

**Township of Upper Pittsgrove  
Municipal Stormwater  
Management Plan**

June 2005

Prepared for:

Upper Pittsgrove Township  
Salem County, New Jersey  
431 Route 77  
Elmer, NJ 08318

As prepared by:

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## Introduction

This Municipal Stormwater Management Plan (MSWMP) documents the strategy for the Township of Upper Pittsgrove (“the Township”) to address stormwater-related impacts. The creation of this plan is required by N.J.A.C. 7:14A-25 Municipal Stormwater Regulations. This plan contains all of the required elements described in N.J.A.C. 7:8 Stormwater Management Rules. The plan addresses groundwater recharge, stormwater quantity, and stormwater quality impacts by incorporating stormwater design and performance standards for new major development, defined as projects that disturb one or more acre of land. These standards are intended to minimize the adverse impact of stormwater runoff on water quality and water quantity and the loss of groundwater recharge that provides baseflow in receiving water bodies. The plan describes long-term operation and maintenance measures for existing and future stormwater facilities.

A “build-out” analysis has not been included in this plan and will be submitted under separate cover.

The plan also addresses the review and update of existing ordinances, the Township Master Plan, and other planning documents to allow for project designs that include low impact development techniques. The final component of this plan is a mitigation strategy for when a variance or exemption of the design and performance standards is sought. As part of the mitigation section of the stormwater plan, specific stormwater management measures are identified to lessen the impact of existing development.

## Goals

The goals of this MSWMP are to:

- reduce flood damage, including damage to life and property;
- minimize, to the extent practical, any increase in stormwater runoff from any new development;
- reduce soil erosion from any development or construction project;
- assure the adequacy of existing and proposed culverts and bridges, and other in-stream structures;
- maintain groundwater recharge;
- prevent, to the greatest extent feasible, an increase in nonpoint pollution;
- maintain the integrity of stream channels for their biological functions, as well as for drainage;
- minimize pollutants in stormwater runoff from new and existing development to restore, enhance, and maintain the chemical, physical, and biological integrity of the waters of the state, to protect public health, to safeguard fish and aquatic life and scenic and ecological values, and to enhance the domestic, municipal, recreational, industrial, and other uses of water; and
- protect public safety through the proper design and operation of stormwater basins.

To achieve these goals, this plan outlines specific stormwater design and performance standards for new development. Additionally, the plan proposes stormwater management controls to address impacts from existing development. Preventative and corrective maintenance strategies are included in the plan to ensure long-term effectiveness of stormwater management facilities. The plan also outlines safety standards for stormwater infrastructure to be implemented to protect public safety.

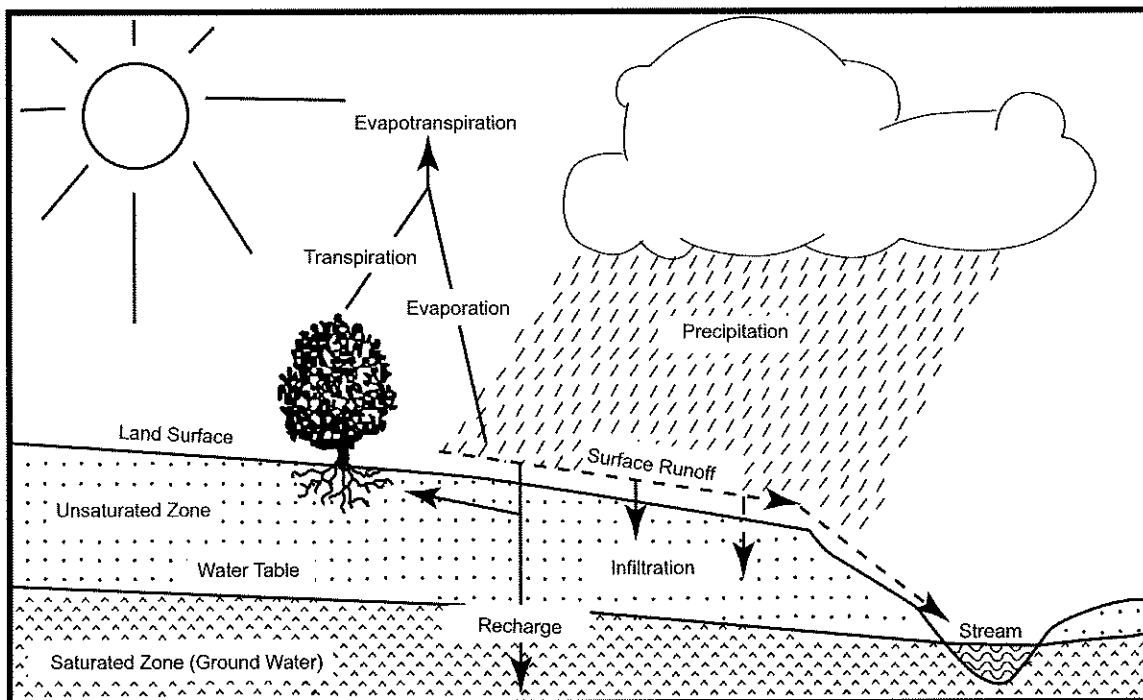
### Stormwater Discussion

Land development can dramatically alter the hydrologic cycle (see Figure No. 1) of a site and, ultimately, an entire watershed. Prior to development, native vegetation can either directly intercept precipitation or draw that portion that has infiltrated into the ground and return it to the atmosphere through evapotranspiration. Development can remove this beneficial vegetation and replace it with lawn or impervious cover, reducing the site's evapotranspiration and infiltration rates. Clearing and grading a site can remove depressions that store rainfall. Construction activities may also compact the soil and diminish its infiltration ability, resulting in increased volumes and rates of stormwater runoff from the site.

Impervious areas that are connected to each other through gutters, channels, and storm sewers can transport runoff more quickly than natural areas. This shortening of the transport or travel time quickens the rainfall-runoff response of the drainage area, causing flow in downstream waterways to peak faster and higher than natural conditions. These increases can create new and aggravate existing downstream flooding and erosion problems and increase the quantity of sediment in the channel. Filtration of runoff and removal of pollutants by surface and channel vegetation is eliminated by storm sewers that discharge runoff directly into a stream.

Increases in impervious area can also decrease opportunities for infiltration, which in turn, reduces stream base flow and groundwater recharge. Reduced base flows and increased peak flows produce greater fluctuations between normal and storm flow rates, which can increase channel erosion. Reduced base flows can also negatively impact the hydrology of adjacent wetlands and the health of biological communities that depend on base flows. Finally, erosion and sedimentation can destroy habitat from which some species cannot adapt.

Figure No. 1: Groundwater Recharge in the Hydrologic Cycle



Source: New Jersey Geological Survey Report GSR-32.

