PREPARED FOR:

Borough of Union Beach
650 Poole Avenue
Union Beach, New Jersey 07735

PREPARED BY:

T&M Associates
11 Tindall Road
Middletown, NJ 07748

TIER A MUNICIPAL
STORMWATER GENERAL PERMIT

STORMWATER POLLUTION PREVENTION PLAN (SPPP) 2018 UPDATE

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

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Municipality Information

Municipality: Union Beach Borough County: Monmouth

NJPDES #: NJG 0148466 PI ID #: 168615

Team Member/Title: Stephen Higgins, CPWM, Director of Public Works

Effective Date of Permit Authorization (EDPA): 04/01/2004

Date of Completion: 03/01/2005 Date of most recent update: 04/20/2018

"I certify that this SPPP includes all of the information and items identified in Attachment A of the Tier A Municipal Stormwater General Permit. All attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for purposely, knowingly, recklessly, or negligently submitting false information."

_____ 04/20/2018

(Signature) (Date)

Stephen Higgins, CPWM Director of Public Works

(Print Name) (Title)

Sworn and scribed to before me this _____ day of April, 2018.

_____

Name of Notary Public (Please Print)

Affix seal here

_____

Signature of Notary Public

(NOTE: A new SPPP signature page should be attached each time the SPPP is updated or modified, excluding data entries. Previous SPPP signature pages shall be retained as part of the SPPP.)

Tier A Municipal Stormwater Regulation Program

Stormwater Pollution Prevention Team Members

Number of team members may vary.

Completed by: *Edward G. Broberg, PE*
Title: *Borough Engineer*
Date: *April 20, 2018*
Municipality: *Union Beach Borough*
County: *Monmouth*
NJPDES #: *NJG0148466*
PI ID #: *168615*

Stormwater Program Coordinator: *Stephen Higgins, CPWM*
Title: *Director of Public Works*
Office Phone #: *(732) 264-1133*
Emergency Phone #: *Same as above*

Public Notice Coordinator: *Anne Marie Friscia, RMC*
Title: *Borough Clerk*
Office Phone #: *(732) 264-2277*
Emergency Phone #: *Same as above*

Post-Construction Stormwater Management Coordinator: *Edward G. Broberg, PE*
Title: *Borough Engineer*
Office Phone #: *(732) 671-6400*
Emergency Phone #: *Same as above*

Local Public Education Coordinator: *Stephen Higgins, CPWM*
Title: *Director of Public Works*
Office Phone #: *(732) 264-1133*
Emergency Phone #: *Same as above*

Ordinance Coordinator: *Anne Marie Friscia, RMC*
Title: *Borough Clerk*
Office Phone #: *(732) 264-2277*
Emergency Phone #: *Same as above*

Public Works Coordinator: *Stephen Higgins, CPWM*
Title: *Director of Public Works*
Office Phone #: *(732) 264-1133*
Emergency Phone #: *Same as above*

Employee Training Coordinator: *Stephen Higgins, CPWM*
Title: *Director of Public Works*
Office Phone #: *(732) 264-1133*
Emergency Phone #: *Same as above*

Other:
Title:
Office Phone #:
Emergency Phone #:

SPPP Form 2 - Public Notice

Municipality Information

Municipality: Union Beach Borough County: Monmouth

NJPDES #: NJG 0148466 PI ID #: 168615

Team Member/Title: Anne Marie Friscia, RMC, Borough Clerk

Effective Date of Permit Authorization (EDPA): 04/01/2004

Date of Completion: 06/1/2005 Date of most recent update: 04/20/2018

Briefly outline the principal ways in which you comply with applicable State and local public notice requirements when providing for public participation in the development and implementation of your stormwater program.

The Borough of Union Beach provides public notice of meetings as required by the Open Public Meetings Act ("Sunshine Law," N.J.S.A. 10:4-6 et seq.) and as required by N.J.S.A. 40:49-1 et. seq. for the passage of ordinances. The Borough will also provide public notice for municipal actions where necessary, for example in the adoption of applicable stormwater related ordinances or in the re-adoption of the stormwater management plan in subsequent re-examinations. All public notices will be in accordance with Municipal Land Use Law (N.J.S.A. 40:55D-1 et. seq.).

Copies of the Stormwater Pollution Prevention Plan (SPPP), the adopted Municipal Stormwater Management Plan and Ordinance, and the community wide ordinances (pet waste, wildlife feeding, litter control, improper disposal of waste, yard waste program, illicit connections, and private storm drain inlet retrofitting) have also been posted on the Borough's website for review by the public.

Starting January 1, 2019, the Borough will also provide public notice to all public involvement projects pertaining to stormwater education and outreach activities either on the municipality's website, through a mass mailing, through an advertisement in the Borough newspaper of record or through other similar means.

SPPP Form 3 - New Development and Redevelopment Program

Municipality Information

Municipality: Union Beach Borough County: Monmouth

NJPDES #: NJG 0148466 PI ID #: 168615

Team Member/Title: Edward G Broberg, PE, Borough Engineer

Effective Date of Permit Authorization (EDPA): 04/01/2004

Date of Completion: 03/01/2005 Date of most recent update: 04/20/2018

Describe in general terms your post-construction stormwater management in new development and redevelopment program (post-construction program), and how it complies with the Tier A Permit minimum standard. This description must address compliance with the Residential Site Improvement Standards for stormwater management; ensuring adequate long-term operation and maintenance of BMPs (including BMPs on property that you own or operate); design of storm drain inlets (including inlets that you install); and preparation, adoption, approval, and implementation of a municipal stormwater management plan and municipal stormwater control ordinance(s). Attach additional pages as necessary. Some additional specific information (mainly about that plan and ordinance(s)) will be provided in your annual reports.

The Borough's post-construction stormwater management program for new development and redevelopment projects is as follows:

1. The Borough's Planning Board ensures that plans for all new residential development and redevelopment projects, subject to the Residential Site Improvements Standards (RSIS), are in compliance with the Stormwater Management Regulations prior to issuance of final subdivision or site plan approvals under the Municipal Land Use Law.

2. Borough representatives will ensure continued compliance of all private developments with the approved subdivision plans, and applicable ordinances, as well as, long term operation and maintenance plans of approved BMPs on private property. The Director of Public Works will be responsible for appropriate long-term operation and maintenance of BMP's on Borough property and will monitor private BMP's as needed to ensure proper operation and maintenance is being conducted in accordance with approved operation and maintenance plans.

3. The Borough's Planning Board will ensure all plans for new development and redevelopment projects incorporate the new design of storm drain inlets. The Borough Engineer will ensure proper installation of said inlets and the Director of Public Works will be responsible for proper maintenance and/or retrofit of existing and new inlets.

SPPP Form 3 - New Development and Redevelopment Program (Continued)

Municipality Information

Municipality: Union Beach Borough County: Monmouth

NJPDES #: NJG 0148466 PI ID #: 168615

Team Member/Title: Edward G. Broberg, PE, Borough Engineer

Effective Date of Permit Authorization (EDPA): 04/01/2004

Date of Completion: 03/01/2005 Date of most recent update: 04/20/2018

Describe in general terms your post-construction stormwater management in new development and redevelopment program (post-construction program), and how it complies with the Tier A Permit minimum standard. This description must address compliance with the Residential Site Improvement Standards for stormwater management; ensuring adequate long-term operation and maintenance of BMPs (including BMPs on property that you own or operate); design of storm drain inlets (including inlets that you install); and preparation, adoption, approval, and implementation of a municipal stormwater management plan and municipal stormwater control ordinance(s). Attach additional pages as necessary. Some additional specific information (mainly about that plan and ordinance(s)) will be provided in your annual reports.

4. The Borough's Municipal Stormwater Management Plan and Stormwater Control Ordinance have been completed and adopted in accordance with NJDEP's requirements and final copies have been reviewed and approved by the Monmouth County Planning Board. Copies of both the plan and ordinance are included in Appendix 1 of this report and are also available for review and download on the Borough's website. The Municipal Stormwater Management Plan will be updated as needed as part of the re-examination of the Borough's master plan.

5. All new plans for new development and redevelopment projects are reviewed by the appropriate personnel for compliance with the design and maintenance measures adopted. Additionally, starting January 1, 2019, the Borough and/or their representatives will complete, update, finalize and maintain a "Major Development Stormwater Summary" for applicable structural and non-structural stormwater measures proposed. A copy of the summary report is included in Appendix 2 of this report.

SPPP Form 4 - Local Public Education Program

Municipality Information

Municipality: Union Beach Borough County: Monmouth

NJPDES #: NJG 0148466 PI ID #: 168615

Team Member/Title: Stephen Higgins, CPWM, Director of Public Works

Effective Date of Permit Authorization (EDPA): 04/01/2004

Date of Completion: 03/01/2005 Date of most recent update: 04/20/2018

Local Public Education Program

Describe your Local Public Education Program. Be specific on how you will distribute your educational information, and how you will conduct your annual event. Attach additional pages with the date(s) of your annual mailing and the date and location of your annual event.

In accordance with the MS4 Permit requirements, the Borough must conduct various public education activities and accumulate a minimum of 12 points worth of activities within a permit year (January 1st through December 31st). A complete list of activities and their corresponding points is provided in Appendix 3 of this report. The Borough is required to select activities from at least three of the five categories provided.

Based on a review of activities provided, the Borough will conduct the following:

- WEBSITE – The Borough will maintain a stormwater related page on their municipal website that includes stormwater related information and links to the Clean Water website and the NJDEP stormwater website. (1 POINT)

- MAILING CAMPAIGN - The Borough will distribute the NJDEP provided brochure to all residents and businesses along with one of its municipal mailings. (2 POINTS)

- ORDINANCE EDUCATION – The Borough will distribute a letter from the mayor to all residents and business along with one of its municipal mailings highlighting the requirements and benefits of the stormwater related ordinances adopted. (3 POINTS)

- STORMWATER DISPLAY - The Borough will coordinate a display at Union Beach Borough Hall, located at at 650 Poole Avenue every year. Borough personnel will setup a table and distribute the DEP provided brochure and other educational materials provided by the NJDEP. (1 POINT)

Additional activities will be evaluated and coordinated as needed throughout the year. For additional details on the Borough's Local Public Education Program, sample brochures and letters to be distributed see Appendix 3 of this report.

SPPP Form 5 - Storm Drain Inlet Labeling

Municipality Information

Municipality: Union Beach Borough County: Monmouth

NJPDES #: NJG 0148466 PI ID #: 168615

Team Member/Title: Stephen Higgins, CPWM, Director of Public Works

Effective Date of Permit Authorization (EDPA): 04/01/2004

Date of Completion: 03/01/2005 Date of most recent update: 04/20/2018

Storm Drain Inlet Labeling

Describe your storm drain inlet labeling program, including your labeling schedule, the details of your long-term maintenance plan, and plans on coordinating with watershed groups or other volunteer organizations.

Labeling of all existing Borough owned storm drain inlets and catch basins has been completed. This includes all inlets along sidewalks that are adjacent to Borough streets and inlets within plazas, parking areas or maintenance yards operated by the Borough. Labels used include the metal round markers or stencils which read “No Dumping Drains to Bay”. New inlets and catch basins are replaced with castings already marked in accordance with NJDEP requirements.

Periodic inspection and maintenance is conducted by Borough public work employees throughout the year during their maintenance and annual storm drain inlet cleaning program. Markers are checked to ensure they are visible and firmly attached to the inlet/catch basin head or casting. If replacement is needed, the work is reported to the Public Works Department for action.

Records of the date and location of repair made is maintained separately by the Borough’s Public Work Department.

SPPP Form 6 - MS4 Outfall Pipe Mapping

Municipality Information

Municipality: Union Beach Borough County: Monmouth

NJPDES #: NJG 0148466 PI ID #: 168615

Team Member/Title: Stephen Higgins, CPWM, Director of Public Works

Effective Date of Permit Authorization (EDPA): 04/01/2004

Date of Completion: 03/01/2005 Date of most recent update: 04/20/2018

Explain how you will prepare your map (include its type and scale, and the schedule for the mapping process). Who will prepare your map (e.g., municipal employees, a consultant, etc.)?

The Borough's outfalls were previously mapped by the U.S. Army Corps of Engineers on two, 24"x36", (1:100 scale) maps.

In 2015, the Borough Engineer's office obtained a Post-Sandy Planning Assistance Grant from the New Jersey Department of Community Affairs to prepare a Captial Improvement Program. As part of this study, an inspection was performed of all Borough owned outfalls. GPS data was collected for each outfall and drainage structure and a new digital map was developed for the Borough. A copy is provided in Appendix 4 of this report.

Revisions and/or additions to the outfall and collection system mapping are completed annually if necessary by the Borough Engineer's office. The map is prepared using AutoCAD. Outfalls and stormwater inlets/manholes are located and includes an alpha-numeric identifier.

SPPP Form 7 - Illicit Connection Elimination Program

Municipality Information

Municipality: Union Beach Borough County: Monmouth

NJPDES #: NJG 0148466 PI ID #: 168615

Team Member/Title: Stephen Higgins, CPWM, Director of Public Works

Effective Date of Permit Authorization (EDPA): 04/01/2004

Date of Completion: 03/01/2005 Date of most recent update: 04/20/2018

Describe your Illicit Connection Elimination Program and explain how you plan on responding to complaints and/or reports of illicit connections (e.g., hotlines, etc.). Attach additional pages as necessary.

The Borough completed its initial illicit connection inspection of each outfall as required by the original MS4 permit issuance. The NJDEP's Illicit Connection Inspection Report Form was used as necessary to conduct the inspections. Outfalls that were found to have a dry weather flow or evidence of an intermittent non-stormwater flow were re-inspected.

Borough personnel will continue to inspect their outfalls a minimum of once every 5 years as required by the current permit renewal. In the event of dry weather flows, Borough personnel will conduct investigations as needed to identify and eliminate the source. If, after three investigation attempts, the illicit connection is not found, a Closeout Investigation Form will be prepared and submitted along with the Borough's Annual Inspection and Recertification Report. Illicit connections found to originate from another public entity will be reported by the Borough to the affected entity and the NJDEP.

Presently, residents may contact either the Department of Public Works or Police Department to report any spills or leaks of hazardous materials. Records of all inspections will be maintained by the Public Works Department and the number of outfalls and active sources of dry weather flows, if any, will be reported to the NJDEP annually as part of the Borough's Annual Inspection and Recertification Report.

Illicit Connection Inspection Report Form

Municipality Information

Municipality: Union Beach Borough County: Monmouth

NJPDES #: NJG 0148466 PI ID #: 168615

Team Member/Title: Stephen Higgins, CPWM, Director of Public Works

Effective Date of Permit Authorization (EDPA): 04/01/2004

Date of Completion: 03/01/2005 Date of most recent update: 04/20/2018

Outfall #:_____ Location:_____

Receiving Waterbody: _____

1. Is there a dry weather flow? Y ( ) N ( )
2. If "YES", what is the outfall flow estimate?_____gpm
   (flow sample should be kept for further testing, and this form will need to be submitted with the Annual Report and Certification)
3. Are there any indications of an intermittent flow? Y ( ) N ( )
4. If you answered "**NO**" to BOTH questions #1 and #3, there is probably not an illicit connection and you can skip to question #7.
   (NOTE: This form **does not** need to be submitted to the Department but should be kept with your SPPP.)

   If you answered "**YES**" to either question, please continue on to question #5.
   (NOTE: This form will need to be submitted to the Department with the Annual Report and Certification.)

