to plan for its development.

(h) the selection of a growth allocation formula presents many formidable difficulties. The Authority has considered various methods of allocation as set forth on Schedule C, each of which is subject to valid criticism.

THEREFORE, BE IT RESOLVED BY THE ROCKAWAY VALLEY REGIONAL SEWERAGE AUTHORITY AS FOLLOWS:

The following proposal is hereby endorsed by the Authority and Counsel for the Authority is hereby directed to present it to the Honorable Jacques H. Gascoyne, Superior Court of New Jersey:

1. The identified available existing capacity in the treatment plant of 3.7 mgd shall be divided into three general categories consisting of "Committed Flows," "Septic Reserve" and "Municipal Growth Reserve" as more fully described below: (See also Schedule B for a diagramatic analysis)

A. Committed Flows

900,000 gpd to be allocated only for the purpose of providing capacity to allow the connection of all structures not yet connected to the system;

(1) for which Court Orders are validly existing as of April 1, 1986,

or

(2) for which CP-1 Permits are validly existing as of April 1, 1986.

All gallonage in this category which has not been actually connected to the system on or before January 1, 1988, shall be revoked and allocated to the "Septic Reserve" as described below.

B. Septic Reserve

"Municipal Reserve"

1.2 mgd to be allocated only for the purpose of providing capacity(to the extent set forth on Schedule D below) to allow the connection of structures presently served by septic systems, for which a Certificate of Occupancy had been issued before December 30, 1985 and which are located in areas which local authorities determine are unsuitable for such systems.

Gallonage shall be reserved for such purpose for each municipality until January 1, 1988, in the

amounts set forth on Schedule D in the category entitled "Septic Program through 1990."

Unless, such structures are actually connected to the system or CP-1 Construction Permits have been obtained and are in effect, before January 1, 1988, such gallonage shall no longer be reserved to a particular municipality, but shall be transferred to the "Septic Reserve - First Come - First Serve."

Gallonage which continues to be reserved as the result of the issuance of a CP-1 Construction Permit prior to January 1, 1988, will be transferred to the "Growth Reserve" on December 31, 1990, unless the construction of the project to provide for the connection of such gallonage shall have commenced before that date.

"Septic Reserve-First Come-First Serve"

Gallonage which is transferred to the "Septic Reserve-First Come-First Serve" shall be used only for the purpose of serving the structures or septic systems defined above. Gallonage which is neither connected to the sewer system prior to December 31, 1990, or included in CP-1 Construction Permit, issued prior to that date, shall be removed from the reserve and become available for any purpose.

C. Municipal Growth Reserve

1.6 mgd shall be transferred to the "Municipal Growth Reserve." Gallonage in the Municipal Growth Reserve shall be reserved to each municipality until December 31, 1990 in accordance with an allocation method to be determined by the Court. The allocation of the use of such gallonage shall be within the discretion of each municipality.

Gallonage in the Municipal Growth Reserve which is not actually connected to the system or for which a CP-1 Construction Permit has not been issued prior to December 31, 1990, shall be removed from the Municipal Growth Reserve and shall become available for any purpose.

2. No connection shall be made to the Authority's system unless a Permit shall have first been issued pursuant to the Service Rules of the Authority, as the same may be amended from time to time. All connections shall be in compliance with all regulations of the Authority and the entire length of such connection shall be subject to prior inspection by the Authority.

3. The Court should retain jurisdiction of the case, in order to resolve unanticipated issues or to modify the procedures set forth herein upon a showing of changed circumstances.

4. Recognizing that it is uniquely situated to submit a proposed system for the allocation of the

Municipal Growth Reserve, because it has been receiving all the data submitted by the member municipalities and because it is comprised of representatives from each municipality, the Authority has attempted to develop a fair and balanced allocation proposal. Of all the methods considered, that entitled "Average of All Methods" is considered to be the most preferable.

I hereby certify that the foregoing Resolution was adopted at the regular meeting of the Rockaway Valley Regional Sewerage Authority held on March 13, 1986 on motion of Louis Ruisi seconded by Robert W. Busch, Jr.

ROLL CALL VOTE;

YEAS:

Thomas E. Hopkins
Robert W. Busch, Jr.
Joseph McElroy
John P. Whalen
Louis Ruisi
Herbert Steinberg
Chester F. Ritzer
Barbara Boulle

NAYS:

Edward F. Secco

ABSTAIN:

None

ABSENT:

James Delaney

Chester F. Ritzer

Chester F. Ritzer Secretary

ROCKAWAY VALLEY REGIONAL SEWERAGE AUTHORITY

WASTEWATER FLOW EVALUATION

	Design Projection 1987	EIS Projection 2000	1984 Base (a)	1985 Base (a)
EXISTING CONNECTIONS				
Present Theoretical Flow	5.7	6.0	5.9	5.9
Infiltration/Inflow	1.2	1.9	2.4	0.99
Base Plant Flow	6.9	7.9	8.3	6.89
EXISTING DEVELOPMENT				
Approved Extensions (dry)	(b)	(b)	0.08	0.08
Approved Extensions(uninstalled)	(b)	(b)	0.95	0.95
Res./Non-Res. on septics	2.6	2.2	1.54	1.54
Outstanding court orders	-	-	0.16	0.16
SUB-TOTAL	9.5	10.1	11.03	9.62
PROPOSED DEVELOPMENT				
By planning bd./bd. of adjustment	2.3	1.6	.84	.84
Mount Laurel:				
Town obligation (20%)			0.49	0.49
Builders' Remedy (80%)			1.97	1.97
Developable Land			+ Future Applications	
Mine Hill	0.2	0.2	0.2	0.2
TOTAL	12.0	11.9	14.53+	13.12+

Note: Annual average flow rate in million gallons per day.

(a) Existing and proposed development projections based on municipalities' responses to RVRSA questionnaires of May, 1985 and August, 1985, and responses to Superior Court of N.J. Court Order dated October 18, 1985 by the Hon. Jacques H. Gascoyne.

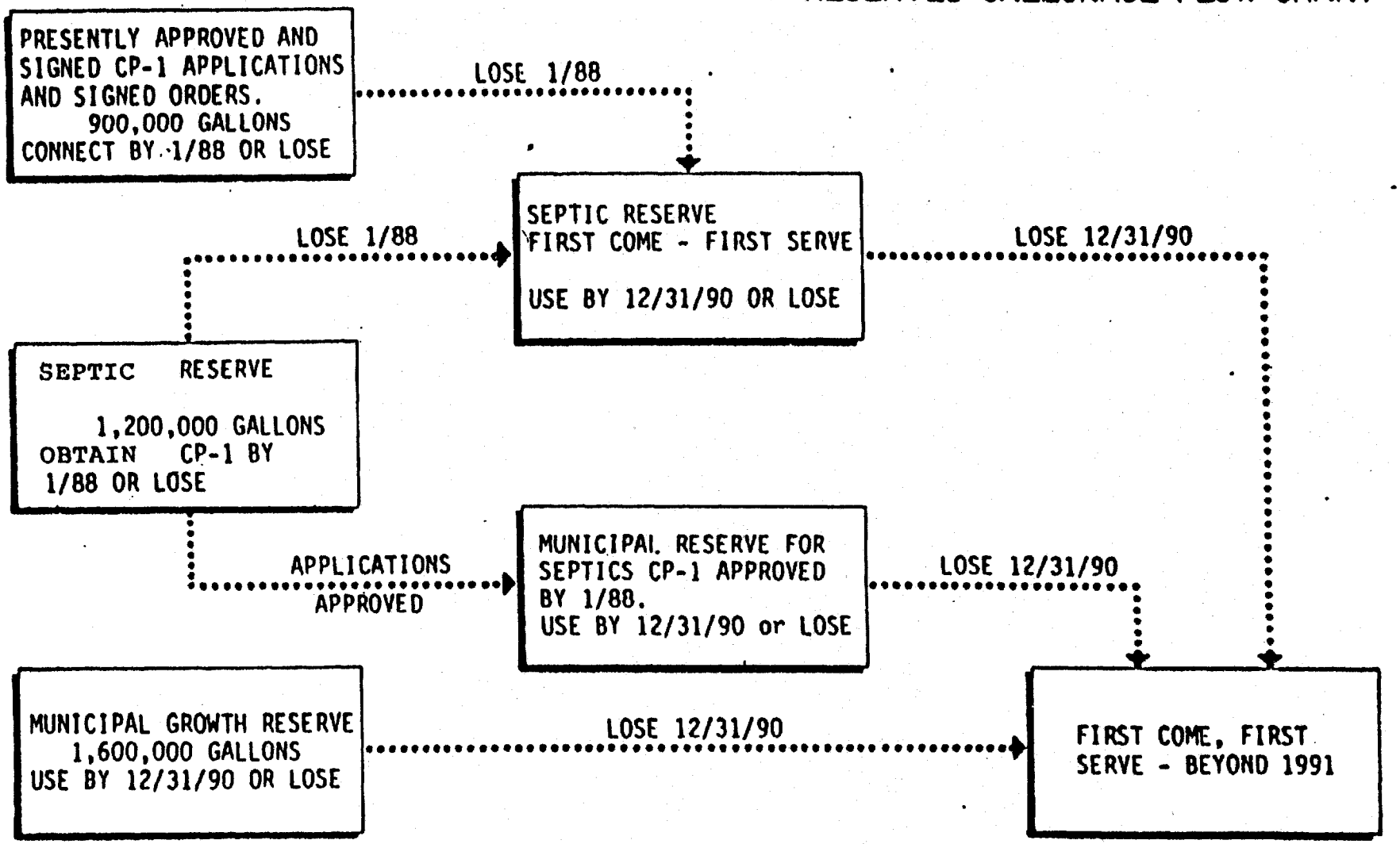
(b) Included under "Residential/Non-Residential on septics."