In addition to increases in runoff peaks, volumes, and loss of groundwater recharge, land development often results in the accumulation of pollutants on the land surface that runoff can mobilize and transport to streams. New impervious surfaces and cleared areas created by development can accumulate a variety of pollutants from the atmosphere, fertilizers, animal wastes, and leakage and wear from vehicles. Pollutants can include metals, suspended solids, hydrocarbons, pathogens, and nutrients.

As well as increased pollutant loading, land development can adversely affect water quality and stream biota in more subtle ways. For example, stormwater falling on impervious surfaces or stored in detention or retention basins can become heated and raise the temperature of the downstream waterway, adversely affecting cold water fish species such as trout. Development can remove trees along stream banks that normally provide shading, stabilization, and leaf litter that falls into streams and becomes food for the aquatic community.

### Background

The Township encompasses ±40.36 square mile area in eastern Salem County, New Jersey. South Harrison and Elk Townships bound the Township to the north, Elmer Boro and Pittsgrove Township to the south and Alloway and Upper Deerfield Townships to the southwest.

The population of the Township has increased from 3,140 in 1990 to 3,468 in 2000. The total housing units has also increased from 1,069 in 1990 to 1,250 in 2000. The population, housing and roadway increase, along with changes in the landscape, have most likely increased stormwater runoff volumes and pollutant loads to the waterways of the municipality.

Figure No. 2 (see attached) illustrates the waterways in the Township. Figure No. 3 (see attached) depicts the Township boundary on the USGS quadrangle maps.

The New Jersey Department of Environmental Protection (NJDEP) has established an Ambient Biomonitoring Network (AMNET) to document the health of the state's waterways. There are over 800 AMNET sites throughout the state of New Jersey. These sites are sampled for benthic macroinvertebrates by NJDEP on a five-year cycle. Streams are classified as non-impaired, moderately impaired, or severely impaired based on the AMNET data. The data is used to generate a New Jersey Impairment Score (NJIS), which is based on a number of biometrics related to benthic macroinvertebrate community dynamics.

The major stream that flows through the Township located west, Salem River, is non- impaired. The tributaries that flow through the Township to these rivers are also non-impaired based on AMNET data.

In addition to the AMNET data, the NJDEP and other regulatory agencies collect water quality chemical data on the streams in the state. There is no data for the Salem River, which means that this river is not an impaired waterway and the NJDEP is not required to develop a Total Maximum Daily Load (TMDL) for this waterway.

A TMDL is the amount of a pollutant that can be accepted by a waterbody without causing an exceedance of water quality standards or interfering with the ability to use a waterbody for one or more of its designated uses. The allowable load is allocated to the various sources of the pollutant, such as stormwater and wastewater discharges, which require an NJPDES permit to discharge, and nonpoint source, which includes stormwater runoff from agricultural areas and residential areas, along with a margin of safety. Provisions may also be made for future sources in the form of reserve capacity. An implementation plan is developed to identify how the various

sources will be reduced to the designated allocations. Implementation strategies may include improved stormwater treatment plants, adoption of ordinances, reforestation of stream corridors, retrofitting stormwater systems, and other BMPs.

The New Jersey Integrated Water Quality Monitoring and Assessment Report (305(b) and 303(d)) (Integrated List) is required by the federal Clean Water Act to be prepared biennially and is a valuable source of water quality information. This combined report presents the extent to which New Jersey waters are attaining water quality standards, and identifies waters that are impaired. Sublist 5 of the Integrated List constitutes the list of waters impaired or threatened by pollutants, for which one or more TMDLs are needed.

A map of the groundwater recharge areas is shown in Figure No. 4 (see attached). Wellhead protection areas, also required as part of the MSWMP, are shown in Figure No. 5 (see attached).

We recommend the Township adopt specific ordinances to protect the wellhead protection areas to minimize the infiltration of pollutants into aquifers.

### ***Design and Performance Standards***

The Township will adopt the design and performance standards for stormwater management measures as presented in N.J.A.C. 7:8-5 to minimize the adverse impact of stormwater runoff on water quality and water quantity and loss of groundwater recharge in receiving water bodies. The design and performance standards include the language for maintenance of stormwater management measures consistent with the stormwater management rules at N.J.A.C. 7:8-5.8 Maintenance Requirements, and language for safety standards consistent with N.J.A.C. 7:8-6 Safety Standards for Stormwater Management Basins. The ordinances will be submitted to the county for review and approval within 4/1/06.

During construction, Township inspectors will observe the construction of the project to ensure that the stormwater management measures are constructed and function as designed.

### ***Plan Consistency***

The Township is not within a Regional Stormwater Management Planning Area and no TMDLs have been developed for waters within the Township; therefore this plan does not need to be consistent with any regional stormwater management plans (RSWMPs) nor any TMDLs. If any RSWMPs or TMDLs are developed in the future, this Municipal Stormwater Management Plan will be updated to be consistent.

The Municipal Stormwater Management Plan is consistent with the Residential Site Improvement Standards (RSIS) at N.J.A.C. 5:21. The municipality will utilize the most current update of the RSIS in the New Jersey Stormwater Best Management Practices Manual for stormwater management review of residential areas. This Municipal Stormwater Management Plan will be updated to be consistent with any future updates to the RSIS.

The Township's Stormwater Management Ordinance requires all new development and redevelopment plans to comply with New Jersey's Soil Erosion and Sediment Control Standards. During construction, Township inspectors will observe on-site soil erosion and sediment control measures and report any inconsistencies to the local Soil Conservation District.

### Nonstructural Stormwater Management Strategies

The Township has reviewed the master plan and ordinances, and has provided a list of the sections in the Township land use and zoning ordinances that are to be modified to incorporate nonstructural stormwater management strategies. These are the ordinances identified for revision. Once the ordinance texts are completed, they will be submitted to the county review agency for review and approval within 4/1/06. A copy will be sent to the Department of Environmental Protection at the time of submission.

The Township Code was reviewed with regard to incorporating nonstructural stormwater management strategies. We recommend the following strategies be incorporated into the code.

#### 1) Chapter III: Zoning

##### a) Article III: Supplementary District Regulations

- i) § 3.8: Flood Hazard Areas describes procedures for construction within a floodplain designation. The purpose is to prevent excessive and unsafe development, prevent unsanitary conditions and related hazards, minimize danger to public health by protecting water supplies, recharge areas and the natural drainage system.

We recommend this section be amended to encourage the use of natural vegetated swales for any new construction or substantial improvements.

- ii) § 3.9: Environmentally Sensitive Lands describes procedures for protecting environmentally sensitive lands including headwaters of various regional streams.

We recommend this section be amended to incorporate language to the standards for approval to provide mitigation funding or partial funding to the municipality for an environmental enhancement project that has been identified in the Municipal Stormwater Management Plan, or towards the development of a Regional Stormwater Management Plan.

##### b) Article IV: General Standards

- i) § 3.11: Fences and Walls detail the standards for fences and walls.

We recommend this section be amended to encourage the use of vegetative screening. The Township may want to consider providing a list of approved native vegetation.

- ii) § 3.12: Driveways describe the requirements for providing access from a public street or way to any permitted use or structure.