5. **PHYSICAL OBSERVATIONS**:

(a) ODOR:

(b) **COLOR**:

(c) **TURBIDITY**:

FLOATABLES:

(e) **DEPOSITS/STAINS**:

VEGETATION CONDITIONS:

(g) **DAMAGE TO OUTFALL STRUCTURES**:

IDENTIFY STRUCTURE:

DAMAGE:

6. **ANALYSES OF OUTFALL FLOW SAMPLE:**

* field calibrate instruments in accordance with manufacturer's instructions prior to testing.

(a) **DETERGENTS**:_____mg/L

(if sample is greater than 0.06 mg/L, the sample is contaminated with detergents [which may be from sanitary wastewater or other sources]. Further testing is required, and this outfall should be given the highest priority.)

(if the sample is not greater than 0.06 mg/L and it does not show physical characteristics of sanitary wastewater [e.g., odor, floatables, and/or color] it is unlikely that it is from sanitary wastewater sources, yet there may still be an illicit connection of industrial wastewater, rinse water, backwash or cooling water. Skip to question #6c.)

(b) AMMONIA (as N) TO POTASSIUM RATIO:_____

(if the Ammonia to Potassium Ratio is greater than 0.6:1, then it is likely that the pollutant is sanitary sewage)

(if the Ammonia to Potassium Ratio is less than or equal to 0.6:1, then the pollutant is from another washwater source.)

(c) FLUORIDE:_____mg/L

(if the fluoride levels are between 1.0 and 2.5 mg/L, then the flow is most likely from fluoride treated potable water.)

(if the sample tests below a detection limit of 0.1 mg/L for fluoride, it is likely to be from groundwater infiltration, springs or streams. In some cases, however, it is possible that the discharge could originate from an onsite well used for industrial cooling water, which will test non-detect for both detergents and fluoride. To differentiate between these cooling water discharges and groundwater infiltration, you will have to rely on temperature.)

(d) TEMPERATURE:_____°F

(if the temperature of the sample is over 70°F, it is most likely cooling water)

(if the temperature of the sample is under 70°F, it is most likely from ground water infiltration)

7. Is there a suspected illicit connection? Y ( ) N ( )

   If "**YES**", what is the suspected source? _____

   If "**NO**", skip to signature block on the bottom of this form.

8. Has the investigation of the suspected illicit connection been completed? Y ( ) N ( )

   If "**YES**", proceed to question #9.
   If "**NO**", skip to signature block on the bottom of this form.

9. Was the source of the illicit connection found? Y ( ) N ( )

   If "**YES**", identify the source. _____

   What plan of action will follow to eliminate the illicit connection? Resolution:

   If "**NO**", complete the Closeout Investigation Form and attach it to this Illicit here is a dry weather flow or evidence of an intermittent flow, be sure to include this form with your Annual Report and Certification.

Inspector's Name: _____

Title: _____

Signature:_____ Date: _____

If there is a dry weather flow or evidence of an intermittent flow, be sure to include this form with your Annual Report and Certification.

If there is not a dry weather flow or evidence of an intermittent flow, this form should be retained with your SPPP.

Closeout Investigation Form

Municipality Information

Municipality: Union Beach Borough County: Monmouth

NJPDES #: NJG 0148466 PI ID #: 168615

Team Member/Title: Stephen Higgins, CPWM, Director of Public Works

Effective Date of Permit Authorization (EDPA): 04/01/2004

Date of Completion: 03/01/2005 Date of most recent update: 04/20/2018

Outfall #: _____ Location: _____

Receiving Waterbody: _____

Basis for Submittal:

( ) A non-stormwater discharge was found, but no source was located within six months.

( ) An intermittent non-stormwater discharge was observed, and three unsuccessful investigations were conducted to investigate the discharge while it was flowing.

Describe each phase of your investigation, including dates. Attach additional pages as necessary:

Inspector's Name: _____

Title: _____

Signature: _____ Date: _____

Complete and attach this form to the appropriate Illicit Connection Inspection Report Form and submit with the Annual Report and Certification.

SPPP Form 8 - Illicit Connection Records

Municipality Information

Municipality: Union Beach Borough County: Monmouth

NJPDES #: NJG 0148466 PI ID #: 168615

Team Member/Title: Stephen Higgins, CPWM, Director of Public Works

Effective Date of Permit Authorization (EDPA): 04/01/2004

Date of Completion: 03/01/2005 Date of most recent update: 04/20/2018

January 1, 2018 – December 31, 2018

Note: *Attach a copy of each illicit connection report form for outfalls found to have a dry weather flow.*

Total number of inspections performed this year? _____

Number of outfalls found to have a dry weather flow? _____

Number of outfalls found to have an illicit connection? _____

How many illicit connections were eliminated? _____

Of the illicit connections found, how many remain? _____

January 1, 2019 – December 31, 2019

Note: *Attach a copy of each illicit connection report form for outfalls found to have a dry weather flow.*

Total number of inspections performed this year? _____

Number of outfalls found to have a dry weather flow? _____

Number of outfalls found to have an illicit connection? _____

How many illicit connections were eliminated? _____

Of the illicit connections found, how many remain? _____

January 1, 2020 – December 31, 2020

Note: *Attach a copy of each illicit connection report form for outfalls found to have a dry weather flow.*

Total number of inspections performed this year? _____

Number of outfalls found to have a dry weather flow? _____

Number of outfalls found to have an illicit connection? _____

How many illicit connections were eliminated? _____

Of the illicit connections found, how many remain? _____

January 1, 2021 – December 31, 2021

Note: *Attach a copy of each illicit connection report form for outfalls found to have a dry weather flow.*

Total number of inspections performed this year? _____

Number of outfalls found to have a dry weather flow? _____

Number of outfalls found to have an illicit connection? _____

How many illicit connections were eliminated? _____

Of the illicit connections found, how many remain? _____

SPPP Form 9 - Yard Waste Collection/Ordinance Program

Municipality Information

Municipality: Union Beach Borough County: Monmouth

NJPDES #: NJG 0148466 PI ID #: 168615

Team Member/Title: Stephen Higgins, CPWM, Director of Public Works

Effective Date of Permit Authorization (EDPA): 04/01/2004

Date of Completion: 03/01/2005 Date of most recent update: 04/20/2018

Please describe your yard waste collection program. Be sure to include the collection schedule and how you will notify the residents and businesses of this schedule. Attach additional pages as necessary.

The Borough currently posts on their website and distributes an annual trash and recycling schedule to all residents and businesses that utilize the Borough's collection system and clean-up procedures.

A copy of the current schedule outlining the Borough's existing yard waste collection program and schedule is included in Appendix 5 of this report. The Borough is broken down into two (2) sections. Leaves will be picked up in the Fall on Tuesdays for Section A and Wednesday for Section B. Brush pickup is done with regular gargage when property bundeled. The Borough will continue their existing collection program.

An ordinance is already in place prohibiting residents from placing yard waste more than three (3) days prior to the scheduled collections and all leaves and brush are required to be bundled or in paper bags. There is no collection of grass. The Borough currently mandates that residents place all items for collection in a location that does not obstruct the storm drains (i.e. 10 feet from an inlet).

SPPP Form 10 - Ordinances

Municipality Information

Municipality: Union Beach Borough County: Monmouth

NJPDES #: NJG 0148466 PI ID #: 168615

Team Member/Title: Anne Marie Friscia, RMC, Borough Clerk

Effective Date of Permit Authorization (EDPA): 04/01/2004

Date of Completion: 03/01/2005 Date of most recent update: 04/20/2018

For each ordinance, give the date of adoption. If not yet adopted, explain the development status:

Pet Waste Adopted on 3/16/2006

Are information sheets regarding pet waste distributed with pet licenses? Y (X) N ( )

Records of the dates the pet waste brochure is distributed will be maintained and the information will be provided to the Borough Stormwater Coordinator as needed to include in the Borough's Annual Inspection and Recertification Report.

Litter Adopted on 3/16/2006

Improper Waste Disposal Adopted on 3/16/2006

Wildlife Feeding Adopted on 3/16/2006

Yard Waste Adopted on 3/16/2006

Illicit Connections Adopted on 3/16/2006

Private Storm Drain Retrofitting Adopted on 08/19/2010

Refuse Containers and Dumpsters Adopted on 08/19/2010

How will these ordinances be enforced?

The Code Enforcement Officer will enforce these ordinances as necessary. If someone violates one of these ordinances they will be given a warning before a summons is issued for the violation.

Records of violations issued will be maintained by the Borough and reported as needed to the NJDEP in the Borough's Annual Inspection and Recertification Report.

SPPP Form 11 – Storm Drain Inlet Retrofitting

Municipality Information

Municipality: Union Beach Borough County: Monmouth

NJPDES #: NJG 0148466 PI ID #: 168615

Team Member/Title: Stephen Higgins, CPWM, Director of Public Works

Effective Date of Permit Authorization (EDPA): 04/01/2004

Date of Completion: 03/01/2005 Date of most recent update: 04/20/2018

What type of storm drain inlet design will generally be used for retrofitting?

The Borough utilizes NJDOT bicycle safe grates and Campbell Foundry Model Type B inlet with a 6" Type N-ECO curb piece or equal.

Repaving, repairing, reconstruction or alteration project name	Projected start date	Start date	Date of completion	# of storm drain inlets	# of storm drains w/ hydraulic exemptions
Jersey Avenue	Summer 2005			4	0
Broadway	Summer 2005			4	0
Campbell Street	Summer 2005			2	0
Central Avenue	Summer 2005			2	0
Continued on Attached					

Are you claiming any alternative device exemptions or historic place exemptions for any of the above projects? Please explain:

The Borough's Engineer maintains a list of Capital Improvements Projects and the number of inlets and/or catch basins being replaced. Quantities are reported annually in the Borough's Annual Inspection and Recertification Report. No exemptions have been requested to date. In the event one is needed documentation will be provided in accordance with NJDEP requirements.

SUMMARY OF INLETS REHABILITATED AS PART OF THE BOROUGH OF UNION BEACH'S ANNUAL CAPITAL IMPROVEMENT PROGRAM

Year	Project Name(s)	Total Number of Inlets Within Project Area	Number of Inlets Replaced /Retrofit	Number of Inlets Not Retrofit as Part of this Project
2006	Lorillard Ave., Central Ave Phase II, State Street and Curb and Sidewalk	14	14	0
2007	Pine Street, Central Ave Phase III, Harris Phase II and Curb and Sidewalk	18	18	0
2008	Wesley Avenue, Morningside, Edmunds Phase I and Floyd Ave.	23	23	0
2009	Jersey Avenue Phase I & Edmunds Phase II	4	4	0
2010	Jersey Avenue Phase II, Dibling Street & Morningside Traffic Calming	14	14	0
2011	Scholer Drive, Phase I and Bayview Ave Phase II	13	13	0
2012	Scholer Drive Phase II and Hauge Street	18	18	0
2013	Reconstruction of Heckelman	6	6	0
2014	Spruce, Center, Fifth, Pine and Pine and Third Streets Intersections	17	17	0
2014	Reconstruction of Harrison and Orange from Newark to Johnson	10	10	0
2015	West Street, Central Avenue and Isabelle Street	17	17	0
2016	Arlington Avenue, Branch Street, Tenth Street and Johnson Avenue	13	13	0
2017	Harrison Phase II, Bayview and Ocean Avenue	8	8	0
2018	Newark Avenue, Arlington Avenue, St James and Bank Street	*To be determined, project is currently in design phase.*		
2019				
2020				
2021				
2022				
2023				
2024				

SPPP Form 12 – Street Sweeping and Road Erosion Control Maintenance

Municipality Information

Municipality: Union Beach Borough County: Monmouth

NJPDES #: NJG 0148466 PI ID #: 168615

Team Member/Title: Stephen Higgins, CPWM, Director of Public Works

Effective Date of Permit Authorization (EDPA): 04/01/2004

Date of Completion: 03/01/2005 Date of most recent update: 04/20/2018

Street Sweeping

Please describe the street sweeping schedule that you will maintain.
(NOTE: Attach a street sweeping log containing the following information: date and area swept, # of miles swept and the total amount of materials collected.)

The Borough will continue to maintain its existing sweeping program. Although there are no roadways that meet NJDEP street sweeping requriements, the Borough will ensure that the following commercial roadways are swept monthly, weather and surface conditions permitting.

All sweepings collected are stored into an existing container kept at Public Works and disposed off periodically as needed.

See Appendix 6 for detailed description of the Borough's street sweeping program. Records of the sweepings collected and the dates are maintained by the Public Works Department.

Road Erosion Control Maintenance

Describe your Road Erosion Control Maintenance Program, including inspection schedules. A list of all sites of roadside erosion and the repair technique(s) you will be using for each site should be attached to this form.
(NOTE: Attach a road erosion control maintenance log containing the following information: location, repairs, date)

The Borough performs its Road Erosion Control Maintenance Program as part of its daily street sweeping and inlet cleaning activities. Any road erosion problems will be reported to Stephen Higgins, CPWM, Director of Public Works, as needed.

If applicable, identified areas will be prioritized and repaired in accordance with the Standards for Soil Erosion and Sediment Control in New Jersey. The Borough will maintain records of street inspections conducted, as well as, a list of repairs and the dates they were completed.

SPPP Form 13 – Stormwater Facility Maintenance

Municipality Information

Municipality: Union Beach Borough County: Monmouth

NJPDES #: NJG 0148466 PI ID #: 168615

Team Member/Title: Stephen Higgins, CPWM, Director of Public Works

Effective Date of Permit Authorization (EDPA): 04/01/2004

Date of Completion: 03/01/2005 Date of most recent update: 04/20/2018

Please describe your annual catch basin cleaning program and schedule. Attach a map/diagram or additional pages as necessary.

Presently the Borough conducts bi-annual inspection and cleaning of their storm drain inlets. Flood prone areas are also inspected and cleaned after major storm events and as needed throughout the year. During these inspections accumulated debris and/or sediment is cleared or scheduled for follow up cleaning. Material collected is dumped into the street sweeping spoils container located in the Public Works Yard and disposed off periodically as needed.

Inspection and cleaning records are maintained by the Borough's Public Works and reported to the NJDEP as part of the Borough's Annual Inspection and Recertification Report.

See Appendix 6 for additional information.

Please describe your stormwater facility maintenance program for cleaning and maintenance of all stormwater facilities operated by the municipality. Attach additional pages as necessary.

(NOTE: Attach a maintenance log containing information on any repairs/maintenance performed on stormwater facilities to ensure their proper function and operation.)

The Borough will continue to maintain its existing stormwater system maintenance program to ensure systems are functioning properly. Presently, the Borough operates stormwater outfalls, catch basins and manholes. These facilities are maintained on a regular basis throughout the year and on an as needed basis in high risk areas by the Borough Public Works Department.

See Appendix 6 for a detailed description of the Borough's stormwater facility maintenance program. Records of inspection and routine maintenance and/or repairs are kept by the Borough's DPW Department.

SPPP Form 14 - Outfall Pipe Stream Scouring Remediation

Municipality Information

Municipality: Union Beach Borough County: Monmouth

NJPDES #: NJG 0148466 PI ID #: 168615

Team Member/Title: Stephen Higgins, CPWM, Director of Public Works

Effective Date of Permit Authorization (EDPA): 04/01/2004

Date of Completion: 03/01/2005 Date of most recent update: 04/20/2018

Describe your stormwater outfall pipe scouring detection, remediation and maintenance program to detect and control active localized stream and stream bank scouring. Attach additional pages as necessary.

(NOTE: Attach a prioritized list of sites observed to have outfall pipe stream and stream bank scouring, date of anticipated repair, method of repair and date of completion.)

An initial inspection of all outfalls was conducted in 2006 and no evidence of scouring were detected. The Borough, in accordance with the 2018 permit renewal requirements, will conduct scouring inspections of their outfalls once every 5 years.