SCHEDULE A

SCHEDULE B

Rockaway Valley Regional Sewerage Authority

RESERVED GALLONAGE FLOW CHART



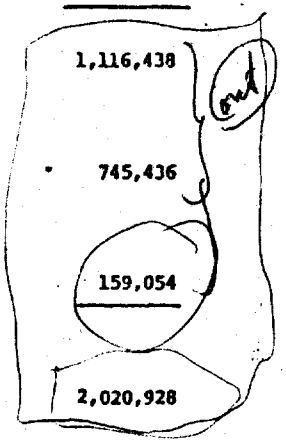
SCHEDULE C

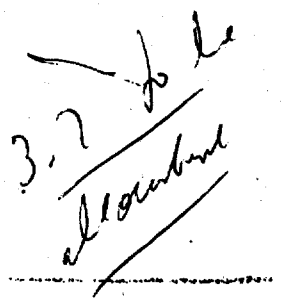
SUMMARY
METHODS OF DISTRIBUTING 1.6 MGD GROWTH RESERVE

Member Municipalities		Applications Before Planning Boards	Prior Court Allocations	Stipulation of Settlement	E.I.S. Distribution	Vacant Developable Land	Projected Population Growth	Average of all Methods
Town of Boonton	%	2.15	4.12	11.18	2.60	1.37	2.12	3.923
	GAL	34,400	65,920	178,880	41,600	21,920	33,920	62,773
Township of Boonton	%	0	1.22	0.96	4.54	4.40	6.49	2.935
	GAL	0	19,520	15,360	72,640	70,400	103,840	46,960
Township of Denville	%	10.76	18.38	15.93	20.13	9.04	6.59	13.472
	GAL	172,160	294,080	254,880	322,080	144,640	105,440	215,547
Borough of Rockaway	%	1.40	7.14	11.87	2.60	0.73	5.33	4.845
	GAL	22,400	114,240	189,920	41,600	11,680	85,280	77,520
Township of Rockaway	%	57.46	22.30	12.64	42.21	57.46	10.54	33.768
	GAL	919,360	356,800	202,240	675,360	919,360	168,640	540,293
Borough of Victory Gardens	%	1.59	1.39	2.13	0.65	0.01	0.86	1.105
	GAL	25,440	22,240	34,080	10,400	160	13,760	17,680
Township of Randolph	%	11.74	26.12	4.80	16.88	19.86	42.68	20.347
	GAL	187,840	417,920	76,800	270,080	317,760	682,880	325,547
Borough of Wharton	%	0.04	6.94	8.82	3.25	1.53	14.82	5.90
	GAL	640	111,040	141,120	52,000	24,480	237,120	94,400
Town of Dover	%	14.86	12.39	31.67	0.65	0.96	8.48	11.502
	GAL	237,760	198,240	506,720	10,400	15,360	135,680	184,027
Borough of Mine Hill	%	0	0	0	6.49	4.64	2.09	2.203
	GAL	0	0	0	103,840	74,240	33,440	35,253

SCHEDULE D

	Boonton	Boonton Twsp	Denville	Rockaway Borough	Rockaway Twsp	Victory Gardens	Randolph Twsp	Wharton	Dover	Picatinny Arsenal	Mine Hill	TOTAL ALLOCATIONS
Septic Program through 1990	168,750	16,650	324,000	7,922	119,084	0	466,807	13,225	0	0	0	1,116,438
CP-1 Application/ Const. Permits, Dry Sewers	0	0	11,090	14,700	441,425	0	15,121	29,100	14,000	220,000	0	745,436
Signed Orders	16,460	4,360	18,597	10,650	34,231	4,687	45,810	12,369	11,890	0	0	159,054
TOTAL ALLOCATIONS	185,210	21,010	353,687	33,272	594,740	4,687	527,738	54,694	25,890	220,000	0	2,020,928





DRAFT

EXHIBIT I

TOWNSHIP OF DENVILLE

MORRIS COUNTY, NEW JERSEY

SUMMARY REPORT

AREA-WIDE WATER SYSTEM CAPABILITIES

MT. LAUREL II CONSIDERATIONS

MAY 23, 1985

LEE T. PURCELL ASSOCIATES
CONSULTING ENGINEERS
60 Hamilton Street
Paterson, New Jersey 07505

35 Main Street
Franklin, New Jersey 07416

TOWNSHIP OF DENVILLE

AREA-WIDE WATER SYSTEM CAPABILITIES

MT. LAUREL II CONSIDERATIONS

MAY 23, 1985

GENERAL

An overview of the water system was undertaken by our office with regard to its ability to: a) safely sustain adequate supplies, while recognizing peak and average needs; b) provide suitable storage; and transmit water throughout the municipality.

For this purpose, the following planning elements were utilized for water supply evaluation:

a. 300 gal/day/equivalent residential unit[1]

b. 3.2 persons/equivalent residential unit[1]

c. Planning at this stage is for representative units as noted under a. and b. and does not acknowledge commercial, industrial and multiple housing units as separate entities.

WATER SUPPLY

The Township of Denville currently owns and maintains the following wells with their respective capacities as shown below:

No. 1 - 450 gpm

No. 2 - Abandoned

No. 3 - 800 gpm (requires treatment for VOC)

1. Unless may be modified by site specific applications.

No. 4 - 550 gpm

No. 5 - 1000 gpm

No. 6 - 700 gpm (not in use due to high manganese content)

For the purpose of this investigation, it is assumed that Nos. 3 and 6 will be in service in the future with the incorporation of suitable treatment.

Total collective capacity of all units amounts to 3,500 gpm or 5.04 MGD. Current average pumpage is approximately 1.5 to 1.6 MGD with peak daily flows of 3.0 to 3.2 MGD, more or less. Diversion rights granted to the Township by the Water Allocation Office (or its predecessor(s)) of NJDEP allows the pumping of 70,000,000(2.25 MGD) gallons per month at present, and 90,000,000 (2.9 MGD) once there is sewer capacity available through RVRSA.

Well Locations

Water production is confined to the Primary Pressure Zone as noted below:

a) Well Nos. 3 and 6 - Well Field in Randolph Township off Palmer Road; (Abandoned Well No. 2 in this same field).

b) Well Nos. 1 and 4 - At Morris Ave. Public Work's Yard.

c) Well no. 5 - Riverside Drive at a point southerly of the Rockaway River.

PRESSURE ZONES

The Township because of its topographic relief operates its water system with four (4) separate major pressure zones. All, however, receive water supply only from the wells noted hereinbefore.

Primary Pressure Zone

The Primary Pressure Zone encompasses the majority of the municipality and is generally located within the portions of the Township lying northerly of a line traversing Mt. Pleasant Turnpike, Hill Road, Cooper Road, Magnolia Avenue, and Birch Run Avenue. All operating wells discharge into this sytem.

All other Pressure Zones are served by mechanical means (pumps or pressure-sensitive valving) to accomplish water transfer. Three (3) storage reservoirs with overflows at El. 790 are located in this Zone. Past studies and master planning for the development of the 1.5 MG Reservoir on Flicker Terrace defined the elevational service limits of the primary Pressure Zone to a maximum at El. 700 to assure greater than 20 psi, even when the water surface in a reservoir was depressed.