We recommend this section be amended to allow the use of pervious paving materials to minimize stormwater runoff and promote groundwater recharge.

- iii) § 3.15.2: Professional Office Centers describes standards for professional office centers.

The Township may want to consider encouraging the use of vegetative roofs to reduce impervious surfaces by retaining precipitation on and within the planting bed and on the surface of vegetation, ultimately reducing the volume of runoff from the roof.

##### c) Article V: Special Standards and Requirements

- i) § 3.17: Roadside stands details the standards for roadside stands.

We recommend this section be amended to require the use of pervious materials (i.e. gravel, crushed stone, pavers) for parking or temporary stopping areas to minimize stormwater runoff and promote groundwater recharge.

- ii) § 3.19: Recreation Clubs, Lodges, Churches, and Assembly Halls provide standards for recreation clubs, lodges, churches and assembly halls.

The Township may want to consider encouraging the use of vegetative roofs to reduce impervious surfaces by retaining precipitation on and within the planting bed and on the surface of vegetation, ultimately reducing the volume of runoff from the roof.

- iii) § 3.22.1: Motels and Hotels describe the provisions for motels and hotels.

The Township may want to consider encouraging the use of vegetative roofs to reduce impervious surfaces.

- iv) § 3.23.1: Planned Commercial Centers detail the requirements for planned commercial centers.

The Township may want to consider reducing the maximum percentage of impervious surfaces by the encouraging the following:

- Use of pervious paving materials (for holiday overflow parking, therefore reducing the impervious parking area) to minimize stormwater runoff and promote groundwater recharge.
- Allow for curb cuts or flush curbs with curb stops to allow vegetated swales to be used for stormwater conveyance and to allow the disconnection of impervious areas.
- Use of vegetative roofs to reduce impervious surfaces by retaining precipitation on and within the planting bed and on the surface of vegetation, ultimately reducing the volume of runoff from the roof.
- Use of landscaped islands with flush curbs.
- Use of native ground cover and plants for landscaping purposes.

- v) § 3.26: Private or Public Swimming Clubs provide standards for private or public swimming clubs.

We recommend this section be amended to allow the use of pervious paving materials to minimize stormwater runoff and promote groundwater recharge.

We also recommend this section encourage the use of native ground cover and plants for landscaping purposes.

- vi) § 3.27: Industrial Use Standards describes the requirements for industrial uses.

The Township may want to consider encouraging the use of vegetative roofs to reduce impervious surfaces.

## 2) Chapter IV: Site Plan Review

### a) Article IV: Improvements and Design Standards

- i) § 4.6: Off-Street Parking details off-street parking requirements.



We recommend this section be amended to allow the use of pervious paving materials to minimize stormwater runoff and promote groundwater recharge.

This section should be amended to allow for curb cuts or flush curbs with curb stops to allow vegetated swales to be used for stormwater conveyance and to allow the disconnection of impervious areas.

We also recommend this section encourage the use of native ground cover and plants for landscaping purposes.

- ii) § 4.7: Off-Street Loading details off-street loading requirements.

We recommend this section be amended to allow the use of pervious paving materials to minimize stormwater runoff and promote groundwater recharge.

We also recommend this section encourage the use of native ground cover and plants for landscaping purposes.

- iii) § 4.8: Access describes access standards as well as complying with the driveway requirements § 3.12.

We recommend this section be amended to allow the use of pervious paving materials to minimize stormwater runoff and promote groundwater recharge.

- iv) § 4.10: Buffering and Screening requires sufficient buffering along the perimeter of all site plans, along and adjacent to property lines of similar or proposed uses and along the road. They are also required whenever a commercial or industrial land use abuts existing or proposed residential land use.

We recommend this section be amended to require the use of native vegetation, which requires less fertilization and watering and to also include language to require the preservation of natural wood tracts and limits land disturbance for new construction.

We also recommend this section be amended to incorporate language to allow buffer areas to be used for stormwater management by disconnecting impervious surfaces and treating runoff from these impervious surfaces.

We also recommend this section encourage the use of vegetative screening. The Township may want to consider providing a list of approved native vegetation.

- v) § 4.11: Landscaping describes the standards for landscaping.

We recommend this section be amended to require the use of native vegetation, which requires less fertilization and watering. The Township may want to consider providing a list of approved tree and shrub species.

### 3) Chapter V: Land Subdivision

#### a) Article II: Improvements and Design Standards

- i) § 5.5: Streets and Roads detail the design requirements for streets and roads.

We recommend this section be amended to encourage developers to limit on-street parking to allow for narrower paved widths.

- ii) § 5.6: Drainage details the design standards for drainage systems.

We recommend this section be amended to encourage the use of natural vegetated swales in lieu of inlets and pipes.

- iii) § 5.8: Natural Features requires that natural features, such as natural terrain, wetlands, wooded areas, vistas, natural drainage ways and lakes, be preserved whenever possible.

We recommend this section be amended to provide additional language to ensure that leaf litter and other beneficial aspects of the wooded areas are maintained in addition to the trees.

- iv) § 5.9: Trees requires that striping trees from a lot is prohibited.

We recommend this section be amended to require the use of native vegetation, which requires less fertilization and watering. The Township may want to consider providing a list of approved tree and shrub species.

- v) § 5.11: Pedestrian Circulation describes the sidewalk requirements for the Township.

We recommend language be added to this section to require developers to design sidewalks to discharge stormwater to neighboring lawns where feasible to disconnect these impervious surfaces, and/or use permeable paving materials where appropriate.

- vi) § 5.16: Recreation Areas requires a recreation area for each subdivision containing more than 20 lots.

We recommend this section be amended to require the use of native vegetation, which requires less fertilization and watering. The Township may want to consider providing a list of approved tree and shrub species.

The Township has 4 residential districts. Each district has a maximum percent impervious surface allocation, ranging from 10 percent for the A District, to 20 percent for the LR-A, MR and VR Districts, which have a minimum lot sizes of 2 acres, 1 acre and 30,000 square feet respectively, for single-family homes.

The Township has 5 nonresidential districts. Each of these districts has a maximum percent impervious surface allocation, ranging from 10 percent for the A and P Districts to 30 percent for the LI District.

We recommend the Township Code be amended to remind developers that satisfying the percent impervious requirements do not relieve them of responsibility for complying with the Design and Performance Standards for Stormwater Management Measures.

Also, if a developer is given a variance to exceed the maximum allowable percent imperviousness, the developer must mitigate the impact of the additional impervious surfaces. This mitigation effort must address water quality, flooding, and groundwater recharge.

### Land Use/Build-Out Analysis

A detailed land use analysis for the Township shall be submitted under separate cover.