Outfall pipes showing signs of scouring will be reported to the Director of Public Works and Borough Engineer. These outfalls will be evaluated to determine if additional rehabiliation, repair or replacement is necessary. Based on the condition of the outfall, they will be prioritized for rehabilitation and/or repair in accordance with the Standards for Soil Erosion and Sediment Control in New Jersey. Repairs and/or rehabilitation work that does not require NJDEP permits will be prioritized first.

All repairs will be followed with an annual inspection to ensure that the scouring has not resumed.

Records of all inspection, maintenance and/or rehabilitation/repairs conducted will be kept by the Borough's DPW Department.

SPPP Form 15 - De-icing Material Storage

Municipality Information

Municipality: Union Beach Borough County: Monmouth

NJPDES #: NJG 0148466 PI ID #: 168615

Team Member/Title: Stephen Higgins, CPWM, Director of Public Works

Effective Date of Permit Authorization (EDPA): 04/01/2004

Date of Completion: 03/01/2005 Date of most recent update: 04/20/2018

De-icing Material Storage

Describe how you currently store your municipality's de-icing materials and describe your inspection schedule for the storage area. If your current storage practices do not meet the de-icing material storage SBR describe your construction schedule and your seasonal tarping interim measures. If you plan on sharing a storage structure, please include its location, as well as a complete list of all concerned public entities. If you store sand outdoors, describe how it meets the minimum standard.

The Borough stores salt and sand for de-icing roadways in a building located within their DPW yard. During the off-season, any leftover de-icing material is pushed back towards the back of the structure and left to be used during the next winter season.

Routine maintenance and inspection of the de-icing material storage structure is conducted as needed throughout the year.

SPPP Form 16 – Standard Operating Procedures

Municipality Information

Municipality: Union Beach Borough County: Monmouth

NJPDES #: NJG 0148466 PI ID #: 168615

Team Member/Title: Stephen Higgins, CPWM, Director of Public Works

Effective Date of Permit Authorization (EDPA): 04/01/2004

Date of Completion: 03/01/2005 Date of most recent update: 04/20/2018

BMP	Date SOP went into effect	Describe your inspection schedule
Fueling Operations (including the required practices listed in Attachment D of the permit)	NOT APPLICABLE	* The Borough does not have an on-site fueling station.
Vehicle Maintenance (including the required practices listed in Attachment D of the permit)	April 2005	Inspections to be held on a monthly basis. Records will be maintained. See Appendix 7 for a copy of SOP.
Vehicle Washing	NOT APPLICABLE	*No vehicle washing is conducted onsite; the borough utilizes offsite facilities for any vehicle washing needed. Records are maintained where applicable.
Good Housekeeping Practices (including the required practices listed in Attachment D of the permit) **Attach inventory list required by Attachment D of the permit**.	April 2005	Indoor/outdoor storage areas, containers and surrounding areas around the DPW will be inspected on a monthly basis. Records will be maintained. See Appendix 7 for a copy of SOP. *See Apendix 7 for a copy of the DPW facilities inventory list required by the permit renewal.

SPPP Form 17 - Employee Training

Municipality Information

Municipality: Union Beach Borough County: Monmouth

NJPDES #: NJG 0148466 PI ID #: 168615

Team Member/Title: Stephen Higgins, CPWM, Director of Public Works

Effective Date of Permit Authorization (EDPA): 04/01/2004

Date of Completion: 03/01/2005 Date of most recent update: 04/20/2018

Describe your employee training program. For each required topic, list the employees that will receive training on that topic, and the date the training will be held. Attach additional pages as necessary.

The Borough's Employee Training Program will be broken down into four (4) phases. Phase 1 will include training to be undertaken by the Borough's Board Members and Governing Bodies. Phase 2 will include training requirements for Borough representatives responsible for overseeing the reviews of development and redevelopment applications. Phase 3 will include topics that will be covered on an annual basis with applicable employees. Phase 4 will include those topics that will be covered every two (2) years with applicable employees. Records of all training sessions scheduled for Phase 2 and Phase 3 will be maintained by the Borough's DPW Department. Training will be conducted either through webinars, video training and/or field training where necessary.

Attendance for Phase 3 and 4 of the employee training program will be recorded and maintained by the Borough's DPW Department for future reporting in the Borough's Annual Inspection and Recertification Report, where applicable.

Phase 1 – Municipal Board and Governing Body Members

Borough Board and Governing Body Members that review and approve applications for development and redevelopment projects complete one of the NJDEP's "Training Tools" under their Post Construction Stormwater Management website. Training must be completed by July 1, 2018 and can be found at https://www.nj.gov/dep/stormwater/training.html. Borough Board and Governing Body members will provide the Borough DPW Director with confirmation that the training has been conducted for input in the Borough's Annual Inspection and Recertification Report where applicable.

Phase 2 – Development/Redevelopment Application Reviewer Training

All Borough employees and/or representatives that review development and redevelopment projects for the Borough must complete an NJDEP approved training either offered by NJDEP or other training agency. The initial training must be completed by January 1, 2019 and then taken once every 5 years thereafter. Borough representatives will provide the Borough DPW Director with confirmation that the training has been conducted for input in the Borough's Annual Inspection and Recertification Report where applicable.

SPPP Form 17 - Employee Training (Continued)

Municipality Information

Municipality: Union Beach Borough County: Monmouth

NJPDES #: NJG 0148466 PI ID #: 168615

Team Member/Title: Stephen Higgins, CPWM, Director of Public Works

Effective Date of Permit Authorization (EDPA): 04/01/2004

Date of Completion: 03/01/2005 Date of most recent update: 04/20/2018

Describe your employee training program. For each required topic, list the employees that will receive training on that topic, and the date the training will be held. Attach additional pages as necessary.

Phase 3 – Annual Employee Training Program

Maintenance Yard Operations	Public Works employees & other users as appropriate
STW Facility Maintenance Program	Public Works employees
General SPPP	Public Works employees

Phase 4 – Bi-Annual Employee Training Program

Improper Waste Disposal Education	Code Enforcement Officer & Public Works Employees
Municipal Ordinances	Code Enforcement Officer, Public Works Employees, Police Dept.
Yard Waste Collection Program	Public Works employees
Street Sweeping Program	Public Works employees
Outfall Pipe Stream Scouring Remediation	Public Works employees
Illicit Connection Elimination and Outfall Pipe Mapping	Public Works employees
Construction Activity/Post Construction Stormwater Management in New Development & Redevelopment	Public Works employees & Code Enforcement Officer

The illicit connection elimination training may include field training on procedures to properly conduct outfall inspections for illicit connections, follow-up investigation and procedures for elimination of the illicit connection for new employees. The maintenance yard operations training may include field training on the standard operating procedures for fueling, vehicle maintenance and good housekeeping practices.

As necessary, the Borough will evaluate alternative training tools to optimize the training program. Alternative training tools may include the use of informational CD's provided by MELJIF or through formal training seminars offered by Rutger's Cooperative Extension. Links to training sources can be found at https://www.njstormwater.org/training.htm.

APPENDIX 1

Municipal Stormwater Management Plan
Stormwater Control Ordinance

MUNICIPAL STORMWATER MANAGEMENT PLAN
MASTER PLAN ELEMENT

BOROUGH OF UNION BEACH
MONMOUTH COUNTY, NEW JERSEY

PREPARED FOR:

BOROUGH OF UNION BEACH PLANNING BOARD

ADOPTED MARCH 30, 2005
AMENDED FEBRUARY 2007

PREPARED BY:

EDWARD G. BROBERG, P.E., P.P
BOROUGH OF UNION BEACH ENGINEER

OF THE FIRM

T&M ASSOCIATES

11 Tindall Road
Middletown, New Jersey 07748
(732) 671-6400

EDWARD G. BROBERG, P.E., P.P
LICENSED PROFESSIONAL ENGINEER – NO. GE18001
LICENSED PROFESSIONAL PLANNER NO. 1000

JANUARY 2007

H:\UBCH\01910\Calculations & Reports\Draft Amended MSWMP - UBCH.doc

The original of this document has been signed and sealed in accordance with NJSA 45:14A-1 et. seq.

Members of the 2007 Planning Board

Richard Ellison, Mayor

Charles Steiner, Chairman

John Roche, Vic-Chairman

Frank Wells, Councilman

Michael Kelly, Police Chief

Lou Andreuzzi

Henry Balut

Mary Chepulis

Lloyd Coffey

Kathleen Parsells

Carol Schultz

Ed Tuberion

Cheryl L. Hammel, Esq., Board Attorney

Edward G. Broberg, P.E., P.P., Board Engineer/ Planner

Madeline Russo, Board Secretary

RESOLUTION OF THE PLANNING BOARD OF THE BOROUGH OF UNION BEACH

WHEREAS, the Planning Board is a duly constituted authority created pursuant to the provisions of N.J.S.A. 40:55D-23 of the Municipal Land Use Law; and

WHEREAS, pursuant to N.J.S.A. 40:55D-28, the Planning Board may prepare, and after public hearing, amend a Master Plan or component parts thereof to guide the use of lands within the municipality in a manner which protects public health and safety and promotes the general welfare; and

WHEREAS, pursuant to N.J.A.C. 7:8-4.3(a), a municipality shall adopt a Municipal Stormwater Management Plan as an integral part of its Master Plan; and

WHEREAS, pursuant to N.J.A.C. 7:8-1.1 et. seq., the Planning Board prepared a Municipal Stormwater Management Plan – Master Plan Element, which was adopted on March 30, 2005, in order to comply with the requirements set forth in the New Jersey Administrative Code for Municipal Stormwater Management Planning; and

WHEREAS, Union Beach's Stormwater Master Plan Element was submitted to the Monmouth County Planning Board for review and approval, in accordance with N.J.A.C. 7:8; and

WHEREAS, in 2006, the Monmouth County Planning Board conditionally approved Union Beach's Municipal Stormwater Management Plan – Master Plan Element subject to the Borough amending its Stormwater Master Plan Element to address certain comments outlined in the Monmouth County Planning Board's Stormwater Technical Advisory Committee's Synopsis of Comments; and

WHEREAS, the Planning Board has prepared an amended Municipal Stormwater Management Plan – Master Plan Element Amendment (Amendment), to address the County's comments; and

WHEREAS, pursuant to N.J.S.A. 40:55D-1 et. seq., and specifically N.J.S.A. 40:55D-28 and N.J.S.A. 40:55D-13, the Planning Board conducted a public hearing on the 28th day of February 2007, due notice of said meeting has been given in accordance with New Jersey Statue the Open Public Meetings Act, and the Municipal Land Use Law, and a quorum of the Planning Board being present, the Planning Board reviewed and considered the proposed Amendment together with the public comment thereon, and the Planning Board determined that the Amendment is in compliance with the requirements of the Municipal Land Use Law and that requirement for Stormwater Management pursuant to the applicable sections of the New Jersey Administrative Code.

NOW, THEREFORE, BE IT RESOLVED by the Planning Board of the Borough of Union Beach on this 28 day of February, 2007, that the action of the Planning Board taken on February 28, 2007 adopting the Municipal Stormwater Management Plan -Master Plan Element Amendment prepared by T&M Associates, dated January 19, 2007 be and the same is hereby approved.

BE IT FURTHER RESOLVED, that the Board Secretary is hereby authorized and directed to cause a notice of this Resolution to be published in the *Asbury Park Press* at the Borough's expense and to send a certified copy of this Resolution to the County, the Borough Clerk and the Borough Engineer, to affix a copy of this resolution and the Amendment to the official Stormwater Management Plan Master Plan Element Amendment and the make same available to all other interested parties.

Madeline Russo

MADELINE RUSSO, Secretary
Planning Board
Borough of Union Beach

DATE: February 28 2007
Moved by: Mr. Andreyzzi
Seconded by: Mr. Wells
Those in favor: Caruzza, Wells, Steiner, Andreyzzi, Roche, Coffey, Schultz, Iberion and Chapelis

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INTRODUCTION

As required by the Municipal Stormwater Regulations (N.J.A.C. 7:14A-25), the Borough of Union Beach has developed this Municipal Stormwater Management Plan (plan) to outline their approach to address the impacts resulting from stormwater related issues associated with future development, redevelopment, and land use changes. This plan addresses groundwater recharge, stormwater quantity, and stormwater quality impacts through the incorporation of stormwater design and performance standards for new development and redevelopment projects that disturb one or more acres of land and/or result in more than one quarter acre of additional impervious coverage. The standards are intended to minimize negative or adverse impacts of stormwater runoff such as decreased water quality, increased water quantity and reduction of groundwater recharge that provides base flow to the Borough's receiving bodies of water. In addition to minimizing these impacts, this plan provides long term operation and maintenance measures for existing and proposed stormwater management facilities.

This plan provides recommendations for ordinance modifications in order to expedite the implementation of stormwater management strategies. The plan also includes mitigation strategies to permit the Borough to grant variances or exemptions from proposed design and performance standards set forth by the Municipal Stormwater Regulations (N.J.A.C. 7:8-5.5).

GOALS AND OBJECTIVES

The goals of this plan are:

1. Reduce flood damage, including damage to life and property;
2. Minimize, to the extent practical, any increase in stormwater runoff from any new development or redevelopment;
3. Reduce soil erosion from any development, redevelopment or construction project;
4. Seek to assure the adequacy of existing and proposed culverts and bridges, and other in-stream structures;
5. Maintain groundwater recharge;
6. Prevent, to the greatest extent feasible, an increase in non-point pollution;

7. Maintain the integrity of stream channels for their biological function, as well as for drainage;
8. 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;
9. Protect public safety through the proper design and operation of stormwater basins and best management practices.
10. Increase public awareness of stormwater management through public education.
11. Improve stormwater management along the bay front, roads and intersections through effective infrastructure, maintenance and replacement.
12. To achieve the stormwater quality standards established by the New Jersey Department of Environmental Protection.
13. Preserve and upgrade existing utility infrastructures, including water, stormwater management and wastewater treatment.
14. Encourage regularly scheduled infrastructure maintenance consistent with long-range plans to avoid system failure.
15. Maintain facilities that are in current use and renovate or reuse obsolete facilities for other uses.
16. To encourage sensitive design in the conservation and re-use of the buildings and their environment and to mitigate the effects of adjoining developments.