Union Hill Pressure Zone

Water transfer is via Hill Road Booster Station, with storage in this Zone at the Horizon Drive ground storage reservoir. The overflow of this tank is at El. 1013 and its capacity is 0.50 MG. The Zone encompasses the Birch Run Area as well as the majority of the Township south of the line tracing Cooper Road and Mt. Pleasant Turnpike. It should be noted that an Intermediate Pressure Zone, operating through a pressure reducing valve at the Hill Road Booster Station serves the Birch Run Development.

Shongum Mountain Zone

Located in the southern-most tip of the municipality, this recently created zone serves new residential development through the Water Booster Station on Tonnelier Way and a 0.26 MG standpipe located

on the crest of Copeland Road; overflow is at El. 1086. Water is supplied to the pump house through the Union Hill system.

Morris Knolls (Snake Hill) Zone

A localized system taking water from the Primary Pressure Zone through a pump house located close to Franklin Ave. Storage in this location is within a 0.20 MG tank with its overflow at El. 865.

Low Pressure Zone

Located in the north central portion of the community and utilizing a 0.25 MG tank, with overflow at El. 713, this zone takes water from the Primary Pressure Zone via an altitude valve. Pumping is not required since the operating levels are below the Primary Pressure Zone (El. 790).

Miscellaneous Service Zones

a. Dover Hills section of Randolph Township has been purchased by the Randolph MUA, and supply shall be transferred to that Authority in the immediate future.

b. Summer booster and 0.01 MG summer tank located along Hillcrest Drive are in service from April 15th to October 15th and utilizes overland, small diameter piping to serve summer residences or supplement local, private wells, during dry periods.

c. Woodstone Road from the Rockaway Borough border to Holstein Lake is served by Rockaway.

AVAILABLE STORAGE FACILITIES

The Township has in the past, constructed or has caused to be constructed seven (7) major storage reservoirs which float on the distribution system of the various zones. These are identified in attached Table A.

TOWNSHIP OF DENVILLE

TABLE A

EXISTING WATER STORAGE FACILITIES

TANK	PRESS. ZONE	CAP (MG)	OVERFLOW ELEV. FT	
Hillscrest	Primary	0.50	790	
Palmer Rd & R.O.W	Primary	0.50	790	
Flicker Terrace (Hillcrest)	Primary	1.50	790	
Low Press (Hillcrest)	(Below Prim.)	0.25	713	
Horizon Dr. (Copeland Rd)	Union Drive	0.50	1013*	
Shongum Mountain	Shongum Mtn.	0.26	1086	
Morris Knolls (Snake Hill)	Morris Knolls	0.20	865	(Serves school)
Summer Tank		0.01	--	(April 15th to Oct. 15th overland small piping)
	TOTAL CAPACITY:	3.72		

* A portion of this system northerly of Route 10 is within an "Intermediate Zone" where service is via Hill Road Booster Station through a pressure reducing valve.

Total stored capacity amounts to the following by Zone:

a.	Primary Pressure Zone:	2.50 MG
b.	Union Hill:	0.50 MG
c.	Shongum Mountain:	0.26 MG
d.	Low Pressure Zone:	0.25 MG
e.	Morris Knolls:	0.20 MG
		3.71 MG
+	Summer Tank	0.01 MG

EXISTING WATER BOOSTER STATIONS

Booster stations currently in service in the Township are four in number as delineated in Table B.

The major installation of this type is the Hill Road Booster Station; this is about to be upgraded by the Township so that capacity will be increased from 200 gpm to 600 gpm. Hill Road feeds water from the Primary Pressure Zone to the Union Hill Pressure Zone. Standby power is provided for one of the existing 200 gpm pumps in the form of a gasoline engine and right-angle drive.

Morris Knolls booster station is rated to deliver 100 gpm (per pump) and is a localized system designed to primarily serve the Morris Knolls High School.

Tonnelier Way Booster Station is intended to pump water from the distribution system of the Union Hill Zone to the Copeland Road Standpipe at a rate of 100 gpm. Two pumps are provided along with standby power using a diesel-electric generating set.

Other facilities shown in Table B are of a minor nature within the overall water system.

TOWNSHIP OF DENVILLE

TABLE B

EXISTING WATER BOOSTER STATIONS

Hill Road Booster	Transfer from Primary Primary Zone to Union Hill Zone(s)	200 GPM (Pres) 600 GPM (Fut)*
Morris Knolls	Transfer from Primary Press. Zone to Snake Hill (Morris Knolls)	100 GPM (2 ea.)
Dover Hills	Sold to Randolph Supply to be provided by Randolph	
Tonnelier Way	Transfer from the Union Hill Zone to Shongum Mt. Zone	100 gpm (2 ea.)
Summer Booster (Hillcrest Ave)	Seasonal Use April 15th to Oct. 15th	25± homes served
Summer Booster Rockridge	Abandoned	

*Contract bid for modification to station. Replace one 200 GPM, maintain one 200 GPM pump and provide two new 600 gpm pumps.

WATER DISTRIBUTION SYSTEM

The Township supplies water to some 4,800 customers as it is presently structured. Water mains vary in size from 3 in. and less in diameter to a maximum of 12 in. diameter. The Township maintains a continuous upgrading program to enhance distribution capability by the installation of extensions and the replacement of undersized lines with larger size pipe. Developer lines in the most recent instances have been not less than 8 in. diameter. The Township has also been pursuing water main replacements throughout the Township via the Water Supply Bond Loan Rehabilitation Program administered by the NJ Dept. of Environmental Protection, Division of Water Resources

Two such projects are currently in the offing to replace key undersized mains or dead-ends in accordance with the rules and regulations in force for the Water Supply Bond. A schedule of water mains to be upgraded is appended hereto.

FUTURE SERVICE CAPABILITY

The water supply, storage and distribution system of the Township has a certain inherent capability with regard to future service. Any excess capacity may be allocated to new intra-municipal construction, may be utilized to supplement supply deficiencies in neighboring municipalities, or a combination thereof.

Assessment of Court-Imposed Solution - Mt. Laurel II

It is the understanding of Lee T. Purcell Associates, that the court-imposed solution could demand up to 924 low and moderate income housing, of which 41 were credited for past rehabilitative work.

The remaining 883, if satisfied via the Builder's Remedy would require the ability to accommodate 4,400 new housing units and an additional population of 13,000,[1] or 2.95 persons per unit constructed.

For purposes of anlysis of the infrastructure, the currently proposed sites were eight (8) in number to be located as follows:

a. Sites 1-6

Snake Hill area (Morris Knolls) between Frankin Road and Franklin Avenue and adjacent to the Rockaway Borough Boundry.

b. Site 7

Adjacent to Rockaway Borough Boundry between Rtes. I-80 and 46.

c. Site 8

This is the Affordable Living Corp. (Brill Tract) that was the subject of previous investigations and reports.

Assuming 4,400 new units in total less 360 proposed for the Brill Tract, would require the distribution of 4,400 minus 360 or 4,040 units on Sites 1 - 7. Sites 1 - 6 would receive water from the Primary Pressure Zone with additional modification for service above El. 700. Site 7 may be served through the Low Pressure zone as it is currently valved and operated.

Mt. Laurel II - Assessment of Shongum Mountain Area

In 1979, Lee T. Purcell Associates was engaged to investigate the development of water supply needs for the Shongum Mountain Area

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1. Data furnished by Stephan C. Hansbury, Esq., March 19, 1985.

of the Township. In particular, it was the purpose of this effort to define those portions of the system which could operate off the existing Union Hill Tank (overflow el. 1013) as opposed to those areas of Shongum Mountain which would require the creation of a new Shongum Mountain Service Zone complete with its own water storage tank (Copeland Rd. Stanpipe) and Booster Station (Tonnelier Way). This system was installed and by March 1984 made operational through the cooperative efforts of land developers and the Township of Denville. This system was incorporated and defined in a "Developers Agreement".

The Copeland Rd. storage reservoir was developed with an overflow elevation of 1086 and would therefore provide adequate pressures of 20 PSI to the second floor fixtures of the new homes that were to be constructed at the highest points along Shongum Mountain.

The 1979 study indicated that the area south of Casterline Road, and bounded by the Randolph Township and Parsippany Township borders would support 350-370 residential units based on the zoning and planning at that time.