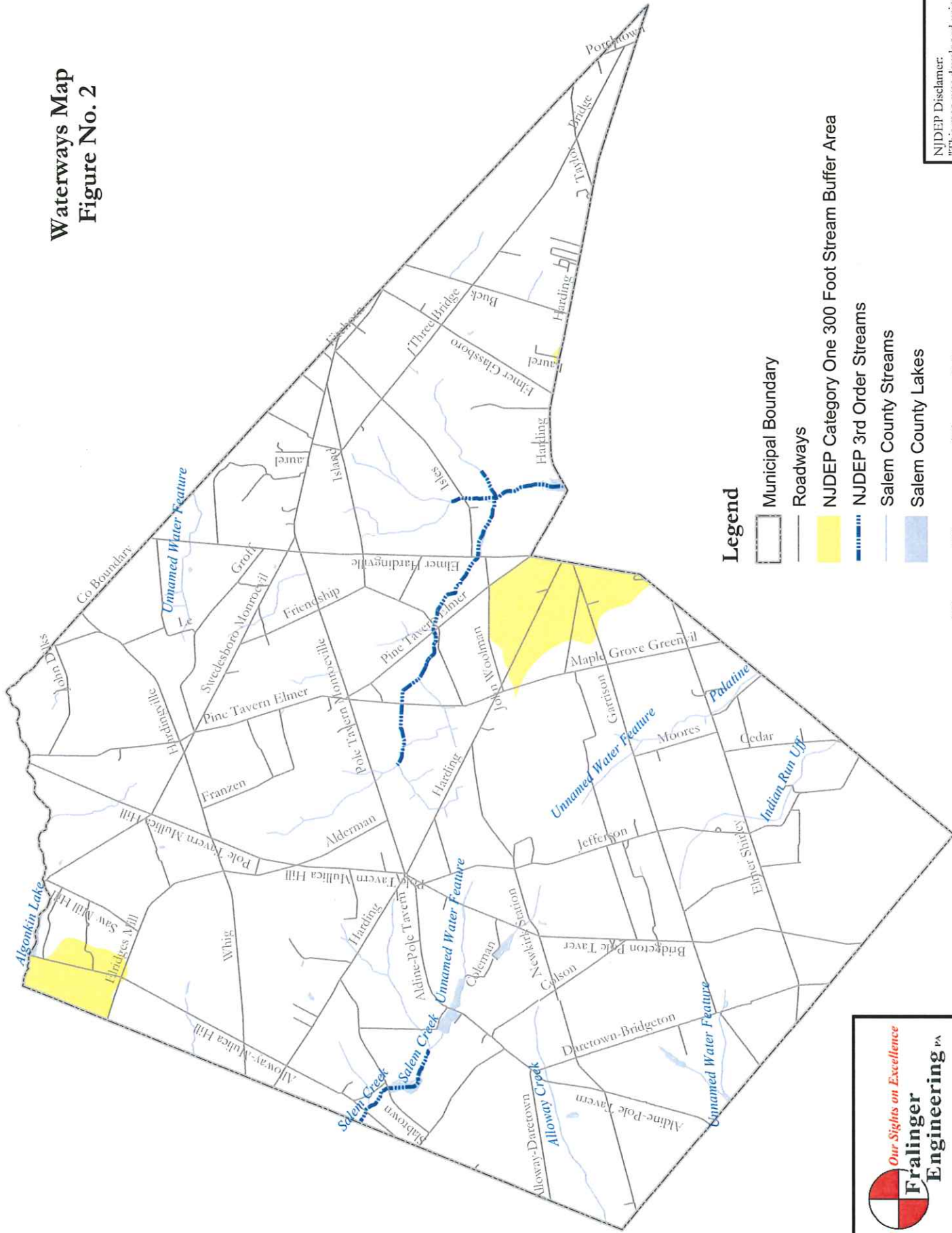
### Mitigation Plans

This mitigation plan is provided for a proposed development that is granted a variance or exemption from the stormwater management design and performance standards.







The municipality should set up a trust fund to allow a developer to provide a fee to the municipality for an environmental enhancement project that has been identified by the governing body for Municipal Stormwater Management Planning, or towards the development of a Regional Stormwater Management Plan. The fee or amount of funding shall be determined by the governing body and include costs associated with purchasing the property or easement for mitigation, costs for the design, permitting, construction, inspection and contract administration, costs for operation and maintenance, and the cost associated with the long-term maintenance requirements of the mitigation measure.

## Figures

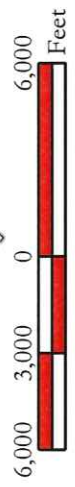
**Waterways Map  
Figure No. 2**



**Legend**

-  Municipal Boundary
-  Roadways
-  NJDEP Category One 300 Foot Stream Buffer Area
-  NJDEP 3rd Order Streams
-  Salem County Streams
-  Salem County Lakes

**Upper Pittsgrove Township  
Salem County, NJ**



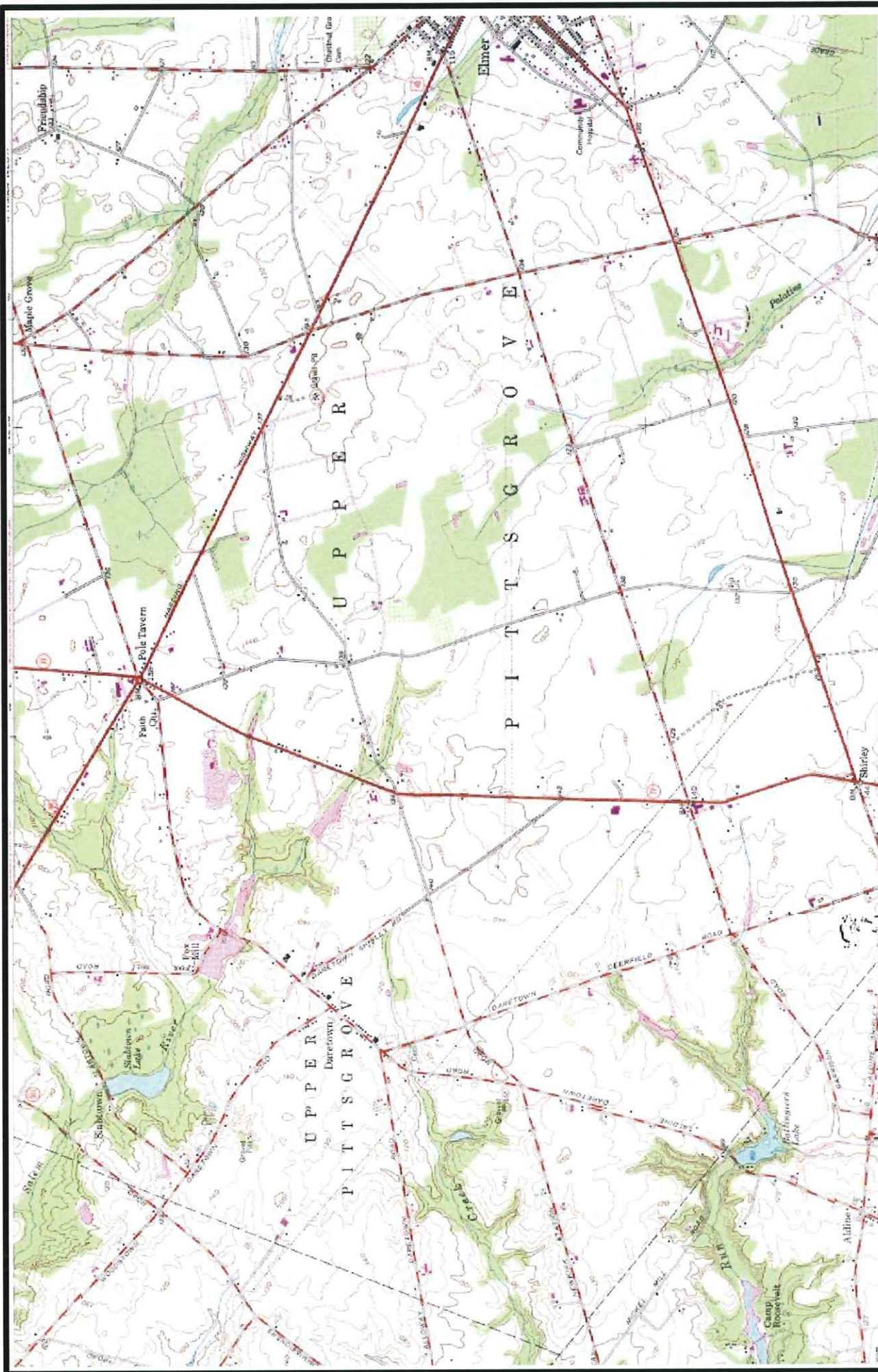
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# Upper Pittsgrove Township Salem County, NJ