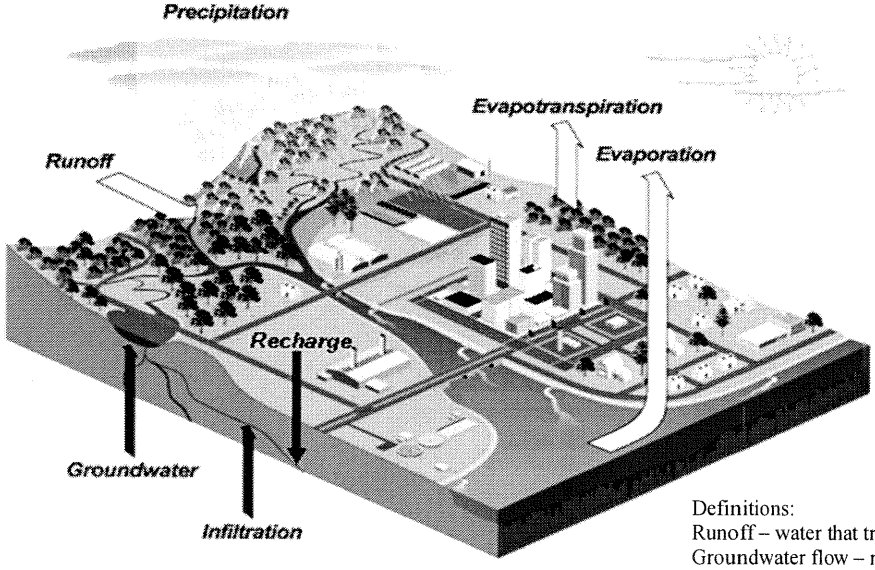
To achieve these goals, the plan outlines specific stormwater design and performance standards for new development and proposes stormwater management controls for addressing impacts from existing developments. Preventive and corrective maintenance strategies are also included to ensure the long-term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

STORMWATER DISCUSSION

HYDROLOGIC CYCLE

The hydrologic cycle or water cycle, as shown in Figure 1, is the continuous circulation of water between the ocean, atmosphere, and the land. The driving force of this natural cycle is the sun. Water, stored in oceans, depressions, streams, rivers, water bodies, vegetation and even land surfaces, continuously evaporates due to solar energy. This water vapor then condenses in the atmosphere to form clouds and fog. After water condenses, it precipitates, usually in the form of rain or snow, onto land surfaces and water bodies. Precipitation falling on land surfaces is often intercepted by vegetation. Plants and trees transpire water vapor back into the atmosphere, as well as aid in the infiltration of water into the soil. The vaporization of water through transpiration and evaporation is called evapo-transpiration. Infiltrated water percolates through the soil as groundwater, while surface water flows overland. Water flows across or below the surface to reach major water bodies and eventually flows to the Earth's seas and oceans. This constant process of evapo-transpiration, condensation, precipitation, and infiltration comprises the hydrologic cycle.

Figure 1: Hydrologic Cycle



Definitions:
Runoff – water that travels over the ground surface to a channel
Groundwater flow – movement of water through the subsurface
Infiltration – penetration of water through the ground surface
Recharge – water that reaches saturated zone

Source: Kern River Connections
http://www.creativille.org/kernriver/watershed.htm

IMPACTS OF STORMWATER

Prior to any land development, native vegetation often intercepts precipitation directly or absorbs infiltrated runoff into their roots. Development often replaces native vegetation with lawns or impervious cover, such as pavement or structures, thereby reducing the amount of evapo-transpiration and infiltration. Re-grading and clearing of property disturbs the natural topography of rises and depressions that can naturally capture rainwater and allow for infiltration and evaporation. Construction activities often compact soil, thereby decreasing its permeability or ability to infiltrate stormwater. Development activities also generally increase the volume of stormwater runoff from a given site.

Connected impervious surfaces and storm sewers (such as roof gutters emptying into paved parking lots that drain into a storm sewer) allow the runoff to be transported downstream more rapidly than natural areas. This shortens travel time and increases the rainfall-runoff response of the drainage area, causing downstream waterways to peak higher and quicker than natural areas, a situation that can cause or exacerbate downstream flooding, erosion, and sedimentation in stream channels. Furthermore, connected impervious surfaces do not allow pollutants to be filtered, or for infiltration and groundwater recharge to occur, prior to reaching the receiving waters. Increase volume, combined with reduced base flows, results in a greater fluctuation between normal and storm flows causing greater channel erosion. Additionally, reduced base flows, increase fluctuation, and soil erosion can affect the downstream hydrology of the watershed, impacting ecological integrity.

Water quantity impacts, combined with land development, often adversely impact stormwater quality. Impervious surfaces collect pollutants from the atmosphere, animal waste, fertilizers and pesticides, as well as pollutants from motor vehicles. Pollutants such as hydrocarbons, metals, suspended solids, pathogens, and organic and nitrogen containing compounds, collect and concentrate on impervious surfaces. During storm events, these pollutants are washed directly into the municipal storm sewer systems. In addition to chemical and biological pollution, thermal pollution can occur from water collected or stored on impervious surfaces or in stormwater impoundments, which have been heated by the sun. Thermal pollution can affect

aquatic habitats, adversely impacting cold water fish. Removal of shade trees and stabilizing vegetation from stream banks also contributes to thermal pollution.

As towns and cities develop from rural agricultural communities, the landscape is altered in dramatic ways. Both residential and non-residential development on former vacant lots can have a great impact on the hydrologic cycle for the specific site. Localized impacts to the hydrologic cycle will ultimately impact the hydrologic cycle of the entire watershed encompassing that development site.

Proper stormwater management will help mitigate the negative impact of land development and its effects on stormwater. This plan outlines the Borough's proposal to improve stormwater quality, decrease stormwater quantity, and increase groundwater recharge. By managing stormwater, the Borough will improve the quality of aquatic ecosystems and restore some of the natural balance to the environment.

BACKGROUND

The Borough of Union Beach is a small 1.8 square mile municipality located in the northern part of Monmouth County. Union Beach is surrounded by the Raritan Bay to the north, Thorns Creek to the east, Hazlet Township to the south and Chingarora Creek to the west. Additionally, Flat Creek and East Creek flow through the Borough. All of the creeks within the Borough flow north and discharge in the Raritan Bay. Figure 2 delineates the Borough boundaries on a United States Geological Survey (USGS) quadrangle map. As shown on this map, the topography of Union Beach can be characterized by low, flat terrain, with elevations ranging between zero feet NGVD (Sea Level) to approximately 20 feet NGVD in the extreme southeastern and southwestern portions of the Borough. Wide stretches of swampy marshlands are located along the various creeks in the Borough.

DEMOGRAPHICS AND LAND USE

Union Beach is an established community as shown on Table 1 below. The Borough's population, according to the 2000 US Census, is 6,649 and has remained fairly stable for the past forty years. This is evident in the fact the Borough has only grown at an average rate of which is less than the county and state growth rates. Additional information regarding the Borough's historical population growth can be found in the *Borough of Union Beach Master Plan*, last revised September 1985.

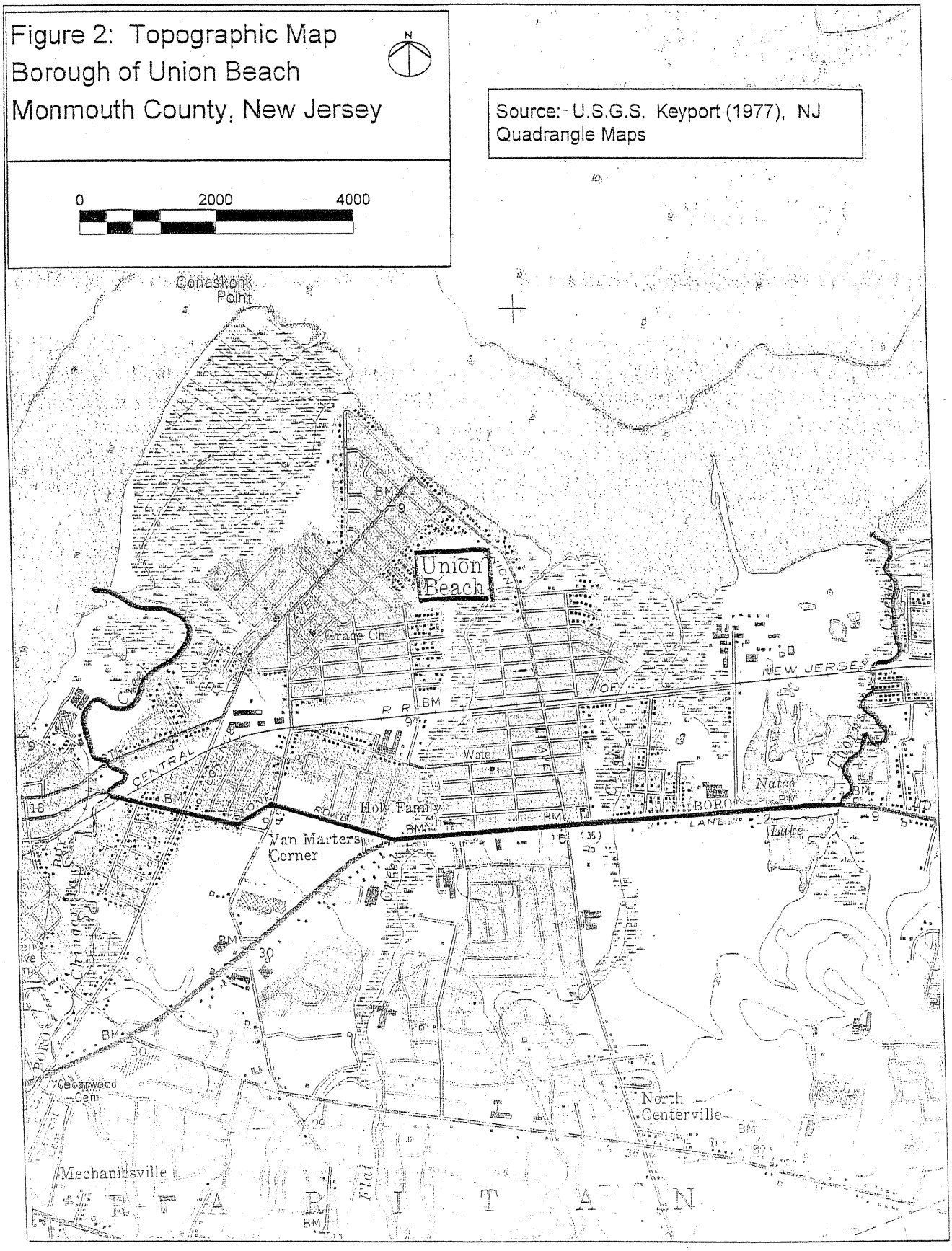
Table 1: Historical Population Growth 1930 – 2000

Year	*Borough of Union Beach*		*Monmouth County*		*New Jersey*	
	Total Population	*Average Annual Growth Rate Over the Prior 10-year Period*	*Total Population*	*Average Annual Growth Rate Over the Prior 10-year Period*	*Total Population*	*Average Annual Growth Rate Over the Prior 10-year Period*
1930	1,893	–	147,209	–	4,041,334	2.8%
1940	2,076	0.9%	161,238	0.9%	4,160,165	0.3%
1950	3,636	5.8%	225,327	4.0%	4,835,329	1.6%
1960	5,862	4.9%	334,401	4.8%	6,066,782	2.6%
1970	6,472	1.0%	461,849	3.8%	7,171,112	1.8%
1980	6,354	-0.2%	503,173	0.9%	7,364,823	0.3%
1990	6,156	-0.3%	553,124	1.0%	7,730,118	0.5%
2000	6,649	0.8%	615,305	1.1%	8,414,350	0.9%

Figure 2: Topographic Map
Borough of Union Beach
Monmouth County, New Jersey

Source: U.S.G.S. Keyport (1977), NJ Quadrangle Maps

0 2000 4000



Union Beach has 2,143 residential dwellings, 45 commercial properties and 8 industrial properties. As shown in Table 2 below, approximately 96% of the properties are occupied.

Table 2: General Housing Characteristics

	1990		2000		Change
	Number	Percent	Number	Percent	Number
Occupancy Status					
Total Housing Units	2,080	100	2,229	100	149
Occupied Housing Units	1,978	95.1	2,143	96.1	165
Vacant Housing Units	102	4.9	86	3.9	- 16
Tenure					
Occupied Housing Units	1,978	100	2,143	100	156
Owner- Occupied Housing Units	1,700	85.5	1,800	84	100
Renter- Occupied Housing Units	287	14.5	343	16	56
Population	6,156	100	6,649	100	493
Households	1,978	100	2,143	100	156
Family Household	1,619	81.9	1,722	80.4	103
Non-Family Household	359	18.2	421	19.6	62
Persons/ Household	3.11	-	3.10	-	- 0.1

Source: 1990, 2000 US Census

It should be noted though that according to the September 1985 *Borough of Union Beach Master Plan,* the Borough is nearly fully developed and has very little land available for development that is not impacted by environmental constraints. Most development in the Borough is redevelopment, rehabilitation of older housing stock or infill development in established neighborhoods. This is demonstrated in Figure 3 which shows the existing land use within the Borough and Figure 4 which shows the current zoning throughout the Borough.

Table 3: Existing Land Use

Usage	Area (Ac)	% of the Total Land Area	% of the Developable Land Area
Vacant/ Developable	581.8/183.5	50.5	15.9
Residential	289.4	25.1	50.8
Commercial/Office	12.3	1.1	2.2
Industrial	42.4	3.7	7.4
Parks/ Open Spaces	4.5	0.4	0.8
Public/Community Facilities	54.9	4.7	9.6
Quasi-Public	4.9	0.4	0.9
Former Railroad ROW	25.1	2.2	4.5
Streets	136.0	11.9	23.8
Total	1151.3	100	100

Source: Borough of Union Beach Master Plan, 1985

Figure 3: Existing Land Use
Borough of Union Beach
Monmouth County, New Jersey

Source: Existing Land Use, NJDEP (1995-1997).

NOTE: This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not State-authorized.

Figure 4

BOROUGH OF

UNION BEACH

MONMOUTH COUNTY NEW JERSEY

ZONING MAP

ZONING DISTRICTS

- R-8 Residential
- B-1 Neighborhood Business
- B-2 Highway Business
- B-3 Resort Business
- M-1 Light Industrial
- M-2 Heavy Industrial
- O-R Office-Residential
- R-AC Residential-Adult Community

ADOPTED: Ordinance No. 324 - 5/24/79
AMENDED: Ordinance No. 393 - 5/13/82
No. 445 - 9/13/84
No. 556 - 4/28/88
No. 99-799 - 9/16/99
No. 04-38 - 2/19/04

1. Borough Hall
2. Borough Garage
3. Borough Water Works
4. Water Tower
5. Union Beach First Aid Squad
6. Union Gardens Fire Company No. 2
7. Union Hose Fire Company No. 1
8. Union Beach Fire Company No 1
9. Harris Gardens Fire Company
10. Union Beach Library
11. Florence Avenue School
12. Cottage Park School
13. Memorial School
14. Bayshore Regional Sewerage Authority
15. Mon. County Bayshore Outfall Authority
16. State of N.J. Flood Control Dam
17. Scholer Park

RARITAN BAY

RARITAN BAY

RARITAN BAY

BOROUGH OF KEYPORT

BOROUGH OF KEANSBURG

TOWNSHIP OF HAZLET

TOWNSHIP OF HAZLET

M-2

R-8

B-3

B-1

O-R

R-AC

M-1

B-2

NATCO LAKE

SCALE IN FEET

SCALE IN METERS

Revised By Townplan Associates: 3/1/79 Tax Maps : 7/85
Revised By Monmouth County Planning Board : 9/85 - 7/78
Base Map Prepared By: Herbert H. Smith Associates: 1960

T&M ASSOCIATES
ELEVEN TINDALL ROAD

WATER BODIES

As stated above, the Borough's water bodies include Flat Creek, East Creek, and Chingarora Creek. All creeks within the Borough flow north and discharge directly into the Raritan Bay. Figure 5 illustrates the water bodies of the Borough.

The Borough's drainage system consists of approximately 38 outfalls, approximately 6.5 miles of storm sewer pipe ranging between 12 inches and 48 inches in diameter and approximately 400 inlets. The approximate location of the outfalls and inlets are shown in Figure 6. The Borough does not have any other municipally owned drainage facilities or structural stormwater management facilities. One of the outfalls discharges directly into the Raritan Bay, one discharges into Natco Lake, six discharge into East Creek, approximately 16 discharge into Flat Creek, approximately 10 discharge into the marsh area along the western edge of the Borough and four discharge into the marshland along the eastern edge of the Borough.