Analysis of developable land and topographic features revealed that there were 175 possible high level lots in the Shongum Zone. These consisted of the following based on the 1979 planning board information:

Development	No. of Units	% of Service
Toft Hill	41	23
Brill	36	21
Puddingstone (Shawnee)	42	24
Merle	3	2

Denville Estates	43	25
Miscellaneous	10	5
	175	100

Based on the analysis, which concerned itself with peak flow and fire flow needs, it was determined that the following capacities would be required:

a) Standpipe w/250,000 gal. nominal capacity, with Active or Useful Storage of 200,000 gal.

b) Booster Station to draw from the High Pressure Zone (Union Hill) @ 100 gpm Station was equipt with 2 ea. pumps @ 100 gpm and standby power.

Water usage for the area was found from the meter book records to be 291 gpd per household with a township-wide unaccounted for value of 22.5%. Pumpage was therefore determined to amount to 291 x 1.225 or 356 gpd. For design purposes 350 gpd was utilized in the 1979 efforts.

Daily water consumption was projected to be, as an ultimate value, 175 x 350 or 61,250 gpd. Peak flow was taken at 2.0 times average or 122,500 gpd. This would be satisfied with a 100 gpm pump operating at 20.4 hours.

As originally conceived, the system was set to heavily rely on "internal" storage. This was evolved in this manner to protect against loss of supply in the one-line feeder system along Mabro Drive and Tonnelier Way.

Defined Service Area

The service area as developed for the 1979 study as the Shongum Mountain Pressure Zone contained the aforementioned 175 residential units (See Attached Plan) in an area that encompassed Copeland Road,

Shongum Road in Denville, North Ridge Road, and the streets of Denville Estates.

Modified Conditions - Affordable Living Corp.

As part of its assignment, Lee T. Purcell Associates investigated the needs within the Shongum Mtn. area to supply existing and potential customers with inclusion of the Mt. Laurel II development as proposed for the Brill Tract by Affordable Living Corp., Block 10001, Lot 437. Implementation of dense development, including 22% low and moderate income dwelling units was pending for this site. From discussions with Mr. Stephan Lansbury, Esq., Zoning Suit Attorney, Mr. Jeffery Biggs, P.E., Municipal Engineer, and Mr. Russell Montney, Catlin Associates - Municipal Planner, it is our understanding the the potentials for Brill was the following:

a. 80 units/22% low and moderate subsidized housing.

b. 360 units total dwelling units in the form of townhouses/condos.

The 175 homes previously assumed for the development of the infrastructure (water system) now appears to require planning for up to 500 dwelling units based on the following:

Originally Conceived	:	+175
Less Original Brill	:	- 36
Revised Brill	:	+360
TOTAL UNITS		499 - Say 500

Pumpage for Intense Development on Brill Property

The combined needs of the single family homes plus the intense development on the Brill Property requires a restatement of planning

for the water system serving the Shongum Mountain Pressure Zone including increased fire protection.

Daily average and peak supply must be met by the booster station on Tonnelier Way serving this pressure zone. Based on the downgraded area-wide allowance of 300 gpd per residential unit as previously determined, it would be necessary to provide:

AVERAGE FLOW OF 500 x 300 = 150,000 GPD

PEAK FLOW @ 2.0 x AVERAGE = 300,000 GPD

Previously designed pumps (100 gpm) would provide for the peak in 20.4 hours of operation each day. Extending this concept to the intense development operation would mean that new pumps would be needed to provide:

$$\frac{300,000 \text{ GPD}}{20.4\ (60)} = 245 \text{ gpm, say } 250 \text{ gpm}$$

To provide redundant pumping capacity it would be necessary to install two (2) pumps of this capacity to care for peak daily needs WITHOUT CONSIDERATION FOR FIRE FLOW NEEDS.

Fire Flow Analysis

The development of common wall construction for townhouse/condos/etc. will necessitate a substantial increase in the fire flow demand to be placed on the Shongum Mountain extensions of the water system. The Engineer estimates that a capacity of 2500 gpm for 3 hours will be assigned by the Commercial Risk Services, Inc., successor to Insurance Services Office, for this type of development. The effects of this on the water system is shown in Table C for conditions of Peak Flow with Fire Flow superimposed and for conditions of Average Flow with Fire Flow superimposed. Supplemental needs, after accounting for 200,000 gallons in existing storage and

pumpage via standby of 250 gpm for three (3) hours, would amount to a rate of 1347 gpm and 1243 gpm respectively to overcome the calculated deficit. The potential sources for this flow are undefined at this time. It would appear that the additional needs beyond the 200,000 gal. available in the Copeland Road Standpipe should be provided for on-site by the Brill Tract developers.

Off-Tract Improvements

Due to the topographic features of the municipality, and the fact that all well supplies lie within the Primary Service Area, water must be "lifted" to the High Level Service Area, and its subsidiary Intermediate Level Service Area, via the Hill Road Booster Station. This Booster Station lifts water to the Union Hill Water Storage Reservoir. This, in turn, is the supply for the Tonnelier Way Booster and the Copeland Rd. Standpipe (Shongum Mountain Pressure Zone).

TOWNSHIP OF DENVILLE

TABLE C

SHONGUM MOUNTAIN WATER SYSTEM

MAY 23,1985

ESTIMATED FIRE FLOW REQUIREMENTS USING

NEW TANK @ 200,000 GAL ACTIVE STORAGE

I. PEAK DAILY USAGE W/FIRE FLOW (300,000/8)

PEAK DOMESTIC FLOW	:	37,500 GAL/3 HR PERIOD
INCREASED FIRE FLOW DEMAND 2500 GPM/3 HRS*	:	450,000 GAL
		487,500 GAL
Avail. Active Storage	:	-200,000 GAL
		287,500 GAL/3 HR PERIOD
New Pumpage (250 gpm)	:	-45,000 GAL/3 HR PERIOD
MAKE-UP PUMPAGE VOLUME	:	242,500 GAL
MAKE-UP PUMPAGE RATE	:	242,500 ÷ (3x60) = 1347 gpm DEFICIT

II. AVERAGE DAILY USAGE W/FIRE FLOW (150,000/8)

AVERAGE DOMESTIC FLOW	:	18,750 GAL/3 HR PERIOD
INCREASED FIRE FLOW 2500 GPM/3 HRS*	:	450,000 GAL
	:	468,750 GAL
Avail. Active Storage	:	-200,000 GAL
	:	268,750 GAL/3 HR PERIOD
Avail. Pumpage (250 gpm)	:	51,300 GAL/3 HR PERIOD
MAKE-UP PUMPAGE VOLUME	:	223,750 GAL
MAKE-UP PUMPAGE RATE	:	220,575 ÷ (3x60) = 1243 gpm DEFICIT

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* Provision for Townhouses/Common Wall Construction. Engineer anticipates fire flow at 2500 gpm for 3 hours. Actual rating must be established and added capacity via pumpage and storage to be provided.

Costs for Off-Tract Improvements

Based on the analysis previously made and summarized for this document, it will be necessary to provide off-tract improvements to assure adequate capacity and adequate fire flow arrangements. Table D covers the costs for upgrading off-tract facilities to satisfy the densification of development as proposed for the Brill Tract. The total costs would amount to $223,125 construction costs and $357,000 in project costs.

Detailed Impacts on Off-Site Facilities

There exists plans to upgrade the supply for the water system elements of the infrastructure. With the impact of the densification of the Brill Tract, it will be necessary to have in force the following new facilities to assure adequate water supply:

a. Primary Level Area Water Transmission Mains

b. Hill Road Booster Station

c. Revised Tonnelier Way Booster Stations

Again, with reference to the 1979 work, it was determined that the Hill Road Booster Station could not keep pace with the growing demands for water in the High Level Area and the Shongum Zone due to current peak needs. Plans are now available to upgrade this station so that two new pumps will be available to deliver 600 gpm each to the system. This work has been included in the Developers Agreement, but has not been constructed at this time. The Township's timetable for release of this element of work for construction places this project in an imminent situation.