## USGS Quadrangle Map Figure No. 3

Alloway & Elmer Quadrangles

Not to Scale

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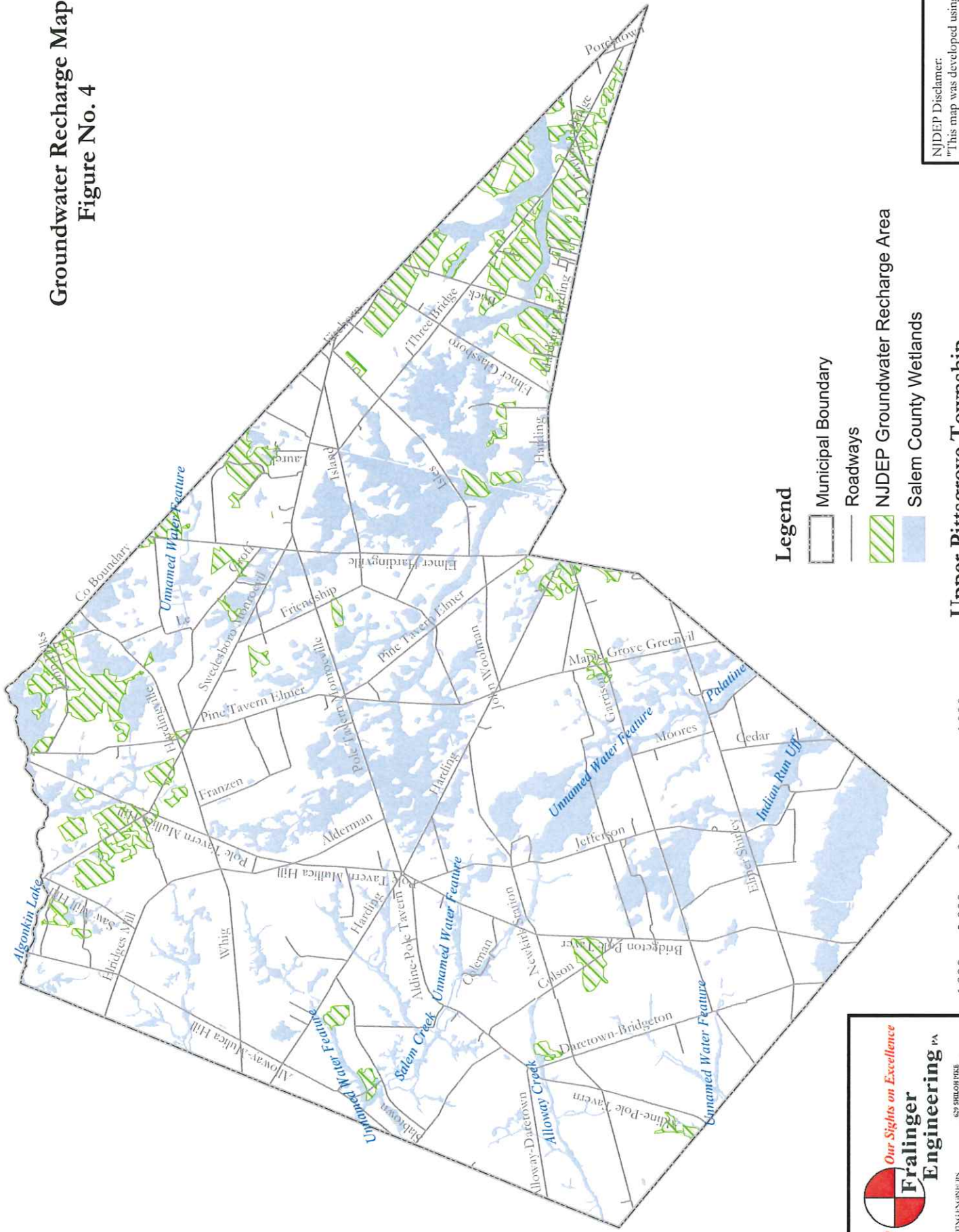
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**Groundwater Recharge Map  
Figure No. 4**



**Legend**

-  Municipal Boundary
-  Roadways
-  NJDEP Groundwater Recharge Area
-  Salem County Wetlands