Natco Lake is a large man-made lake, located on the north side of Route 36, just east of Rose Lane. There is a second lake on the south side of Route 36 in adjacent Hazlet Township. In the 1930's the majority of the land was owned by the National Fireproofing Company (commonly known as NatCo). At the time the company used the land as commercial clay pits and manufactured fire bricks and clay on adjacent Rose Lane. During the mining operation, an underground spring was discovered, which accidentally filled in the clay pits and created Natco Lake. This lake is tidally influenced and provides limited stormwater management function.

Figure 3: Existing Land Use
Borough of Union Beach
Monmouth County, New Jersey

Source: Existing Land Use, NJDEP (1995-1997).

NOTE: This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not State-authorized.

LEGEND

- ▲ OUTFALL
- ■ INLET
- ● STORM MANHOLE

BOROUGH OF UNION BEACH

TM ASSOCIATES
11 TINDALL ROAD
MIDDLETOWN, NJ 07748
TEL 732-671-6400
FAX 732-671-7365

STORMWATER FACILITIES LOCATION MAP

FIGURE NO. 6

UBCH.01910 | UB191-SM | FEB. 2005

WATER QUALITY

The Ambient Biomonitoring Network (AMNET) was established by the New Jersey Department of Environmental Protection (NJDEP) to monitor and document the health of New Jersey's waterways. AMNET currently has 820 sites in five drainage basins that it monitors for benthic macro-invertebrates on a five-year cycle. Waterways are scored based on the data to generate the New Jersey Impairment Score (NJIS) and then categorized as severely impaired, moderately impaired and non-impaired. The NJIS is based on biometrics and benthic macro-invertebrate health (http://www.state.nj.us/dep/wmm/bfbm/).

In addition to the biological health, chemical data is gathered by the NJDEP, the Monmouth County Health Department, and other organizations, and is used to determine the health of waterways. The impaired waterways are summarized on the New Jersey 2004 Integrated List of Water Bodies. This list is then broken down into five sublists based on priority. The water bodies on Sublist 5 are classified as being the most severely impaired or threatened, whereas the water bodies on Sublist 1 are the least threatened or impaired. A summary of the impaired Borough's water bodies is present in Table 4 below.

Table 4: Union Beach Borough Impaired Water Bodies

Stream Location	*ID Number*	*Sublist Number*	*Priority For Sublist 5 Water Bodies*	*Impairment(s)*	*Data Source*
Chingarora Creek	R6436	5 5	High Medium	Fecal Coliform Dissolved Oxygen	Monmouth County Health Department and NJDEP Coastal Monitoring
Flat Creek	AN0457	5	Low	Benthic Macro-invertebrates	NJDEP AMNET

Sources: http://www.state.nj.us/dep/wmm/bfbm/Sub-List, New Jersey's 2004 Integrated List of Water Bodies, dated June 22, 2004

This water quality data is used by NJDEP to develop Total Daily Maximum Loads (TMDL). A TMDL is the quantity of a pollutant that can enter a water body without exceeding water quality standards or interfering with the ability to use the water body for its designated usage. Point and non-point pollution, surface water withdrawals and natural background levels are included in the determination of a TMDL, as required by Section 303(d) of the Clean Water Act. Point source pollution includes, but is not limited to; NJPDES permitted discharges, while non-point source pollution can include stormwater runoff from agricultural lands or impervious surfaces. TMDLs determine the allowable load from each source, with a factor of safety for the pollutant entering the water body. TMDLs can be used to prevent further deterioration of a water body, or to improve the current water quality. Currently, there are no established stormwater TMDLs in Union Beach. As TMDLs are developed, the Borough will revise its plan to be consistent with any adopted TMDL in the future. In addition, the Borough should encourage future monitoring of the Borough's water bodies and Natco Lake and mitigation as necessary.

WATER QUANTITY

Stormwater runoff often causes water quantity issues. In Union Beach, however, stormwater only exacerbates existing tidal flooding issues. The flat grade of the streams and the low relief of the adjacent area make the Borough vulnerable to flooding during periods of heavy rain. Severe thunderstorm activity causes the creeks to overtop and spread their floodwaters over the broad floodplain. There are several streets where stormwater compounds the tidal flooding, including the low-lying streets of Florence Avenue, Union Avenue and Front Street. The Borough is working with the state and county to undertake short-term strategies to address these problem areas. Since Union Beach is on the down gradient receiving end of four (4) watersheds, the Borough sees the most impact. The Borough should work with the upstream communities to establish a regional watershed management plan to encourage upstream communities to reduce runoff and lessen the frequency of flooding throughout the Borough

Most residential and commercial development is located between the low-lying marshland and is below 16 feet NGVD. A majority of the buildings are located within the 100-year floodplain. In

fact, extensive development has occurred up to the very edge of the surrounding wetlands. The United States Army Corp of Engineers in conjunction with the New Jersey Department of Environmental Protection studied flooding and shore protection problems and identified a number of solution alternatives. After review of a number of alternatives, the Army Corp of Engineers' evaluation recommends a combination of structural methods, be implemented to address flooding and provide flood protection measures to reduce flood damage by approximately 90-percent. The recommended measures include the construction of a series of levees and floodwalls, the construction of storm closure gates and tide gates and the construction of stormwater pumping stations. The cost of these recommendations is estimate to be over $90,000,000.00.

Additionally, the Borough has studied the flooding within the Borough and has prepared a detailed Floodplain Management Plan, which identifies the problems associated with tidal flooding and provides goals and recommendations to reduce the effects on the Borough citizens and their property. Copies of both the United States Army Corp of Engineers study as well as the Borough's Floodplain Management Plan are available for review in both the Borough Clerk's and the Borough Engineer's offices.

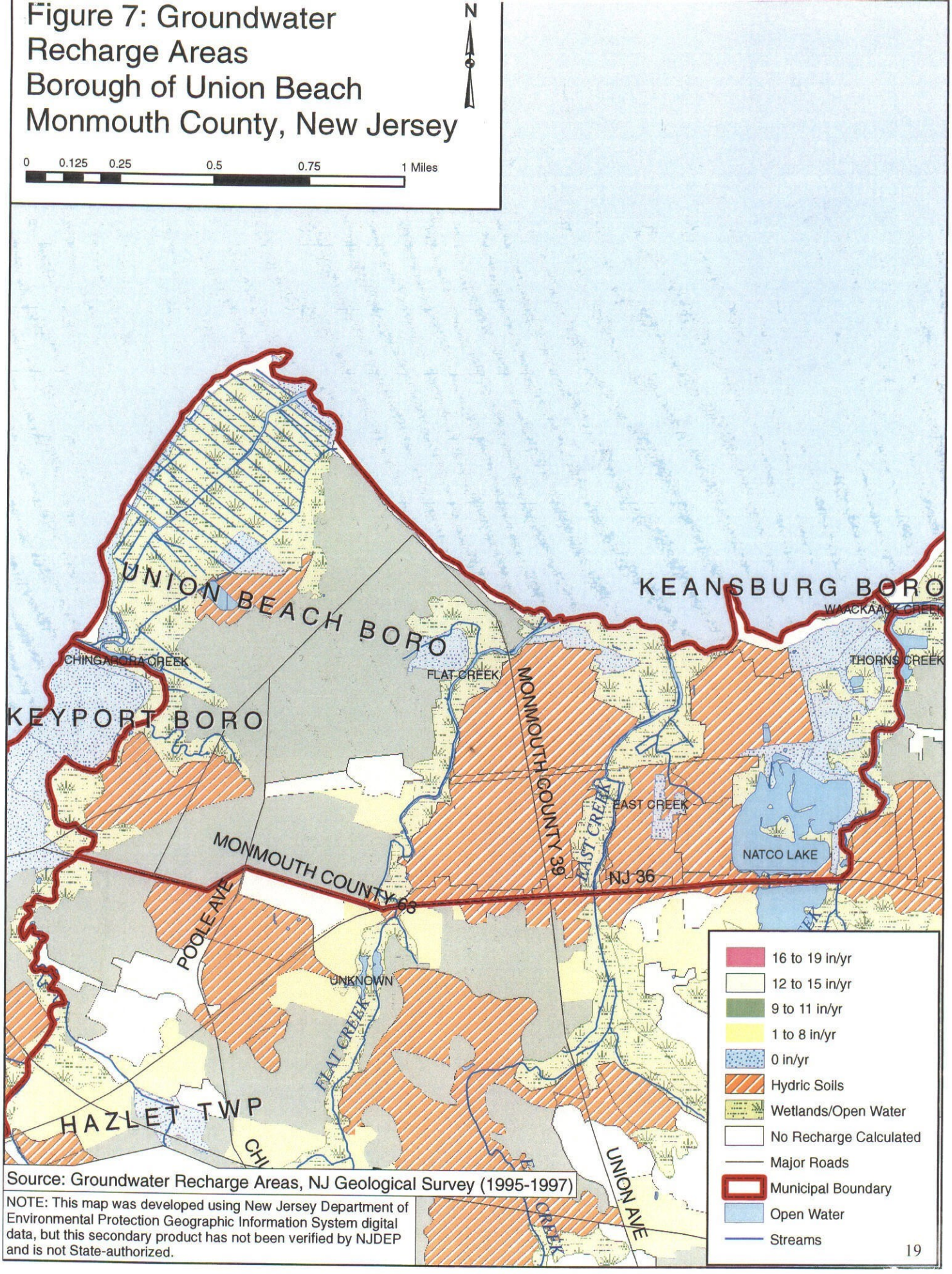
GROUNDWATER RECHARGE

Increases in development of vacant sites have increased impervious surface areas. Impervious surface areas are portions of the development site covered with either structure or pavement that prevents the underlying soil from absorbing rainwater. Instead of entering the soil, rainwater from rooftops and pavement flows onto the adjacent ground, where it is partially absorbed into the ground (depending upon hydraulic soil classifications) or into drainage facilities and streams. The greater the amount of impervious surface, the greater volume of stormwater runoff that drains away from a given site. Greater volumes of stormwater can result in high water elevations in some locations along streams and can exacerbate streambed erosion, and potentially cause downstream siltation. These dynamics alter the floodplain and have negative impacts on both the stream and river ecosystems. A map showing groundwater recharge areas within the Borough is located in Figure 7. This map was developed using the New Jersey Department of

Environmental Protection Geographic Information System digital data and the New Jersey Geological Survey data prepared in 1995-1997.

The Borough's water source is not directly affected by the reduction of groundwater recharge, since the Borough does not have any existing wells. However, Shorelands Water Company has two (2) wells at their facility on Union Avenue in adjacent Hazlet Township. Since the movement of groundwater refreshes aquifers, stormwater infiltration and groundwater recharge are very important for maintaining the aquifer. Figure 8 illustrates the location of the wellhead protection areas for the Shorelands Water Company facilities in Hazlet Township.

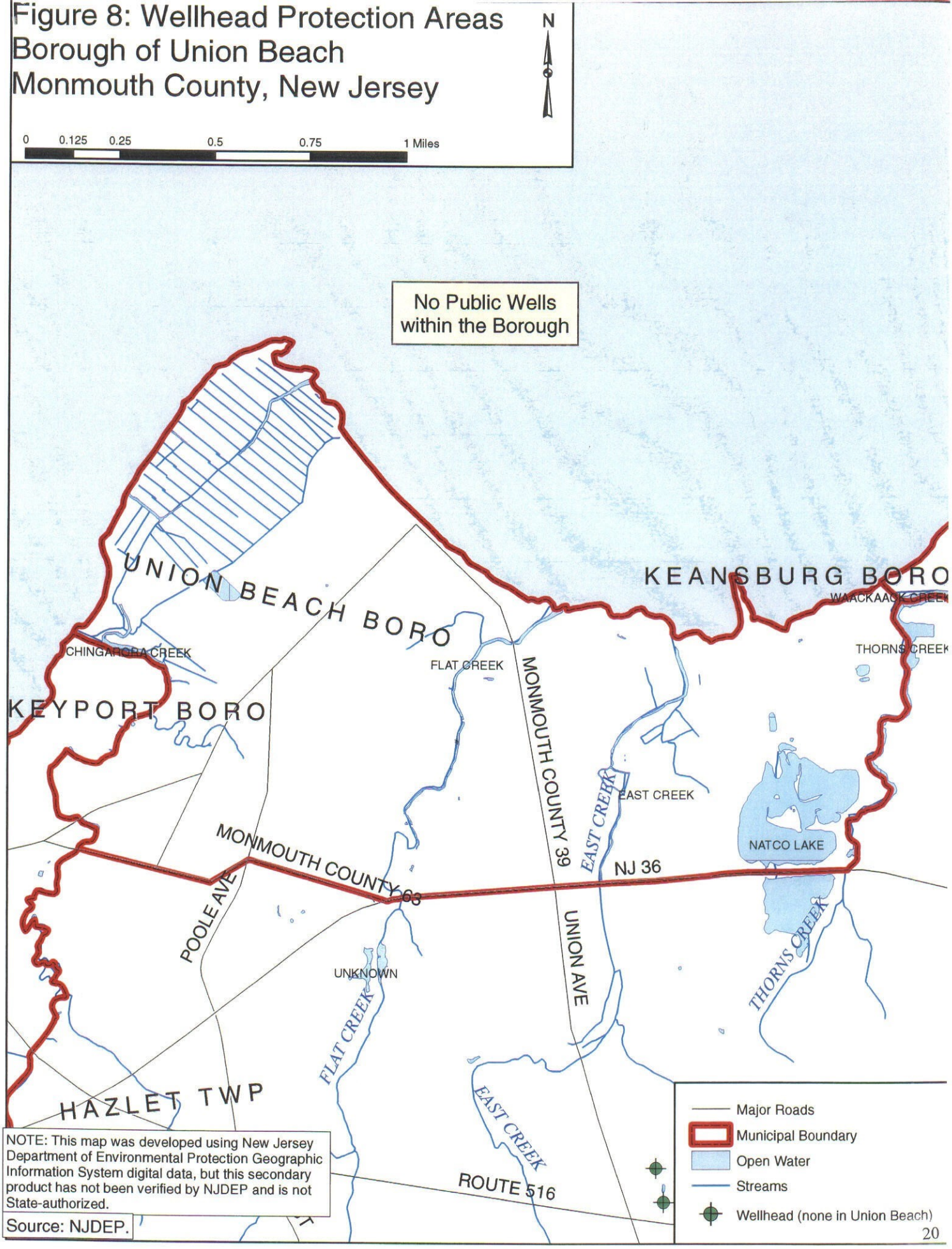
Figure 7: Groundwater Recharge Areas Borough of Union Beach Monmouth County, New Jersey



Source: Groundwater Recharge Areas, NJ Geological Survey (1995-1997)

NOTE: This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not State-authorized.

Figure 8: Wellhead Protection Areas
Borough of Union Beach
Monmouth County, New Jersey



NOTE: This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not State-authorized.

Source: NJDEP.

DESIGN AND PERFORMANCE STANDARDS

The Borough shall adopt applicable design and performance standards for stormwater management measures as presented in N.J.A.C. 7:8-5 to reduce the negative impact of stormwater runoff on water quality and quantity, and loss of groundwater recharge in receiving water bodies. The section of this plan, entitled Stormwater Management Strategies, indicates actions which are appropriate for various types of development in Union Beach. Ultimately, design and performance standards will be created to contain the necessary language to maintain stormwater management measures consistent with the applicable stormwater management rules, N.J.A.C. 7:8-5.8 - Maintenance Requirements. This includes language for safety standards consistent with N.J.A.C. 7:8-6 - Safety Standards for Stormwater Management Basins. Ordinances must be submitted to the Monmouth County Planning Board for review and approval within 12 months of adoption of this plan.

A number of structural and nonstructural strategies require water to be retained for long periods of time. These requirements may increase the promulgation of mosquito breeding habitats. New development and redevelopment activities should be coordinated with the Monmouth County Mosquito Extermination Commission so that proposed structural and nonstructural strategies are properly maintained.