TOWNSHIP OF DENVILLE

TABLE D

SHONGUM MOUNTAIN WATER SYSTEM

MAY 23, 1985

ESTIMATED COSTS FOR IMPROVEMENTS

TO THE WATER SYSTEM

OF THE

TOWNSHIP

OFF-TRACT IMPROVEMENTS[1]

	COSTS[2] (1984)	
ITEM	CONSTRUCTION	PROJECT
Primary Level Area Water Mains	$ 72,000	$ 115,000
Hill Road Booster Station	$ 86,185	$ 138,000
Revisions to Tonnelier Way Booster Station[3]	$ 65,000	$ 104,000
TOTALS	$ 223,125	$ 357,000

1. Off-Tract Improvements do not include provision of water supply for fire fighting on the Brill Tract.

2. Construction costs reflect estimated in-field expenses and Contractor Profit. Project costs include allowances for contingencies, financing during construction, and for engineering, legal and administrative fees.

3. Costs are preliminary in nature. The construction cost would cover retrofit of 2 new pumps and motors (285 gpm), interior and exterior piping changes, increased standby power, and electrical alterations.

In the 1983-1984 design, it was determined that the Hill Road feeder system (water main) of the Primary Service Level should be upgraded to assure continuous and adequate supply conditions to the upgraded Hill Road Booster Station. This newer element consists of 1200 feet of 12 inch line along Franklin Road from a R.O.W. at the Palmer Road Water Storage Reservoir southerly to Route 10.

The system with its improvements could support the following residential units, once upgrading is provided.

I. Hill Road Booster Station

600 gpm (for peak) based on new pumps to be provided

300 gpm (for average)

300 gpm x 20.4 hrs x 60 min. = 367,200 Gallons

@ 300 GAL/UNIT = 1224 units

1224 units would represent the total existing and future connection units (residential, commercial and industrial) in the zones served by this station and the Union Hill Reservoir.

II. Tonnelier Road Booster Station

Assuming modification to 250 gpm peak pumping capacity

125 gpm (for average)

125 gpm x 20.4 hrs x 60 min. = 153,000 Gallons

@ 300 GAL/UNIT = 498 UNITS

Five Hundred (500) units would represent the total existing and future connection units in the Shongum Mountain Pressure Zone.

ADEQUACY OF WATER SUPPLY

As stated previously, all of the present wells when operational can deliver up to 3,500 gpm, assuming that Well No. 6 is provided with treatment for manganeze and Well No. 3 in combination with Well No. 6 are fitted with means to remove volatile organic compounds now found in these well supplies.

The quantity of water available has been analyzed relative to potential system demand based on conservative operation of supply wherein at least one major well is held in reserve, preferably the largest such unit. The remaining wells are presumed to be equivalent to a long-term peak usage of 2.0 times average flow. Average supply would be the limit that the System supply could accommodate as translated into equivalent residential units. This analysis developed hereinafter:

Situation No. 1

a.	Capacity of all wells	3500 gpm(5.04 MGD)
b.	Well No. 5, Out of Service	1000 gpm (1.44 MGD)
c.	Availabile supply, Limit of Peak Demand	2500 gpm (3.60 MGD)
d.	Average allowable Demand upon Supply	1200 gpm (1.80 MGD)
e.	No. of Equiv. Resid. Units at 300 gpd/unit	6000
f.	Est. Equiv. Population at 3.2 persons/unit	19,200

Situation No. 2

a.	Capacity of all wells	3500 gpm (5.04 MGD)

b.	Well No. 6, Out of Service	700 gpm (1.00 MGD)
c.	Available Supply, Limit of Peak Demand	2800 gpm (4.03 MGD)
d.	Average Allowable Demand Upon Supply	1400 gpm (2.02 MGD)
e.	No. of Equiv. Resid. Units at 300 gpd/unit	6733
f.	Est. Equiv. Populationat 3.2 persons/unit	21,550

Of the above, current customers and population account for some 4800 units and approximately 15,360 persons (based on 3.2 persons per equivalent dwelling unit).

Available Aggregate Supply - Current Wells

Comparison of each of Situations No. 1 and No. 2 to existing users and population was made to determine available capacity within the existing supply as a quantitatives analysis only (with the presumption that unacceptable water quality would be accommodated via a capital improvement program):

	SITUATION NO. 1		SITUATION NO. 2	
	Equiv. Units	Equiv. Population	Equiv. Units	Equiv. Population
Max. Water Capacity	6000	19,200	6733	21,550
Existing Condtions	4800	15,360	4800	15,360
Avail. for Growth	1200	3,840	1933	6,190

Without additional production capability at the well head, based on the peaking needs of 2.0, the system could not consistently provide supplies to is customers over peak periods of flow beyond those shown in the above-summary.

Should 4,400 additional units be considered with an attendant population of 13,000, it would appear that Mt. Laurel needs exclusive other growth in the community would require:

	SITUATION NO. 1		SITUATION NO. 2	
	Equiv. Units	Equiv. Population	Equiv. Units	Equiv. Population
Existing Conditions	4,800	15,360*	4,800	15,360*
Mt. Laurel	4,400	13,000*	4,400	13,000*
Aggregate	9,200	28,360	9,200	28,360
Avail. for Growth	-1,200	-3,840	-1,933	-6,190
Requires Additional Supply	8,000	24,520	7,267	21,170
Added Average Water Supply Rate	2.40 MGD (1670gpm)		2.18 MGD(1510 gpm)	
Added Peak Water Supply Rate (2x)	4.80 MGD(3340gpm)		4.36 MGD(3020 gpm)	

*Existing conditions based on 3.2 persons/unit; Mt. Laurel II based on 2.95 persons per unit. A more stringent comparison is not required at this juncture, since this analysis determines the order of magnitude of the potential short fall in water supply.

The above deficit values would be further heightened if under projected conditions, the Mt. Laurel II impacts are for future years superimposed upon the population prognostications for the Township that preceded Mt. Laurel II.

The ability of the portions of the Buried Valley Aquifer underlying the Township of Denville to safely sustain this additional withdrawal has not been studied by this office at this level of investigation into the water utility. However, a summary of recent pertinent data by others has been examined and concerns for supply are summarized in the ensuing section of this Report.

Additionally, some level of improved consumer usage may be gleaned from the system via reduction in the level of unaccounted

water resulting from leakage, flushing, unmetered withdrawals, etc. This may result in a gain that may range from 5% to 7%, more or less, in the forseeable future. NJDEP in its recently ciruclated documents for the Water Supply Management Act Rules, N.J.A.C. 7:19-6, has set a goal for unaccounted-for water at 12% which will require Denville, along with all other purveyors of public water supply, to pursue water loss reduction along with water conservation measures to offset, to a limited degree, the need for additional supplies to meet future demands.

CONCERN FOR BASIN WIDE SUPPLIES

The communities of the Rockaway River Basin are supplied with public water via ground water wells largely drawing from glacial deposits within the confines of the valley. Some portions of the supply are imported via the Morris County MUA.

Two pertinent recent reports were reviewed for comments and data and are primary to the comments provided herein with regard to basin wide water needs; the reports are:

a. Environmental Impact Statement (EIS)

201 Facilities Plan
Morris County, New Jersey
On the Upper Rockaway River Basin
Draft
January 1981
by: USEPA, Region II

b. Results of the 1980-81 Drought Emergency Ground Wter Investigation in Morris and Passaic Counties, N.J.

1983
by: N.J. Geological Survey

The EIS summarizes the findings of many investigations into the hydrogeology and water use data within the area. The Drought report

examines the short term availability of large quantities of ground water for use in stream flow augmentation.

EIS Comments

Ground water pumpage in the Rockaway Valley during the year of 1976 was reported to amount of 19.6 MGD, of which 7.5 to 8.0 mgd were estimated to be consumptive use. The remainder of the supply pumped may hve been returned to the groundwater supply via recharge by lawn sprinkling and septic tank disposal (Pg. B-16). 85% of this supply is withdrawn from the stratified drift deposits. Table 3-1 of the EIS reports (as consumption) the following salient data for public water supplies operating in the drainage basin are:

Average Basin Consumption:[1] 9.9 MGD

Average Basin Consumption[1]: 16.8 MGD

(Ratio of Peak to Average: 1.7)

Of this value, the Township of Denville utilizes:

Average Consumption: 1.6 MGD

Peak Consumption: 2.88 MGD

(Ratio of Peak to Average: 1.8)

It appears that in 1977, the total average use was 9.9 MGD (Public) plus 5.2 MGD (commercial/industrial/institutional) for a total of 15.1 MGD. USEPA estimates 20 MGD "as a conservative estimate of the amount of developable groundwater, based on present recharge rates, from the Quatenary stratified sand and gravel aquifer". Quatenary terminal moraine may be capable of supplying an additional 2.8 MGD (pp. B-17 to B-19). Tapping Precambinan Rock Aquifers for

---

1. Consumption may actually refer to pumpage of the municipal supply.

additional supply has been indicated as not suitble for the development of a significant regional groundwater resource (p. B-7).