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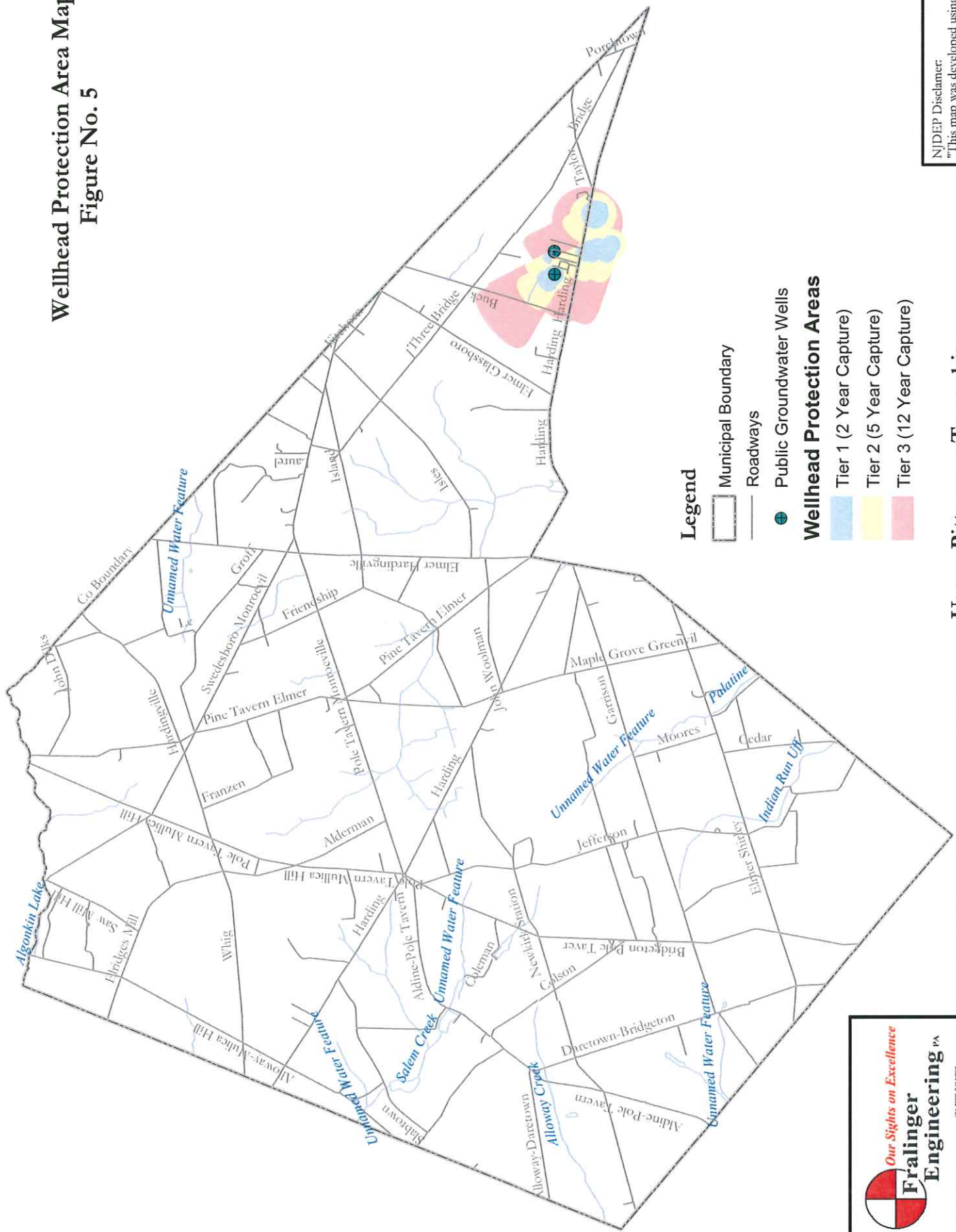
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**Wellhead Protection Area Map  
Figure No. 5**



**Legend**

- Municipal Boundary
  - Roadways
  - Public Groundwater Wells
- Wellhead Protection Areas**
- Tier 1 (2 Year Capture)
  - Tier 2 (5 Year Capture)
  - Tier 3 (12 Year Capture)

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Salem County, NJ**

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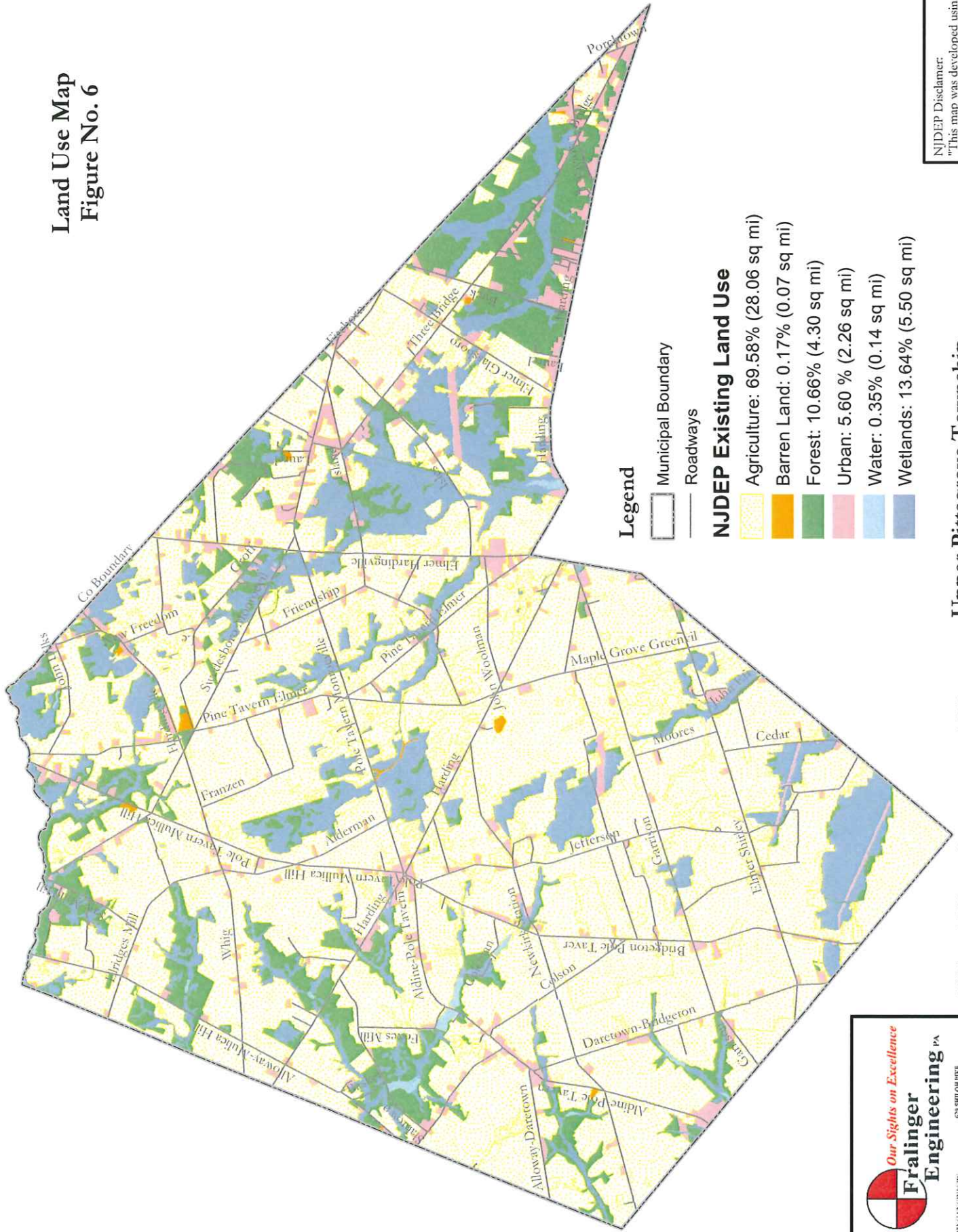
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Land Use Map  
Figure No. 6