Proper construction, inspection and maintenance are critical components for the successful performance of a stormwater management system. During construction, Borough personnel will observe construction of the project to ensure that the appropriate stormwater management measures are constructed and that they function as designed.

The Borough is presently preparing a Stormwater Pollution Prevention Plan (SPPP) to address inspection and maintenance for existing stormwater infrastructures throughout the Borough. Also included in the SPPP plan is the development of a Local Public Education Program to educate property owners on methods to reduce non-point stormwater pollution such as proper waste disposal, solids and floatable controls, fertilizer and pesticide use. New development and redevelopment projects will be required to develop and submit a detailed operation and

maintenance plan for each stormwater management strategy implemented in accordance with N.J.A.C. 7:8 - 5.8. Recommendations for proper maintenance procedures are available in the NJDEP's *Best Management Practices (BMPs) Manual*. Copies of the maintenance plan(s) must be filed with the Borough Department of Public Works.

Borough personnel will perform periodic inspections during the first two years of operation and after significant storms to ensure the system is functioning properly and to identify maintenance needs, if any. After this, annual checks will be done to identify any additional maintenance needs required. This may include clearing of blockages from inlets and/or outlet structures, removal of unwanted or invasive vegetation or accumulated debris/materials.

Borough ordinances should indicate that the inspection of stormwater systems is permissible on private property, provided the necessary easements are in place, upon giving reasonable notice. Ordinances should also indicate a timeframe for maintenance procedures to occur upon receiving notice from the Borough that maintenance is required.

PLAN CONSISTENCY

REGIONAL STORMWATER MANAGEMENT PLANS

Currently, there are no adopted Regional Stormwater Management Plans developed for water bodies located "within" the Borough's boundaries. This plan will be updated to be consistent with any Regional Stormwater Management Plans that are established in the future. Union Beach will take part in the development of any proposed Regional Stormwater Management Plans that may affect water bodies within or adjacent to the Borough.

TOTAL MAXIMUM DAILY LOADS (TMDL)

The NJDEP has not yet established a non-point source pollution TMDL for any waterbodies in the Borough. This plan will be updated to be consistent with any future stormwater TMDL established by the NJDEP.

RESIDENTIAL SITE IMPROVEMENT STANDARDS (RSIS)

This plan is consistent with regulations established under the Residential Site Improvement Standards (RSIS) or N.J.A.C. 5:21, and will be updated to remain consistent with any future updates of RSIS. Additionally, the Borough will use the latest update of RSIS during its reviews of residential area development for stormwater management.

SOIL CONSERVATION

The Borough's Stormwater Management Control Ordinance requires that all new development and redevelopment projects comply with the Soil Erosion and Sediment Control Standards of New Jersey. In cooperation with the Freehold Soil Conservation District, Borough personnel will observe on-site soil erosion and sediment control measures as part of the construction site inspections.

MONMOUTH COUNTY GROWTH MANAGEMENT GUIDE

The Monmouth County Growth Management Guide, adopted in December 1995, sets forth a series of goals and objectives designed to enhance the quality of life for residents of Monmouth County. This plan is consistent with those objectives, which include:

- Encouraging the protection of the County's unique, diverse, natural and scenic natural resources; and
- Promote the protection of non-renewable natural resources; and
- Encouraging the protection and conservation of all water resources; and
- Promote the preservation and improvements of coastal water resources; and
- Promote the preservation and improvements of surface water quality; and
- Encourage the preservation and improvements of groundwater quality and quantity; and
- Promote the preservation, restoration, and enhancement of wetlands and stream corridors in order to protect the adjacent water bodies, such as streams, rivers, lakes, bays and oceans.

This plan is consistent with the County Growth Management Guide by encouraging the protection of stream corridors and encouraging flood control and ground water recharge and through the implementation of the principals of non-structural and structural strategies. This Plan is also consistent with the County Growth Management Guide, by preserving and protecting valuable natural features within the Borough.

STATE DEVELOPMENT OR REDEVELOPMENT PLAN (SDRP)

This plan is consistent with the plans and policies of the SDRP, which was adopted in 2001. The SDRP places non environmentally constrained areas in the Borough of Union Beach in the Metropolitan Planning Area (PA1). Exceptions to the PA1 designation are wetlands and floodplain areas that are located within the Environmentally Sensitive Planning Area (PA5). According to the State Plan, most of the communities within the PA1 planning area are fully developed or almost fully developed with little vacant land available for new development. This Plan is consistent with the State Plan by preserving and protecting the established residential character of the Borough, preserving and upgrading the existing utility infrastructure, providing adequate open space facilities, and preserving and protecting valuable natural features within the Borough.

STORMWATER MANAGEMENT STRATEGIES

The Borough has reviewed its new comprehensive Master Plan, adopted on October 26, 2005 and its pertinent development ordinances for consistency with the new stormwater regulations. Based on its review, the Board finds that the following sections must be modified in order to incorporate the NJDEP's nonstructural strategies for stormwater management. It should be noted that the Borough is fully developed and minimal "major development"[1] is anticipated.

- **Section 13-5.13: Preserving Natural Features:** This Section requires natural features such as wetlands and floodplains be preserved to the extent feasible. This Section should be updated to require areas within 300 feet of a Category-1, unless approval is obtained from the NJDEP to permit a reduction of the buffer width to 150 feet.

- **Section 13-6.5.a: Minor Subdivisions Required Documents:** This Section outlines the items that must be submitted to the Board for review and approval prior to the application being deemed completed and a public hearing being scheduled. This Section should be updated to also require the applicant to submit a completed copy of the NJDEP Best Management Practices Manual Low Impact Development Checklist as part of any site plan or subdivision application. This Section should also be revised to allow the inclusion of the "Design and Performance Standards" requirements outlined in this plan.

- **Section 13-6.6.a: Preliminary Plat of a Major Subdivision Required Documents:** This Section outlines the items that must be submitted to the Board for review and approval prior to the application being deemed completed and a public hearing being scheduled. This Section should be updated to also require the applicant to submit a completed copy of the NJDEP Best Management Practices Manual Low Impact Development Checklist as part of a

[1] Major Development – means any development that provides for ultimately disturbing one or more acres of land or increases impervious surface by one-quarter acre or more. Disturbance for the purpose of this rule is the placement of impervious surface or exposure and/or movement of soil or bedrock or clearing, cutting, or removing of vegetation. Projects undertaken by any government agency which otherwise meet the definition of 'major development' but which do not require approval under the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq., are also considered "major development."

major subdivision application. This Section should also be revised to allow the inclusion of the "Design and Performance Standards" requirements outlined in this plan.

- **Section 13-6.7.a: Preliminary Plat of a Site Plan Required Documents:** This Section outlines the items that must be submitted to the Board for review and approval prior to the application being deemed completed and a public hearing being scheduled. This Section should be updated to also require the applicant to submit a completed copy of the NJDEP Best Management Practices Manual Low Impact Development Checklist as part of any minor or preliminary site plan application. This Section should also be revised to allow the inclusion of the "Design and Performance Standards" requirements outlined in this plan.

- **Section 13-6.8.a: Final Plat of a Major Subdivision Required Documents:** This Section outlines the items that must be submitted to the Board for review and approval prior to the application being deemed completed and a public hearing being scheduled. This Section should be updated to also require the applicant to submit a completed copy of the NJDEP Best Management Practices Manual Low Impact Development Checklist as part of any final subdivision application. This Section should also be revised to allow the inclusion of the "Design and Performance Standards" requirements outlined in this plan.

- **Section 13-6.9.a: Final Plat of a Major Site Plan Required Documents:** This Section outlines the items that must be submitted to the Board for review and approval prior to the application being deemed completed and a public hearing being scheduled. This Section should be updated to also require the applicant to submit a completed copy of the NJDEP Best Management Practices Manual Low Impact Development Checklist as part of any final site plan application. This Section should also be revised to allow the inclusion of the "Design and Performance Standards" requirements outlined in this plan.

- **Section 13-7.3: Off-Tract Improvements:** This Section details the requirement for off-tract improvements. Language should be added to require stormwater management and drainage improvements to conform to the "Design and Safety Standards" of this plan.

- **Section 13-7.7: Site Maintenance During Construction:** This Section outlines the developer's responsibility to maintain the sites during construction. This Section should be updated to require developers to also comply with the Soil Erosion and Sediment Control Standards of New Jersey.

- **Section 13-8.1 General Improvement Standards:** This Section outlines the Standard Specification and Construction Details requirement. This Section should be amended to require developers to also comply with the Soil Erosion and Sediment Control Standards of New Jersey, the New Jersey Stormwater Best Management Practices, the standards set forth in the plan and the stormwater control ordinances required by N.J.A.C. 7:8.

- **Section 13-8.4: Buffer Areas, Screening, Landscaping and Shade Trees:** This Section outlines the requirement for landscaping within the Borough. This Section should be updated to require the use of native vegetation (where feasible) that require less fertilization and watering. This Section should also be updated to allow the use of buffer areas for stormwater management and to encourage the separation or disconnection of impervious surfaces with vegetated areas to provide some filter or treatment of the runoff.

- **Section 13-8.7: Clearing and Grading:** This Section outlines the requirement for clearing and grading. This Section should be updated to require the use of native vegetation (where feasible) that require less fertilization and watering. This Section should also be revised to allow the inclusion of the "Design and Performance Standards" requirements outlined in this plan.

- **Section 13-8.9: Common Open Spaces and Public Open Spaces:** This Section outlines the requirement for any common or public open space created as part of a site plan or subdivision application. This Section should be revised to encourage the preservation of existing treed areas as well as the use of native vegetation (where feasible), since they require less fertilization and watering.

- **Section 13-8.10: Curbs or Curbs and Gutters:** This Section requires that curbs or combination curbs and gutters be constructed along both sides of all existing and proposed streets. This Section should be amended to allow the use of curb cuts or flushed curbing with curb stops to allow vegetative swales to be used as stormwater conveyances and to allow the separation of impervious areas.

- **Section 13-8.20: Off-Street Parking:** This Section outlines the requirements for parking areas. Buffer strips are required, as well as curbing and landscaping between parking areas and the street and buildings. This Section should be modified to encourage the use of native vegetation (where feasible) for landscaping, which requires less fertilizer and water than ornamental plantings. Additionally, the use of landscape islands should be encouraged to separate impervious surfaces. The curbing requirement should also be amended to allow the use of curb cuts or flush curbing with curb stops to allow vegetative swales to be used as stormwater conveyances and to allow the separation of impervious areas. This Section should also be amended to permit a portion of the required parking spaces to be "banked" and left as green space unless needed and to permit the use of pervious pavement (where feasible) to minimize the amount of impervious coverage.

- **Section 13-8.22: Roadway Construction:** This Section describes the roadway pavement requirements. This Section should be updated to permit the use of pervious pavement (where feasible) to reduce the amount of impervious coverage.

- **Section 13-8.25: Sidewalks and Aprons:** This Section requires all streets have sidewalks and aprons constructed from poured concrete. This Section should be amended to allow the use of porous paving materials in areas with low pedestrian traffic. Language should be added to require new sidewalks and aprons to direct stormwater to neighboring lawns, where feasible. This design criterion will allow for the disconnection of impervious surfaces.

- **Section 13-8.28: Storm Drainage Facilities:** This Section outlines the requirement for all storm drainage facilities. This Section should be updated to encourage the use of the New Jersey Stormwater Best Management Practices and to comply with the standards set forth in the plan, as well as the stormwater control ordinances required by N.J.A.C. 7:8.

- **Section 13-8.29: Street Design:** This Section describes minimum street widths, right of ways, shoulders, cul-de-sac radii, the limit of through streets, etc. This Section should be updated to encourage the limitation of on-street parking, thereby allowing narrower streets where public safety permits. This Section should be updated to be consistent with RSIS.

Revisions of the ordinances identified above will allow the incorporation of the non-structural strategies. Drafts of the updated ordinances will be submitted to Monmouth County for review and approval within 12 months of the plan adoption.

NONSTRUCTURAL STRATEGIES

The plan recommends the practical use of the following nonstructural strategies for all major developments[1] in accordance with Subchapter 5 of the NJDEP *Best Management Practices (BMPs) Manual*:

1. Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss.
2. Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces.
3. Maximize the protection of natural drainage features and vegetation.
4. Minimize the decrease in the pre-construction "time of concentration."
5. Minimize land disturbance, including clearing and grading.
6. Minimize soil compaction.

[1] Major Development – means any development that provides for ultimately disturbing one or more acres of land or increases impervious surface by one-quarter acre or more. Disturbance for the purpose of this rule is the placement of impervious surface or exposure and/or movement of soil or bedrock or clearing, cutting, or removing of vegetation. Projects undertaken by any government agency which otherwise meet the definition of 'major development' but which do not require approval under the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq., are also considered "major development."

7. Provide vegetated open-channel conveyance systems that discharge into and through stable vegetated areas.
8. Provide preventative source controls. In addition, Subchapter 5 further requires an applicant seeking approval for a major development[1] to specifically identify which and how these nonstructural strategies have been incorporated into the development's design. Finally, for each of those nonstructural strategies that were not able to be incorporated into the development's design due to engineering, environmental, or safety reasons, the applicant must provide a basis for this contention.

Recommended Measures

Recommendations in the BMP Manual may be implemented through the use of:

- **Vegetated Filter Strips**

  Vegetated filter strips are engineered stormwater conveyance systems that treat small drainage areas. Generally, a vegetated filter strip consists of a level spreader and planted vegetation. The level spreader ensures uniform flow over the vegetation that filters out pollutants, and promotes infiltration of the stormwater.

  Vegetated filter strips are best utilized adjacent to a buffer strip, watercourse or drainage swale since the discharge will be in the form of sheet flow, making it difficult to convey the stormwater downstream in a normal conveyance system (swale or pipe).

- **Stream Corridor Buffer Strips**

  Buffer strips are undisturbed areas between development and the receiving waters. There are two management objectives associated with stream corridor buffer strips:

[1] Major Development – means any development that provides for ultimately disturbing one or more acres of land or increases impervious surface by one-quarter acre or more. Disturbance for the purpose of this rule is the placement of impervious surface or exposure and/or movement of soil or bedrock or clearing, cutting, or removing of vegetation. Projects undertaken by any government agency which otherwise meet the definition of 'major development' but which do not require approval under the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq., are also considered "major development."

- To provide buffer protection along a stream corridor to protect existing ecological form and functions; and
- To minimize the impact of development on the stream itself (filter pollutants, provide shade and bank stability, reduce the velocity of overland flow).

Buffers only provide limited benefits in terms of stormwater management; however, they are an integral part of a system of best management practices.

- **The Stabilization of Banks, Shoreline and Slopes**

  The root systems of trees, shrubs and plants effectively bind soils to resist erosion. Increasing the amount of required plant material for new development and redeveloped residential and non-residential sites should be encouraged throughout the Borough. Planting schemes should be designed by a Certified Landscape Architect to combine plant species that have complementary rooting characteristics to provide long-term stability.

- **Deterrence of Geese**

  Maintaining or planting dense woody vegetation around the perimeter of a pond or wetland is the most effective means of deterring geese from taking over and contaminating local water bodies and ponds. Minimizing the amount of land that is mowed will also limit the preferred habitat for geese. Other deterrence methods and/or actions should also be investigated.