From the above, it appears that the developable groundwater capacity of the Upper Rockaway River Basin (20-23 MGD±) is being approached by the pumpage within the same hydrogeological sphere.

N.J. Geological Survey

Potential impacts on the above can occur during critical dry weather periods should the recommendations of the 1980-1981 Drought Emergency Groundwater Investigation be implemented. This report suggests that the unconsolidated sand and gravel aquifers in Morris and Passaic Counties be tapped (by wells) to "augment streamflow to the reservoirs that serve Newark and Jersey City", (Page 1, Introduction). Within the Upper Rockaway, this same study indicates, "Groundwater available for flow augmentation to the Rockaway River above the confluence with Beaver Brook, Rockaway Township, is estimated to be between 4.5 and 5.0 MGD".

It is apparent from comparison of the EIS data and the stream flow augmentation data that little, if any, additional supply can be made available to support growth in the Township of Denville and the Upper Rockaway River Basin, if excess water at the source is diverted to stream flow augmentation.

Other Report Information

Other concerns noted by LTPA are related to the extent of the cone of influent of pumping wells. Examination of a groundwater quality report by Dan Raviv Associates, Inc. for the Township of Denville indicated:

a. calculated radius of influent for deep and shallow aquifers was 20,000 feet.

b. Denville Well No. 3, some 4,000 feet distant and downstream of Dover Well No. 4, exert an influence upon one another when pumping.

From an examination of the data, it would seem that the continued dependence on local groundwater resources to continue as the sole source of water supply for existing and new development is limited at 20-23 MGD, with reduction of same occuring upon implementation of groundwater augmentation of surface supplies. Of the 20-23 MGD, 1976 data indicates that basin-wide pumpage of 19.6 MGD has approached the safe yield of the available resource. Wells far distant from one another have demonstrated that the cone of influence is far reaching, and a municipality's or large industrial's supply well exerts impacts upon other wells in the basin. Studies are in progress at this time for the Town of Dover, using pump data collected in the Spring of 1985 with the assistance of NJDEP.

ASSESSMENT OF WATER STORAGE FOR FUTURE NEEDS

The State of New Jersey utilizes the parameter of maintaining, at the least, the equivatent of one day's verage usage (pumpage) in storage at a minimum. The capacities of storage facilities are often mitigated by the practicable amount of water in "dead storage" and allocations for fire flow reserve. Additionally, the availability of stand-by power at the source and/or interconnections with adjacent purveyors enhances the ability of a system to offset its dependence on storage. An in-depth analysis was not undertaken since existing storage capacity appears suited to long-term municipal needs. Localized conditions, may however, dictate the construction of new

facilities to suit specific terrain, fireflow and pressure needs on a case by case basis for the Mt. Laurel II sites. Again, this type of need was identified for the Brill Tract (Site No. 8). For the Snake Hill section (near Morris Knolls), significant portions of Sites No. 1 - No. 6 inclusive, appear to require special planning for areas intended to be served through the Primary Pressure Zone, where the ground is at El. 700 or greater. Site No. 7 does not have pressure limitations as it appears to be within or adjacent to the Rockaway River flood plain where elevations are relatively low.

WATER STORAGE FACILITIES - FUTURE SERVICE

Assuming the design parameter of maintaining the equivalent of one day's usage in storage reduced by fifty (50%) percent to maintain fire flow reserve, the municipal water storage facilities can be considered to support the calculated magnitude populations shown below:

Overall: 3.71 MG

Assume 50% of Cap for Fire Flow Reserve

Avail. Water = 1.86 MG

Equiv. UInits - 6,200

Equiv. Population = 19,840

Primary Pressure Zone: 2.50 MG

Assume 50% of Cap. for Fire Flow Reserve

Avail. Water in Storage - 1.25 MG

Equiv. Units = 4,167

Equiv. Population = 13,340

Union Hill: 0.50 MG

Assume 50% of Cap. for Fire Flow Reserve

Avail. Water in Storage = 0.25 MG

Equiv. Units = 833

Equiv. Population = 2,667

Low Pressure Zone: 0.25 MG

(Area can be supplemented by Primary Pressure Zone without pumping of water).

Shongum Mtn: 0.26 MG

(See Separate Analysis of this Summary Report)

Morris Knolls: 0.20 MG

(Small Capacity of booster station and high density use at the school requires that this storage be devoted to firefighting.)

From the above, there does not appear to be a critical storage constraint to growth levels in the community, although site specific limitations may arise where new development is to take place at higher elevations, especially where greater population totals and density can effect water supply and firefighting flow rates for water. As an outgrowth of this analysis, it appears that a down-graded zoning changes in the Union Hill Pressure Zone could require added water storage capacity in this section of the distribution system.

WATER BOOSTER STATION - FUTURE NEEDS

Wherever a new pressure zone is dictated or where it is contemplated that an existing system is sufficiently flexible for expansion, a booster station will be required, complete with acceptable redundancy and standby power to assure continuity of supply, sufficient storage, and fire flow capacity for the density and type of construction to be utilized within the Mt. Laurel II development sites.

WATER MAIN CONSTRUCTION - FUTURE NEEDS

For development of water carrying capacities, the Township presently owns large sized piping (12 in.) along Franklin Ave. in reasonable proximity to Mt. Laurel II sites. Franklin Road piping (8 in.) has over the years demonstrated low carrying capacity. Early master plan recommendations by Metcalf and Eddy, Consulting Engineers and later by Lee T. Purcell Associates, to the Township proposed the strengthening of this line to upgrade north-south potable water flow. Such work should become an off-tract contribution to assure supply reliability to the Mt. Laurell II sites from the Randolph Well Field (Nos. 3 and 6) and the Rockaway River wells of the north-central Denville (Nos. 1, 4 and 5).

Certain staged construction of replacement water mains as identified earlier in this report will be undertaken in the immediate future, based on demonstrated need of the existing community, and in strict accord with the rehabilitation program being fostered and by NJDEP, through its low interest loan program.

SUMMARY

The Township of Denville owns and operates a municipal water department that presently serves about 4,800 equivalent residential users. The water supply appears to be of reasonable quantity for present-day needs and for the immediate future given the expected growth rates and patterns similar to or projected from past historical data. Mt. Laurel II decisions could result in the addition of some 4,400 new residential units and 13,000 additional residents which would require upgrading in the form of off-site improvements to the water system to support the increased size of the community. The

impact of Mt. Laurel II coincident with the lifting of the sewer ban will severely impact the water supply, water storage on a local basis, water booster station implementation in association with new storage at higher elevations than the Primary Pressure Zone, and the transmission capability of significant or key water mains of the distribution system.

Water Supply

The adequacy of the water supply is strongly dependent upon the combination of increased supply together with treatment at Wells Nos. 3 and 6 as outlined herein. Conservative operation of the known wells indicates a potential short fall in capacity with regards to "doubling" of the housing stock under Mt. Laurel II. Reduction in unaccounted-for water and the utilization of municipal-wide conservation will offset a small percentage (<10%) of the anticipated short-fall in supply.

Water Storage

This appears to be reasonably extensive in comparison to future need based on an overall evaluation using the parameter of equating one day average use to one day storage. Such analysis must be subjected to evaluation of localized planning to be assured that all new development will be provided with storage, booster station capacity (where warranted) and adequate supply mains to care for peaking needs and fire flows under all conditions of operation.

There appears to be potential, based on down zoning in the areas served by the Union Hill Tank to eventually require added storage capacity in this zone. Such solutions do not suggest an imminent need at this time of preparation of a study.

Booster Station Capacity

For development and densification in the Township, in water pressure zones lying upgrade of the Primary Pressure Zone, the continued use of booster pumping stations for interzone transfer of potable water supplies appears to be a viable practice.

The engineering analysis pertinent to the Brill Tract indicates the need to upgrade the recently constructed Tonnelier Way Booster Station, or supplement its use with a second installation. The water deficit,translated to gpm was found to be 150 gpm upon saturated development of the Shongum Mountain Zone.

The Hill Road Booster Station will be undergoing improvements in late 1985-early 1986 to upgrade capacity to meet growth needs within the Union Hill-Shongum Mtn. Presusre Zones (southerly tier of the municipality). Should densification continue well beyond the 1224 equivalent dwelling units, additional improvements consisting of improved transmission to bolster the 10 in. loop of the Union Hill Pressure Zone and a second booster station are recommended by this office. The proposed station would be ideally located in the vicinity of the intersection of Mt. Pleasant Turnpike and Openaki Road, and could be there placed on Board of Education property.