**Legend**

- Municipal Boundary
- Roadways

**NJDEP Existing Land Use**

- Agriculture: 69.58% (28.06 sq mi)
- Barren Land: 0.17% (0.07 sq mi)
- Forest: 10.66% (4.30 sq mi)
- Urban: 5.60% (2.26 sq mi)
- Water: 0.35% (0.14 sq mi)
- Wetlands: 13.64% (5.50 sq mi)



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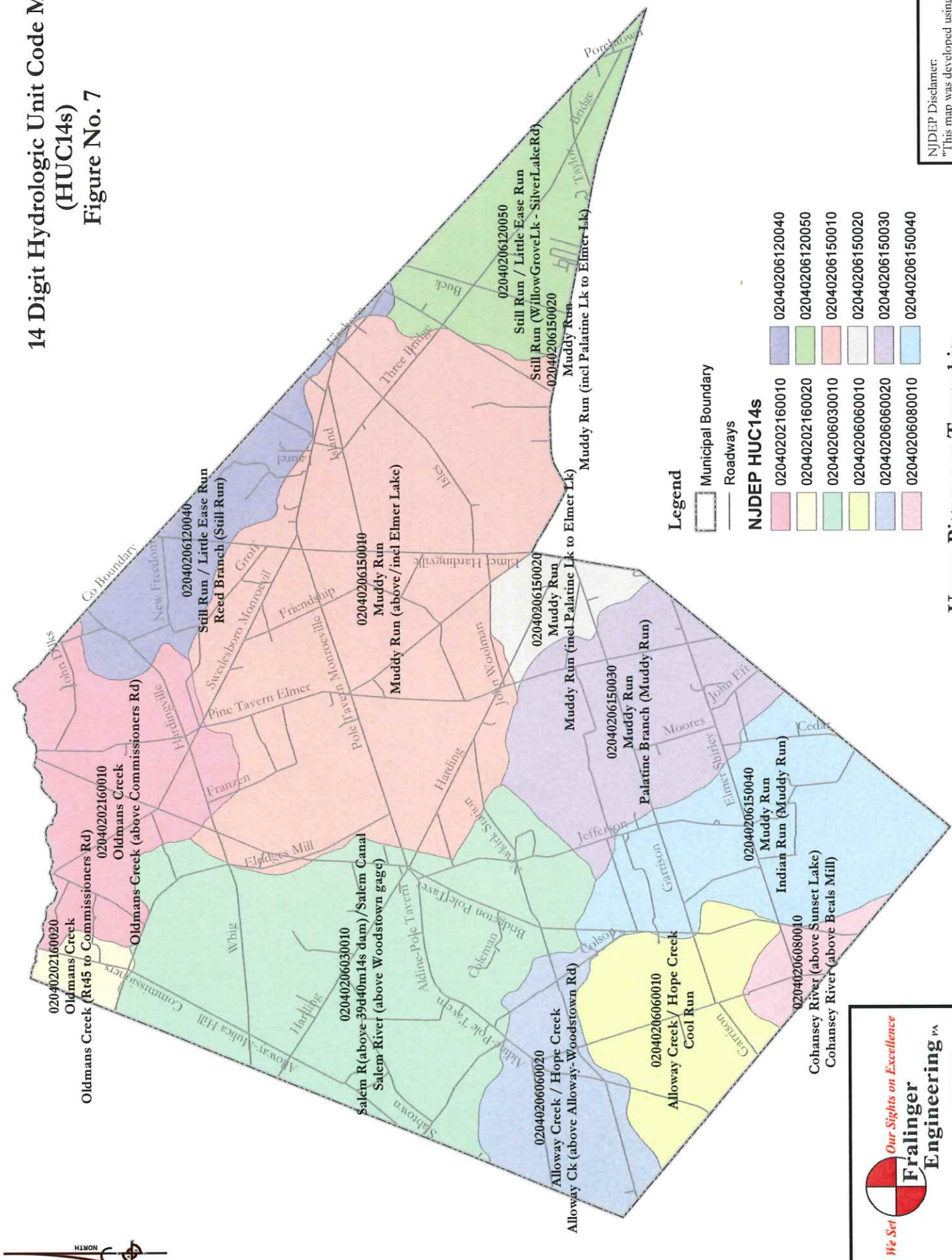
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# 14 Digit Hydrologic Unit Code Map (HUC14s) Figure No. 7



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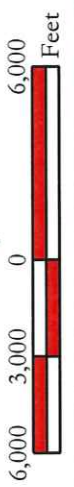
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## Upper Pittsgrove Township Salem County, NJ

- Legend**
- Municipal Boundary
  - Roadways

**NJDEP HUC14s**

02040202160010	02040206120040
02040202160020	02040206120050
02040206030010	02040206150010
02040206060010	02040206150020
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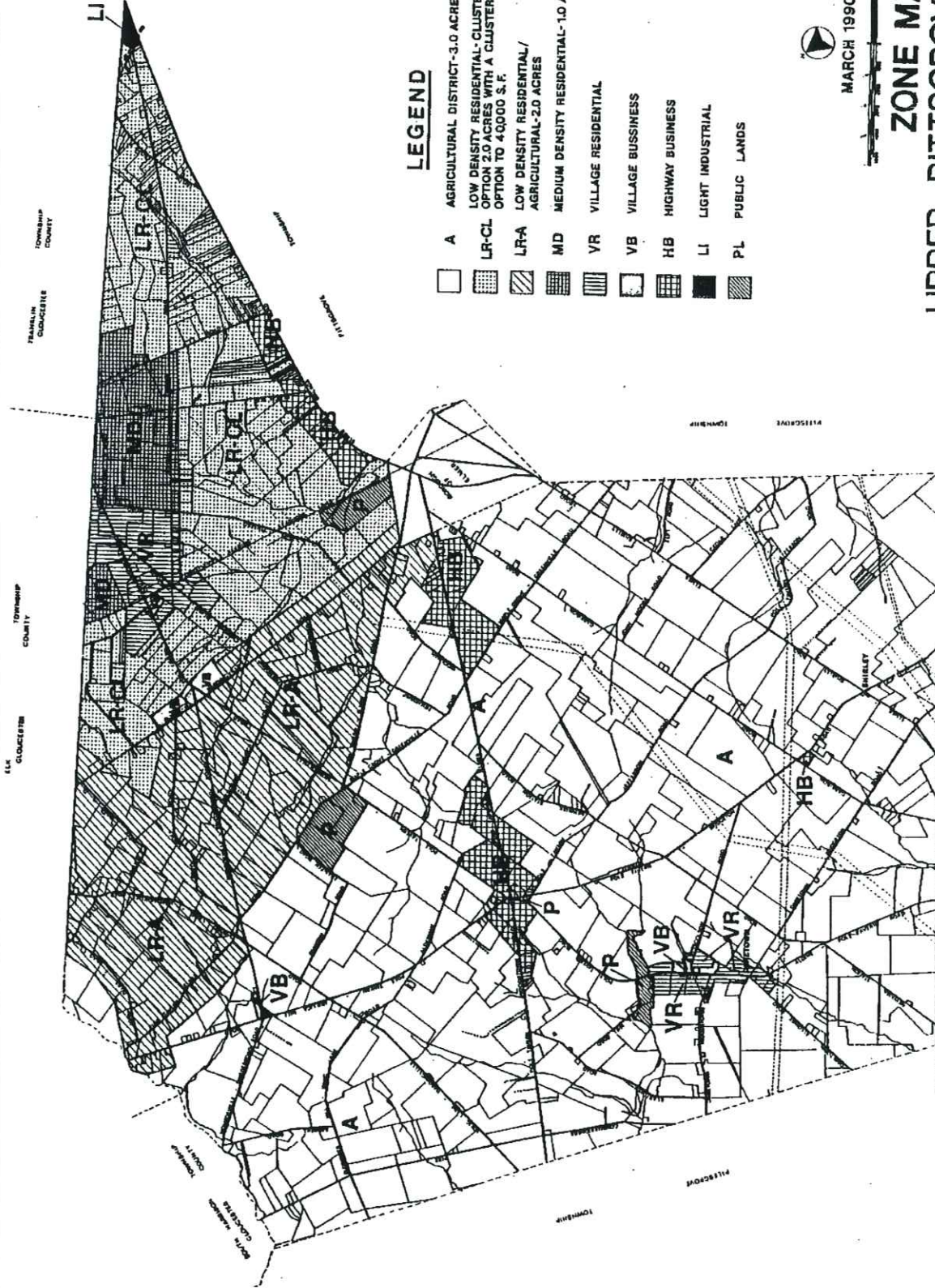