- **Fertilizers**

  The use of fertilizers to create the "perfect lawn" is an increasingly common problem in many residential areas. Fertilizer runoff increases the level of nutrients in water bodies and can accelerate eutrophication[2] in the lakes and rivers and continue on to the coastal areas. The excessive use of fertilizer causes nitrate contamination of groundwater. Good fertilizer maintenance practices help in reducing the amount of nitrates in the soil and thereby lower its

[2] Eutrophication – The normally slow aging process by which a lake evolves into a bog or marsh and ultimately assumes a completely terrestrial state and disappears.

content in the water. Initially, the Borough should work with the NJDEP to educate homeowners of the impacts of the overuse of fertilizers. This discussion should include other techniques to create a "green lawn" without over fertilizing. Almost as important as the use of fertilizer is the combination of over fertilizing and over watering lawns. In many cases, this leads to nutrient rich runoff, which ultimately migrates to a nearby stream, lake or other water body. If fertilizer is applied correctly, the natural characteristics of the underlying soils will absorb or filter out the nutrients in the fertilizer.

STRUCTURAL STORMWATER MANAGEMENT[3]

In Chapter 9 of its *Stormwater Management Best Management Practices* (BMP) *Manual*, the Department of Environmental Protection identifies several structural stormwater management options. The Borough recommends the following structural devices. These structural methods should only be used after all non-structural strategies are deemed impracticable or unsafe. Specifically, the Borough encourages the use of structural stormwater management systems in a manner that maximizes the preservation of community character:

- **Bioretention Systems**

  A bioretention system consists of a soil bed planted with native vegetation located above an underdrained sand layer. It can be configured as either a bioretention basin or a bioretention swale. Stormwater runoff entering the bioretention system is filtered first through the vegetation and then the sand/soil mixture before being conveyed downstream by the underdrain system. Runoff storage depths above the planting bed surface are typically shallow. The adopted Total Suspended Solids (TSS) removal rate for bioretention systems is 90%.

- **Constructed Stormwater Wetlands**

  Constructed stormwater wetlands are wetland systems designed to maximize the removal of pollutants from stormwater runoff through settling and both uptake and filtering by

[3] Definitions provided in the NJDEP – Stormwater Best Management Practices Manual at: http://www.njstormwater.org/tier_A/bmp_manual.htm

vegetation. Constructed stormwater wetlands temporarily store runoff in relatively shallow pools that support conditions suitable for the growth of wetland plants. The adopted TSS removal rate for constructed stormwater wetlands is 90%.

- **Dry Wells**

  A dry well is a subsurface storage facility that receives and temporarily stores stormwater runoff from roofs of structures. Discharge of this stored runoff from a dry well occurs through infiltration into the surrounding soils. A dry well may be either a structural chamber and/or an excavated pit filled with aggregate. Due to the relatively low level of expected pollutants in roof runoff, a dry well cannot be used to directly comply with the suspended solids and nutrient removal requirements contained in the NJDEP Stormwater Management Rules, N.J.A.C. 7:8. However, due to its storage capacity, a dry well may be used to reduce the total stormwater quality design storm runoff volume that a roof would ordinarily discharge to downstream stormwater management facilities. Care should be taken with the location and size of drywells due to potential impacts on basements and foundations.

- **Extended Detention Basins**

  An extended detention basin is a facility constructed through filling and/or excavation that provides temporary storage of stormwater runoff. It has an outlet structure that detains and attenuates runoff inflows and promotes the settlement of pollutants. An extended detention basin is normally designed as a multistage facility that provides runoff storage and attenuation for both stormwater quality and quantity management. The adopted TSS removal rate for extended detention basins ranges between 40 and 60%, depending on the duration of detention time provided in the basin.

- **Infiltration Basins**

  An infiltration basin is a facility constructed within highly permeable soils that provides temporary storage of stormwater runoff. An infiltration basin does not normally have a structural outlet to discharge runoff from the stormwater quality design storm, but may require an emergency overflow for extraordinary storm events. Instead, outflow from an

infiltration basin is through the surrounding soil. An infiltration basin may also be combined with an extended detention basin to provide additional runoff storage for both stormwater quality and quantity management. The adopted TSS removal rate for infiltration basins is 80%.

- **Manufactured Treatment Devices**

  A manufactured treatment device is a pre-fabricated stormwater treatment structure utilizing settling, filtration, absorptive/adsorptive materials, vortex separation, vegetative components, and/or other appropriate technology to remove pollutants from stormwater runoff. The TSS removal rate for manufactured treatment devices is based on the NJDEP certification of the pollutant removal rates on a case-by-case basis. Other pollutants, such as nutrients, metals, hydrocarbons, and bacteria can be included in the verification/certification process if the data supports their removal efficiencies.

- **Pervious Paving Systems**

  Pervious paving systems are paved areas that produce less stormwater runoff than areas paved with conventional paving. This reduction is achieved primarily through the infiltration of a greater portion of the rain falling on the area than would occur with conventional paving. This increased infiltration occurs either through the paving material itself or through void spaces between individual paving blocks known as pavers. Pervious paving systems are divided into three general types. Each type depends primarily upon the nature of the pervious paving surface course and the presence or absence of a runoff storage bed beneath the surface course. Porous paving and permeable pavers with storage bed systems treat the stormwater quality design storm runoff through storage and infiltration. Therefore, these systems have adopted TSS removal rates similar to infiltration structures. Care must be taken with the use of pervious systems to avoid subgrade instability and frost related deterioration. Pervious paving systems also require significant maintenance to maintain their designed porosity.

- **Sand Filters**

  A sand filter consists of a forebay and underdrained sand bed. It can be configured as either a

surface or subsurface facility. Runoff entering the sand filter is conveyed first through the forebay, which removes trash, debris, and coarse sediment, and then through the sand bed to an outlet pipe. Sand filters use solids settling, filtering, and adsorption processes to reduce pollutant concentrations in stormwater. The adopted TSS removal rate for sand filters is 80%.

- **Vegetative Filters**

  A vegetative filter is an area designed to remove suspended solids and other pollutants from stormwater runoff flowing through a length of vegetation called a vegetated filter strip. The vegetation in a filter strip can range from turf and native grasses to herbaceous and woody vegetation, all of which can either be planted or indigenous. It is important to note that all runoff to a vegetated filter strip must both enter and flow through the strip as sheet flow. Failure to do so can severely reduce and even eliminate the filter strip's pollutant removal capabilities. The TSS removal rate for vegetative filters will depend upon the vegetated cover in the filter strip.

- **Wet Ponds**

  A wet pond is a stormwater facility constructed through filling and/or excavation that provides both permanent and temporary storage of stormwater runoff. It has an outlet structure that creates a permanent pool and detains and attenuates runoff inflows and promotes the settlement of pollutants. A wet pond, also known as a retention basin, can also be designed as a multistage facility that also provides extended detention for enhanced stormwater quality design storm treatment and runoff storage and attenuation for stormwater quantity management. The adopted TSS removal rate for wet ponds is 50 to 90%, depending on the permanent pool storage volume in the pond and the length of the retention time provided by the pond.

Each of these structures has advantages and disadvantages to manage stormwater. As previously noted Union Beach is a fully developed community and anticipates the majority of new construction as residential infill development that will disturb less than 1-acre of land and have less than 1-acre of additional impervious coverage.

LAND USE/ BUILD-OUT ANALYSIS

The Borough of Union Beach has less than one square mile of developable or vacant land and therefore is exempt from the NJDEP regulations requiring the development of a build-out analysis which would indicate the potential for development within the Borough. The limited amount of vacant land within the Borough is shown on Figure 3, which outlines the existing land uses within the Borough. Figure 9 illustrates the Hydrologic Units (HUC-14s), or sub watersheds, within the Borough and Figure 10 shows the constrained lands such as wetlands and open waters within the Borough. Except for a very small area in the northeast corner of the Borough, Union Beach is located within the Chingarora Creek to Thorns Creek HUC -14.

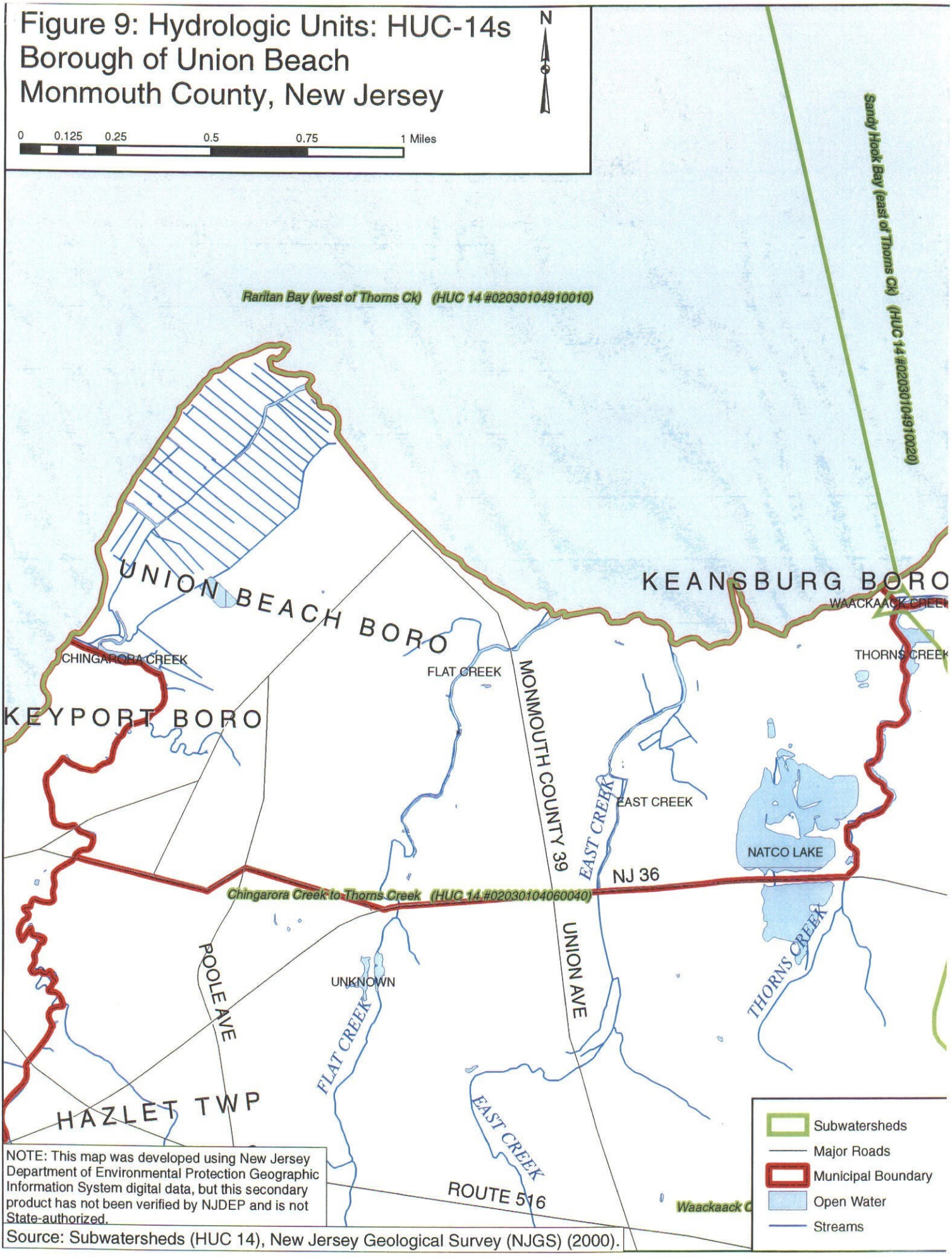
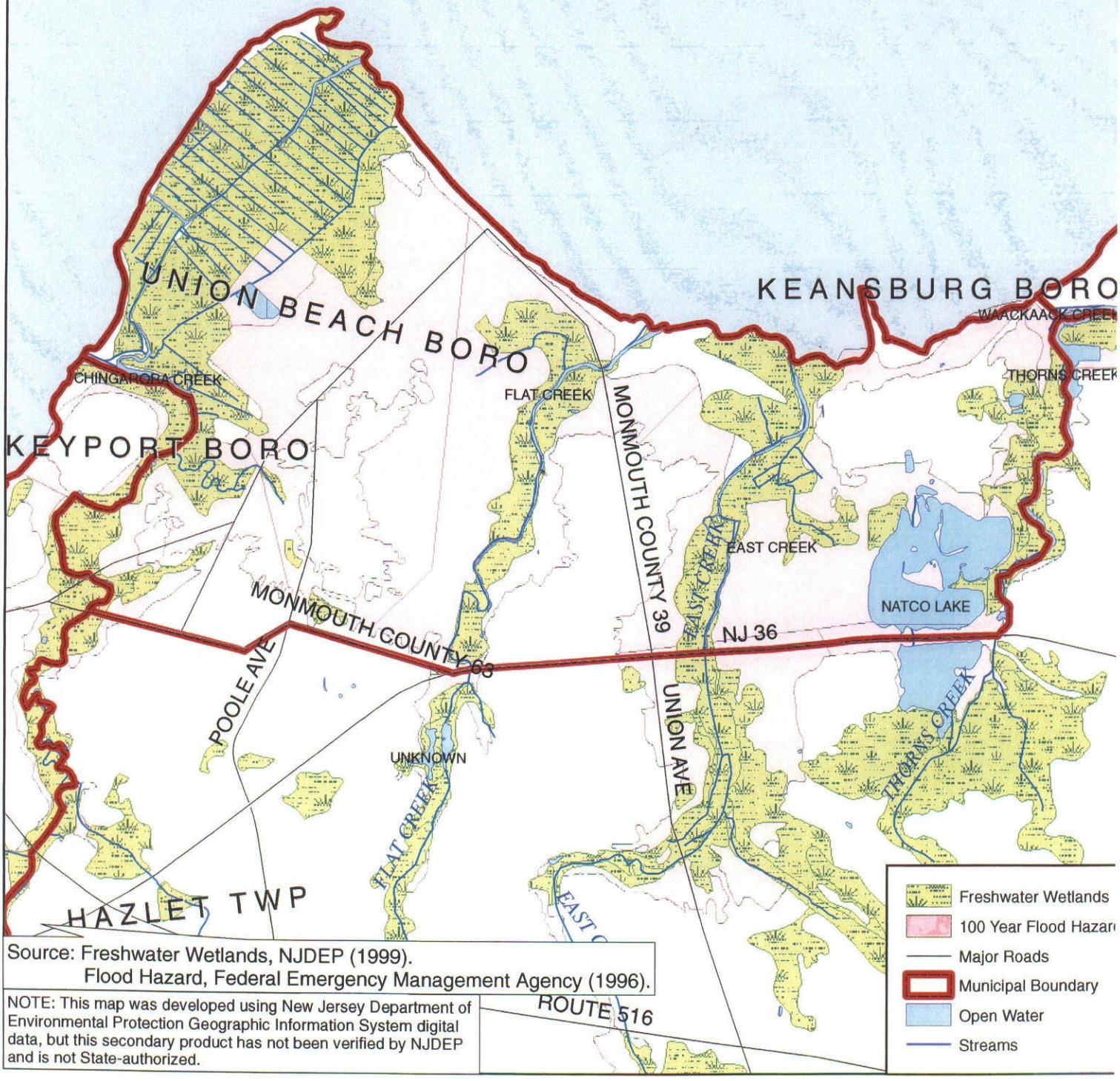


Figure 9: Hydrologic Units: HUC-14s
Borough of Union Beach
Monmouth County, New Jersey
N
0 0.125 0.25 0.5 0.75 1 Miles
Raritan Bay (west of Thorns Ck) (HUC 14 #02030104910010)
Sandy Hook Bay (east of Thorns Ck) (HUC 14 #02030104910020)
UNION BEACH BORO
KEANSBURG BORO
KEYPORT BORO
HAZLET TWP
CHINGARORA CREEK
FLAT CREEK
MONMOUTH COUNTY 39
EAST CREEK
NATCO LAKE
NJ 36
Chingarora Creek to Thorns Creek (HUC 14 #02030104060040)
POOLE AVE
UNKNOWN
UNION AVE
THORNS CREEK
ROUTE 516
Subwatersheds
Major Roads
Municipal Boundary
Open Water
Streams
NOTE: This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not State-authorized.
Source: Subwatersheds (HUC 14), New Jersey Geological Survey (NJGS) (2000).