New systems upland of the Primary Pressure Zone will require sufficient capacity in booster pumping (along with water storage) to satisfy all phases of usage (average, peak) along with means to assure adequate water supplies for fire-fighting purposes. Details of design of such stations are dependent upon the requirements of each locality and costs for same should be borne by the developing

agency. Such a condition appears to exist in the proposed Mt. Laurel II designated tracts, Nos. 1 thru 6.

From our work, we determined the following with regard to service to affordable Living (Brill) with high density development at 360 units:

a. Tonnelier Way Booster Station could provide only 100 gpm out of a total of 250 gpm necessary for the Shongum Mountain Zone.

b. The Copeland Road Standpipe was insufficient in concert with the Tonnelier Water Booster Station to provide fire flows for the dense development proposed for the Brill Tract.

c. An additional station at the foot of Mabro Road (at Shongum Road) or increased capacity at Tonnelier would be necessary to care for domestic flows.

d. Fire flow reserve would have to be provided as part of the Brill Tract since all previous planning did not anticipate the impact of dense housing development.

e. Participation in off-tract improvements to assure adequate transmission of water to the Shongum Mountain area of the Township, as well as throughout the Union Hill Pressure Zone.

f. The Hill Road improvements would be sufficient to transfer water from the Primary Pressure Zone to the Union Hill Zone to serve up to 1224 residential (equivalent) units.

g. Any further growth would be limited by the transmission capability of the existing water mains, and that a second booster station, operating in parallel with the Hill Road installation should become part of the Township's long-term planning. Said station was proposed in September of 1984 for location on Openaki

Road in the vicinity of its intersection with Mt. Pleasant Turnpike.

Water Transmission Mains

On-site improvements by developers will provide distribution main extensions to service their local needs. However, concern for the ability to transmit water to the areas of consumption will result in off-site improvements to upgrade carrying capacity. Improvements in the form of replacement lines are in the early planning stage and are intended for construction under the Water Rehabilitation Program of NJDEP to mitigate existing deficiencies. Of particular concern at this level of the Mt. Laurel II review, and recognizing the particular combined impacts of Tracts 1 - 6 inclusive is the undersized main (8 in.) lying in Franklin Road.

Once the developmental needs are formulated, with specific tracts and their internal water requirements identified, Lee T. Purcell Associates can provide via mathematical modeling of hydraulic conditions, an analysis of proposed water main improvements to assure adequacy.

LIMITATIONS

The information and conclusions contained in this report represent our best professional judgement regarding the requirements for potable water pumping, storage and transmission. The construction of the existing facilities as compared to those originally considered by the Engineer, Lee T. Purcell Associates are assumed to be generally equivalent, although the Engineer did not participate in the final design

and construction of said facilities, with the exception of providing inspection services for the Tonnelier Way Water Booster Station and the Copeland Road Standpipe. There can be modified conditions created by others in design and construction of which Lee T. Purcell Associates and the undersigned have no first-hand knowledge of.

This report has been prepared in accordance with generally accepted sanitary engineering practices and represents, to the best knowledge of the firm, and the signatory, a correct estimation of the conditions as they presently appear to exist, and the cost to correct and/or upgrade deficient facilities.

Respectfully Submitted,

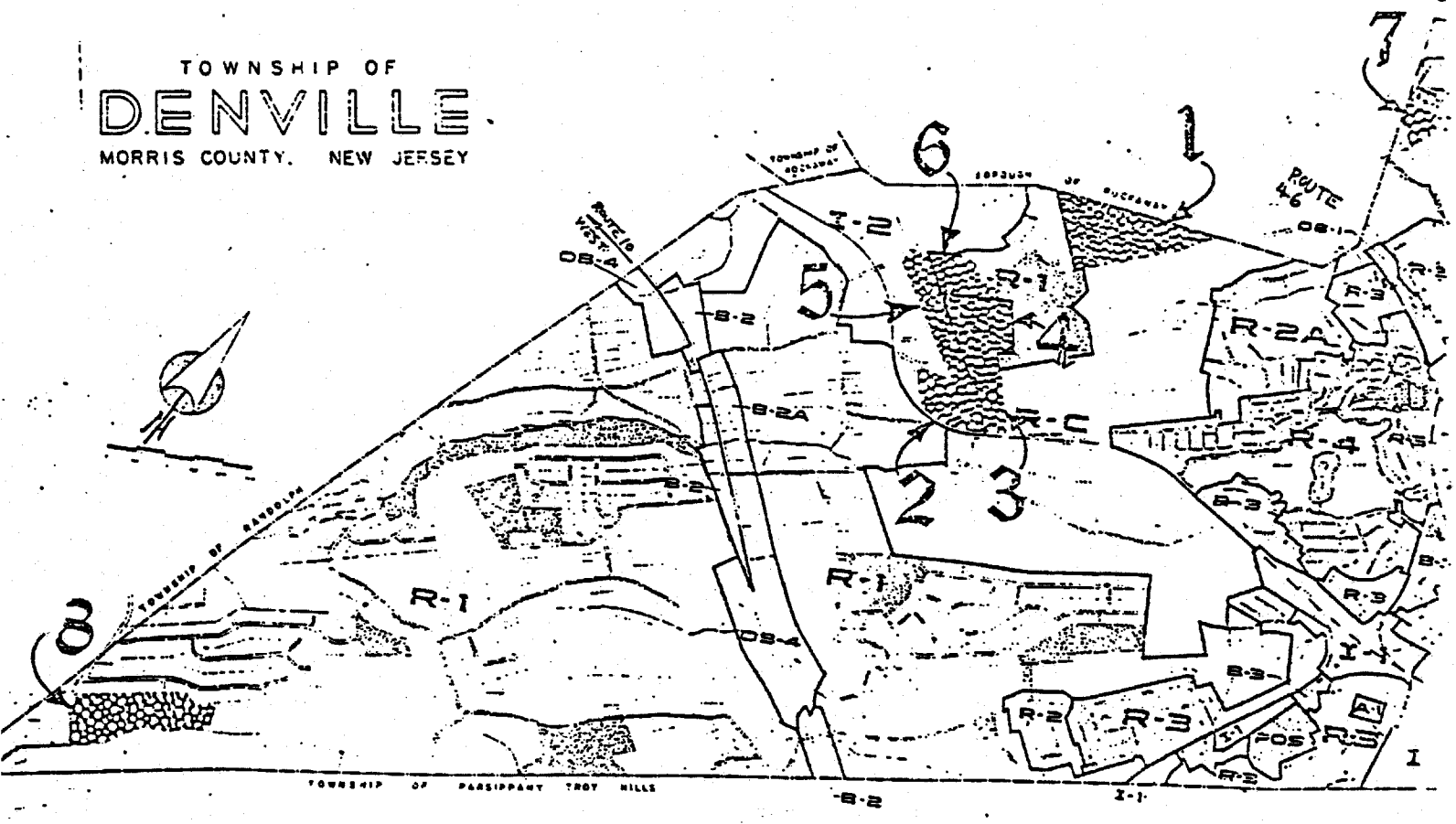
LEE T. PURCELL ASSOCIATES

Jerome Watman, P.E.
Associate

JW:jm

ATTACHMENTS

proposed mt. laurel II sites



TOWNSHIP OF DENVILLE

MORRIS COUNTY, NEW JERSEY

WATER SUPPLY BOND LOAN PROGRAM

PROPOSED PROJECTS FOR INCLUSION

1984

Description of Elements of Work

For 1984, the Township of Denville proposes to undertake a program of seven (7) distinct projects that will remove a major dead end, reinforce the distribution system and replace lines that are three (3) inches and smaller. As part of the program to upgrade the infrastructure, there is inlcuded herein the replacement of 10 line valves at various locations and 10 fire hydrants.

The proposed projects will provide the municipality with the following additional or replacement footage of watermain:

12 inch	2950 l.f.
8 inch	4400 l.f.

This effort, once undertaken and completed, will enhance water distribution and firefighting capability within various sections of the Township. All work as contemplated will be complete with valves, hydrants, transfer of water services (where applicable) to the upgraded pipelines, and all appurtenances thereto.