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**LEGEND**

- A AGRICULTURAL DISTRICT-3.0 ACRES
- LR-CL LOW DENSITY RESIDENTIAL-CLUSTER. OPTION 2.0 ACRES WITH A CLUSTER OPTION TO 40,000 S.F.
- LR-A LOW DENSITY RESIDENTIAL/ AGRICULTURAL-2.0 ACRES
- MD MEDIUM DENSITY RESIDENTIAL-1.0 ACRE
- VR VILLAGE RESIDENTIAL
- VB VILLAGE BUSSINESS
- HB HIGHWAY BUSINESS
- LI LIGHT INDUSTRIAL
- PL PUBLIC LANDS

MARCH 1990

**ZONE MAP**

**UPPER PITTSBORO TOWNSHIP**

SALEM COUNTY, NEW JERSEY

PREPARED BY:  
**ALBERT A. FRALINGER, JR., P.A.**  
 TOWNSHIP ENGINEER

**HARRY R. DARE III**  
 TOWNSHIP PLANNER

Zoning Districts Map  
 Figure No. 8

Upper Pittsgrove Township  
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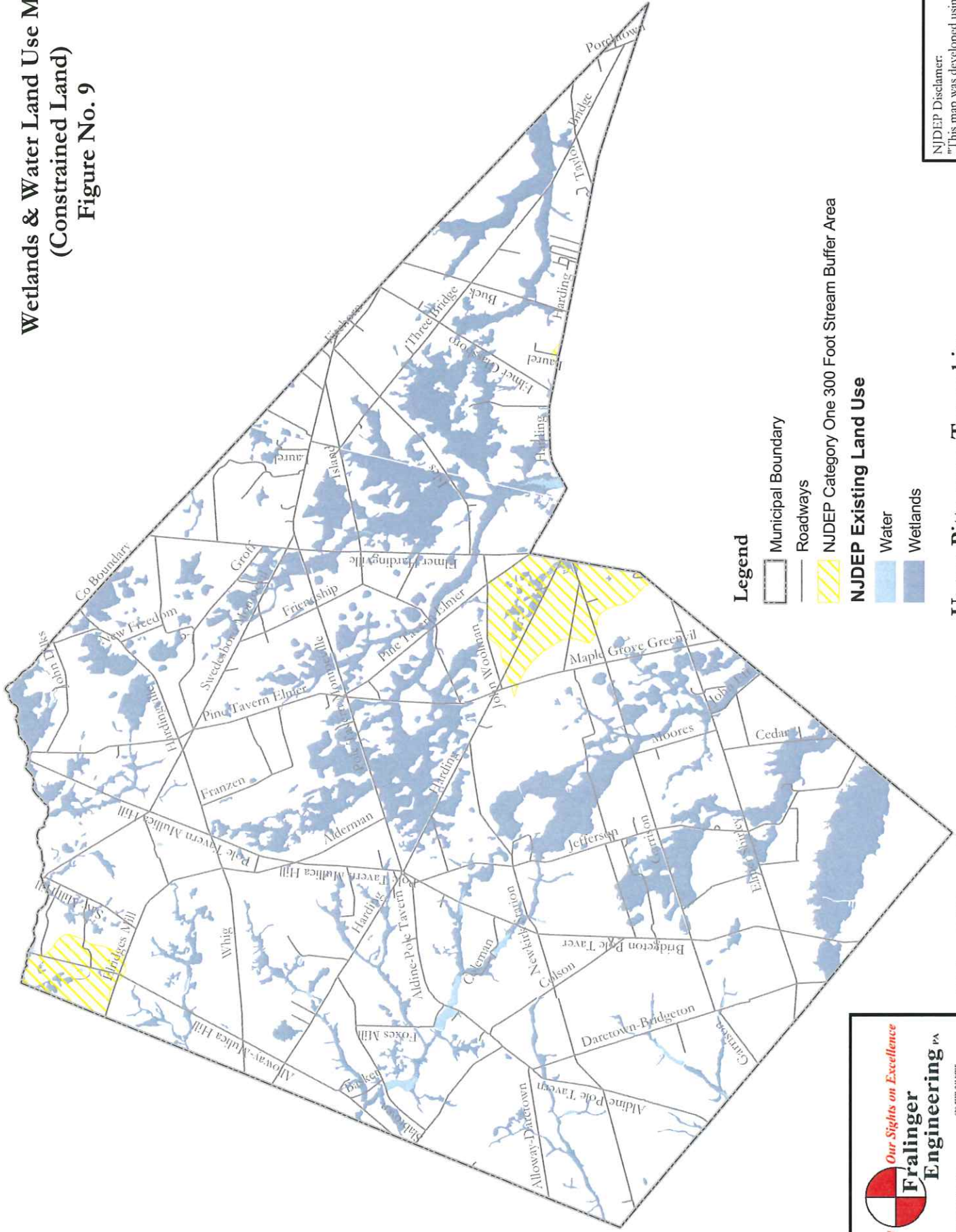
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Date: 5/9/05  
 File No. 23-240,00

Not to Scale

# Wetlands & Water Land Use Map (Constrained Land) Figure No. 9



### Legend

-  Municipal Boundary
-  Roadways
-  NJDEP Category One 300 Foot Stream Buffer Area
-  Water
-  Wetlands

## Upper Pittsgrove Township Salem County, NJ



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