Estimated Costs

The proposed work and the anticipated costs for same appear in the attached table under the seven (7) separate project areas. The total Construction Costs are shown to amount to $409,000, with the Project Costs calculated to be $562,400. Included in the latter are 10% contingencies and 25% to cover engineer, legal and administrative costs.

TOWNSHIP OF DENVILLE

MORRIS COUNTY, NEW JERSEY

WATER SUPPLY BOND LOAN PROGRAM

CONSTRUCTION & PROJECT COST ESTIMATES

1984

	Location	Size in.	Length (ft.)	Cost/ft. $	Construction $
1.	Franklin Rd ROW to Route 10	12	1200	60	$ 72,000
2.	N. Magnolia To Estling Lake Rd.	12	1750	60	105,000
3.	Waleback Waddy, Barns Pass & Hillview Terrace	8	1500	45	67,500
4.	Inoquois - Sunset to Tomahawk	8	1900	45	85,500
5.	Tomahawk Trail	8	500	45	22,500
6.	Seymour - to Cedar Lake West to Woodland Road	8	500	45	22,500
7.	Valves & Hydrants (Municipal Wide)				
	Valves	10 ea.$1200 per unit			12,200
	Hydrants	10 ea.$2200 per unit			22,000
		TOTAL CONSTRUCTION COSTS			$409,000
		10% Contingencies			40,900
					$449,900
		25% Eng'r, Legal, Admin.			112,500
		TOTAL PROJECT COSTS			$562,400

LEE T. PURCELL ASSOCIATES
CONSULTING ENGINEERS
60 Hamilton Street
Paterson, New Jersey 07505

35 Main Street
Franklin, New Jersey 1 07416

TOWNSHIP OF DENVILLE

MORRIS COUNTY, NEW JERSEY

WATER SUPPLY BOND LOAN REHABILITATION PROGRAM

CONSTRUCTION AND PROJECT COST ESTIMATES

OCTOBER 1984

Description of Elements of Work

The Township of Denville desires to continue its program, utilizing state loan funding, of looping to eliminate major dead-ends in the system, and to reinforce lines that are useful in the transmission of potable water within the distribution system.

The proposed projects will provide the municipality with the following looping or replacement footage of water mains:

12 inch	4500 l.f.
8 inch	280 l.f.

This effort, once undertaken and completed, will enhance water distribution and firefighting capability within various sections of the Township.

All work as contemplated will be complete with valves, hydrants, transfer of water services (where applicable) to the upgraded pipelines, and all appurtenances thereto.

Estimated Costs

The proposed work and the anticipated costs for same appear in the attached table as four (4) separate project areas. The total Construction Costs are shown to amount of $357,600 with the Total Project Costs calculated to be $492,000. Included in the latter are 10% Contingencies and 25% to cover Engineering, Legal and Administrative Charges.

TOWNSHIP OF DENVILLE

MORRIS COUNTY, NEW JERSEY

WATER SUPPLY BOND LOAN PROGRAM

CONSTRUCTION & PROJECT COST ESTIMATES

1984

	Location	Size in.	Length (ft.)	Cost/ft. $	Construction $
1.	Bush Road, River Road to Norris Road;	12	2000	60	120,000
	River Crossing			L.S.	50,000
2.	St. Mary's Place to Meyers Ave.	8	280	45	12,600
3.	Mt. Pleasant Turnpike, Hill Road to Semrau Road;	12	700	60	42,000
	Brook Crossing			L.S.	25,000
4.	Mt. Pleasant Turnpike, Openaki Rd. to Semrau Road	12	1800	60	108,000
				TOTAL CONSTRUCTION COSTS	$357,600
				10% Contingencies	36,000
					$393,600
				25% Engr., Legal, Admin.	98,400
				TOTAL PROJECT COSTS	$492,000

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Alexander C. Wood, 3rd J. S. C.

EXHIBIT J

BRANDT, HAUGHEY, PENBERTHY & LEWIS
A PROFESSIONAL CORPORATION
COUNSELLORS AT LAW
4 KINGS HIGHWAY EAST
HADDONFIELD, N.J. 08033
(609) 428-4333

DAVIS ENTERPRISES

Plaintiff

vs.

MOUNT LAUREL MUNICIPAL UTILITIES AUTHORITY,

Defendant

SUPERIOR COURT OF NEW JERSEY
CHANCERY DIVISION
BURLINGTON COUNTY
DOCKET NO. C-635-81

Civil Action

ORDER

This matter having come before the Court on February 18, 1983, the return date of an Order to Show Cause, and the Court having considered the affidavits, briefs and other matters relevant hereto, including the oral argument of counsel.

IT IS on this 8th day of March, 1983, ORDERED that:

1. The defendant, Mt. Laurel Municipal Utilities Authority shall take all appropriate steps necessary, including the construction of additional sewer facilities if necessary, to provide the plaintiff with the 91,200

gallons per day sewer capacity to service the plaintiff's mobile home park.

2. The defendant, Mt. Laurel Municipal Utilities Authority, shall advise this Court in writing on a regular basis, not less frequently than every 15 days, of the steps that it has undertaken to provide sewer capacity to the plaintiff, and including steps that it has taken to reduce infiltration into its system.

3. It is further Ordered that counsel for the plaintiff forthwith request from the Department of Environmental Protection, subject to the Department's available personnel and resources, a written report:

(a) advising the Court as to the current status of the sewer facilities operated by the Mt. Laurel Municipal Utilities Authority, the outstanding sewer connection permits, the gallonage per day deemed committed but not yet used and the status of the sewer extension main permit application for the plaintiff's property, SC-82-3487-4;

(b) advising the Court as to the impediments, if any, to the issuance of the sewer extension main permit for the plaintiff, SC-82-3487-4; and

(c) advising what steps can be appropriately taken to expedite approval of the pending application.

4. As soon as the defendant, Mt. Laurel Municipal Utilities Authority, has adequate capacity available for

the plaintiff, it shall return the sewer main extension application to the New Jersey Department of Environmental Protection with the appropriate resolution of the Mt. Laurel Municipal Utilties Authority certifying that it has such sewer capacity and provide the Department of Environmental Protection with such other data as is requested by that agency and make such other determinations as are required by the Department of Environmental Protection.

5. Until such time as the New Jersey Department of Environmental Protection shall have issued a sewer main extension permit for the plaintiff's mobile home park development, the defendant, Mt. Laurel Municipal Utilities Authority, its agent and employees, are restrained from:

(a) processing any further applications for sewer main extensions; and

(b) issuing any sewer connection permits for any individual structures, construction of which commenced after February 2, 1983.

6. Upon the issuance of sewer main extension permit #SC-82-3487-4, the provisions of Paragraphs 2, 3, 4 and 5 shall automatically dissolve and terminate.

7. After the issuance of the sewer main extension permit by the New Jersey Department of Environmental Protection for the plaintiff's mobile home park, the defendant, Mt. Laurel Municipal Utilities Authority, is

ordered to reserve and retain sewer capacity so as to permit the connection of the plaintiff's mobile home park into the Mt. Laurel Municipal Utilities Authority's sewer system. Prior to permitting additional connections to its sewer system, the Mt. Laurel Municipal Utilities Authority or its Executive Director shall make a specific finding prior to each such connection, that such connection will not violate the provisions of this Order. Periodically, but not less than monthly, the Mt. Laurel Municipal Utilties Authority shall advise the Court and counsel for the plaintiff of the status of available sewer capacity and additional permits and connections to the Municipal Utilities Authority's system since February 2, 1983.

8. In order to encourage the development of the mobile home park as quickly as is reasonably feasible, IT IS ORDERED that:

(a) the plaintiff report to this Court periodically, but not less than every two months, as to the status of the project, including issuance of permits, action on applications, if any, for subsidies and impediments, if any, to the construction of the mobile home park;

(b) if 10% of the mobile home units are not erected within one year from the date of this Order, any party may apply on notice to all other parties for modification of the provisions of this Order.

9. The provisions of this Order shall supersede the temporary Restraining Order and Order to Show Cause dated February 2, 1983.

10. IT IS FURTHER ORDERED that nothing contained in this Order shall prohibit Tedco Equities from tieing in its buildings which are serviced through the Cherry Hill Township sewer facilities.

Alexander C. Wood, III,J.S.C.

SUBMITTED UNDER THE FIVE-DAY RULE.

PAPERS CONSIDERED:

____Notice of Motion

____Movant's Affidavits

____Movant's Brief

__/__Answering Affidavits

____Cross-Motion

____Movant's Reply

____Other