Figure 10: Wetlands and Water Land Uses
Borough of Union Beach
Monmouth County, New Jersey



Source: Freshwater Wetlands, NJDEP (1999).
Flood Hazard, Federal Emergency Management Agency (1996).

NOTE: This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not State-authorized.

MITIGATION PLAN

This mitigation plan is provided for proposed development or redevelopment projects that seek a variance or exemption from the stormwater management design and performance standards set forth in this plan and N.J.A.C. 7:8-5.

MITIGATION PROJECT CRITERIA

To grant a variance or exemption from the stormwater regulations, new development and redevelopment plan applications must propose a mitigation project located within the same drainage basin as the proposed development/redevelopment. Proposed mitigation projects must provide for additional groundwater recharge benefits, protection from stormwater runoff quantity or quality from previously developed property that does not currently meet the design and performance standards outlined in this plan. Mitigation projects should also be as close in terms of hydrology and hydraulics to the proposed development/redevelopment as possible.

Projects must be proposed on an equivalent basis. Developers must propose a mitigation project similar in kind to the variance or exemption being requested. Proposed mitigation projects cannot adversely impact the existing environment.

DEVELOPER MITIGATION PLAN REQUIREMENTS

Proposed mitigation projects shall have Mitigation Plans submitted to the Borough for review and approval prior to granting final approval for site development. Developers should include the following in a Mitigation Plan:

- Mitigation project name, owner name and address, developer name and address, mitigation project location, drainage area, cost estimate;
- Proposed mitigation strategy and impact to sensitive receptor, what is being impacted, mitigated, and how;
- Legal authorization required for construction and maintenance;
- Responsible party, including required maintenance, who will perform the maintenance, proposed cost of maintenance, and how it will be funded;

- All other permits required for construction of the mitigation project;
- Cost estimate of construction inspection; and
- Reason a waiver or exemption is requested and supporting evidence.

Due to the lack of vacant or developable land, it is anticipated that the majority of the mitigation projects proposed will result in retrofitting/rehabilitation of existing stormwater facilities and natural infrastructures. The Borough does not currently have any specific mitigation projects developed at this time. However, this plan recognizes that other projects may be identified in the future by the Borough and/or the Regional Stormwater Planning Area, subject to the approval of the Planning Board or Borough Engineer. The following strategies have been identified to date, as possible mitigation strategies:

- Installation of new inlet casting heads on existing Borough streets, not the subject of a rehabilitation project, for solids and floatable control.
- Disconnecting of impervious surfaces, such as redirecting existing roof drains from the storm sewer system to an overland discharge.
- Removal of accumulated silt and sediment from Borough Streams in flood prone areas to provide additional storage volume.
- Retrofitting of existing Borough stormwater management facilities to improve water quality, water quantity and/or groundwater recharge.

More detailed information is available from the Borough or the Borough Engineer's Office. It is the developer's responsibility to provide a detailed study of any proposed mitigation project and provide the Borough with a proposed mitigation plan for review and approval.

RECOMMENDATIONS

The following are additional recommendations associated with this Stormwater Management Plan Element of the *Master Plan*:

Recommendation A: Review and update the existing Land Development and Zoning Regulations to implement the principals of non-structural and structural stormwater management strategies to reduce stormwater quantity, improve stormwater quality and to maintain or increase groundwater recharge.

Portions of the existing Land Development and Zoning Regulations are inconsistent with recently adopted New Jersey Department of Environmental Protection (NJDEP) Stormwater Management Regulations and the NJDEP *Best Management Practices for the Control of Non-Point Source Pollution from Stormwater Manual*. Some of these inconsistencies are identified in the Stormwater Management Strategies section above. The Borough should update their existing regulations to be in conformance with these regulations and to minimize inconsistencies or conflicts. Since the Borough of Union Beach is also at the downstream end of several watersheds, the Borough should work with the adjacent municipalities to establish a regional watershed management plan to encourage the upstream communities to reduce runoff and lessen the frequency of non-tidal flooding within the Borough.

Recommendation B: Educate residents on the impacts of the overuse of fertilizers and good fertilizer maintenance practices.

As stated in the Stormwater Management Strategies section above, the overuse of fertilizers has a significant detrimental impact on surface water bodies and groundwater. The Borough should work with the NJDEP to educate residents on these impacts and encourage residents to use techniques to create a "green lawn" without over-fertilizing and/or to convert lawn areas to other kinds of vegetation that do not require fertilization and other chemical treatments. Many lawn services also "overspray" fertilizer onto roadways and adjacent properties. The Borough should investigate methods to minimize the application of fertilizers beyond property lines.

Recommendation C: Educate residents on techniques to deter geese.

Geese population can take over and contaminate local water bodies. The planting of vegetation around the perimeter of a water body is an effective means of deterring geese.

Recommendation D: Seek to ensure the proper inspection, monitoring, and maintenance of all stormwater management facilities and develop strategies for all existing and future maintenance and improvements.

Stormwater facilities require regular maintenance to ensure effective and reliable performance. Failure to perform the necessary maintenance can lead to diminished performance, deterioration and failure. In addition, a range of health and safety problems, including mosquito breeding and the potential for drowning, can result from improperly maintained facilities. To minimize these risks, the Borough should implement a procedure for regular inspection, monitoring, and maintenance of Borough owned stormwater facilities.

Additionally, there are a number of privately maintained stormwater facilities within the Borough. The Borough should work with the various property owners, residents and business owners to identify maintenance and/or improvements needs and develop strategies for regular inspection and maintenance of these facilities.

The Borough should also encourage the use of low impact design methods and non-structural strategies that require less maintenance.

Recommendation E: Encourage existing storm drains to be replaced with bicycle safe grates and Campbell Foundry Model #N-2-ECO inlet heads (or approved equal) to prevent floatable and solid debris from entering the stormwater conveyance system.

Typical roadway debris, such as bottles and cans, can easily enter stormwater conveyance systems through typical inlet openings. This debris is then transported downstream into the

receiving water bodies. By replacing existing storm drain inlets with new inlet grates and inlet heads, which have a maximum opening size of 2 inches by 4 inches, the amount of debris entering the stream can be reduced, improving water quality.

Recommendation F: Work with the Monmouth County Mosquito Commission to monitor existing and proposed BMP's.

Many of the recommended non-structural and structural strategies are designed to retain water for a period of time to promote groundwater recharge. Standing water, remaining greater that 72 hours, could become a mosquito larva habitat. To date, there is limited information documenting the creation of mosquito habitat with newer designs of best management practices and non-structural and structural strategies. The Borough should coordinate new development and redevelopment projects using non-structural and structural strategies with the Monmouth County Mosquito Extermination Commission so that these facilities can be periodically monitored, inspected and treated as needed for mosquito control. Developers and the Borough should also solicit input from the Monmouth County Mosquito Extermination Commission early in the design process for new facilities to obtain additional guidance and recommendations.

Recommendation G: To reduce erosion and sedimentation in streams, encourage residents and property owners to minimize the amount of re-grading and to employ techniques to minimize soil erosion.

During construction, large amounts of disturbance or exposed soil are prone to soil erosion. This can result in accumulation and/or sedimentation in streams and elevated amounts of Total Suspended Solids, which can impact the existing vegetation and wildlife.

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Certified A True Copy
Mary Sebik Boro. Clerk

ORDINANCE NO. 2006- 76 :

AN ORDINANCE AMENDING AN ORDINANCE ENTITLED "THE REVISED GENERAL ORDINANCES OF THE BOROUGH OF UNION BEACH, 1980," ENACTING CHAPTER XIX, ENVIRONMENTAL PROTECTION, SECTION 1, STORMWATER MANAGEMENT AND CONTROL.

BE IT ORDAINED BY THE MAYOR AND COUNCIL OF THE BOROUGH OF UNION BEACH that Chapter XIX, Environmental Protection, Section 1, Stormwater Management and Control, is hereby enacted and established as follows:

19-1.1 Title

This section shall be known as and may be cited as the "Stormwater Management Ordinance of the Borough of Union Beach"

19-1.2 Scope and Purpose

a. Policy Statement

Flood control, groundwater recharge, and pollutant reduction through nonstructural or low impact techniques shall be explored before relying on structural Best Management Practices (BMPs). Structural BMPs should be integrated with nonstructural stormwater management measures and proper maintenance plans. Nonstructural measures include both environmentally sensitive site design and source controls that prevent pollutants from being placed on the site. Source control plans should be developed based upon physical site conditions and the origin, nature, and the anticipated loading of potential pollutants. Multiple stormwater management BMPs may be necessary to achieve the established performance standards for water quality, quantity, and groundwater recharge.

b. Purpose

It is the purpose of this section to establish minimum stormwater management requirements and controls for development.

c. Applicability

This section shall be applicable to all development which:

1. Requires a development permit as defined in Chapter XIII of the Code of the Borough of Union Beach; and/or

2. Requires Site Plan or subdivision approval as defined in Chapter XIII of the Code of the Borough of Union Beach; and/or

3. Constitutes a major development as defined by N.J.A.C. 7:8-1.2 et seq.

d. Compatibility with Other Permit and Ordinance Requirements

Development approvals issued pursuant to this section are to be considered an integral part of development approvals under the development permit, subdivision and site plan review process and do not relieve the applicant of the responsibility to secure required permits or approvals for activities regulated by any other applicable code, rule, act, or ordinance. In their interpretation and application, the provisions of this chapter shall be held to be the minimum requirements for the promotion of the public health, safety, and general welfare. This section is not intended to interfere with, abrogate, or annul any other ordinance, rule or regulation, statute, or other provision of law except that, where any provision of this section imposes restrictions different from those imposed by any other ordinance, rule or regulation, or other provision of law, the more restrictive provisions or higher standards shall control.

19-1.3 Definitions and Word Usage

For the purpose of this section, the following terms, phrases, words and their derivations shall have the meaning given herein. When not inconsistent with the contest, words used in the present tense include the future, works in the plural number include the singular and words in the singular number include the plural number. The work "shall" is always mandatory and not merely directory.

Unless specifically defined below, words or phrases used in this section shall be interpreted so as to give them the meaning they have in common usage and to give this section its most reasonable application. The definitions below are the same as or based on the corresponding definitions in the Stormwater Management Rules at N.J.A.C. 7:8-1.2.

CAFRA Planning Map means the geographic depiction of the boundaries for coastal Planning Areas, CAFRA Centers, CAFRA Cores and CAFRA Nodes pursuant to N.J.A.C. 7:7E-5B.3.

CAFRA Centers, Cores or Nodes means those areas within boundaries accepted by the Department pursuant to N.J.A.C. 7:8E-5B.

Compaction means the increase in soil bulk density.

Core means a pedestrian-oriented area of commercial and civic uses serving the surrounding municipality, generally including housing and access to public transportation.

County review agency means an agency designated by the County Board of Chosen Freeholders to review municipal stormwater management plans and implementing ordinance(s). The county review agency may either be:

A county planning agency; or

A county water resource association created under N.J.S.A 58:16A-55.5, if the ordinance or resolution delegates authority to approve, conditionally approve, or disapprove municipal stormwater management plans and implementing ordinances.

Department means the New Jersey Department of Environmental Protection.

Designated Center means a State Development and Redevelopment Plan Center as designated by the State Planning Commission such as urban, regional, town, village, or hamlet.

Design engineer means a person professionally qualified and duly licensed in New Jersey to perform engineering services that may include, but not necessarily be limited to, development of project requirements, creation and development of project design and preparation of drawings and specifications.

Development means the division of a parcel of land into two or more parcels, the construction, reconstruction, conversion, structural alteration, relocation or enlargement of any building or structure, any mining excavation or landfill, and any use or change in the use of any building or other structure, or land or extension of use of land, by any person, for which permission is required under the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq. In the case of development of agricultural lands,

development means: any activity that requires a State permit; any activity reviewed by the County Agricultural Board (CAB) and the State Agricultural Development Committee (SADC), and municipal review of any activity not exempted by the Right to Farm Act , N.J.S.A 4:1C-1 et seq.

Drainage area means a geographic area within which stormwater, sediments, or dissolved materials drain to a particular receiving water body or to a particular point along a receiving water body.

Environmentally critical areas means an area or feature which is of significant environmental value, including but not limited to: stream corridors; natural heritage priority sites; habitat of endangered or threatened species; large areas of contiguous open space or upland forest; steep slopes; and well head protection and groundwater recharge areas. Habitats of endangered or threatened species are identified using the Department's Landscape Project as approved by the Department's Endangered and Non-game Species Program.

Empowerment Neighborhood means a neighborhood designated by the Urban Coordinating Council "in consultation and conjunction with" the New Jersey Redevelopment Authority pursuant to N.J.S.A 55:19-69.

Erosion means the detachment and movement of soil or rock fragments by water, wind, ice or gravity.

Impervious surface means a surface that has been covered with a layer of material so that it is highly resistant to infiltration by water.

Infiltration is the process by which water seeps into the soil from precipitation.

Major development means any development that provides for ultimately disturbing one or more acres of land or increasing impervious surface by one-quarter acre or more. Disturbance for the purpose of this rule is the placement of impervious surface or exposure and/or movement of soil or bedrock or clearing, cutting, or removing of vegetation.

Municipality means any City, Borough, Town, Township, or Village.

Node means an area designated by the State Planning Commission concentrating facilities and activities which are not organized in a compact form.

Nutrient means a chemical element or compound, such as nitrogen or phosphorus, which is essential to and promotes the development of organisms.

Person means any individual, corporation, company, partnership, firm, association, Borough of Union Beach, or political subdivision of this State subject to municipal jurisdiction pursuant to the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq.

Pollutant means any dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, refuse, oil, grease, sewage sludge, munitions, chemical wastes, biological materials, medical wastes, radioactive substance (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.), thermal waste, wrecked or discarded equipment, rock, sand, cellar dirt, industrial, municipal, agricultural, and construction waste or runoff, or other residue discharged directly or indirectly to the land, ground waters or surface waters of the State, or to a domestic treatment works. "Pollutant" includes both hazardous and non-hazardous pollutants.

Recharge means the amount of water from precipitation that infiltrates into the ground and is not evapo-transpired.

Sediment means solid material, mineral or organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water or gravity as a product of erosion.

Site means the lot or lots upon which a development is to occur or has occurred.

Soil means all unconsolidated mineral and organic material of any origin.

State Development and Redevelopment Plan Metropolitan Planning Area (PA1) means an area delineated on the State Plan Policy Map and adopted by the State Planning Commission that is intended to be the focus for much of the state's future redevelopment and revitalization efforts.

State Plan Policy Map is defined as the geographic application of the State Development and Redevelopment Plan's goals and statewide policies, and the official map of these goals and policies.

Stormwater means water resulting from precipitation (including rain and snow) that runs off the land's surface, is transmitted to the subsurface, or is captured by separate storm sewers or other sewage or drainage facilities, or conveyed by snow removal equipment.

Stormwater runoff means water flow on the surface of the ground or in storm sewers, resulting from precipitation.

Stormwater management basin means an excavation or embankment and related areas designed to retain stormwater runoff. A stormwater management basin may either be normally dry (that is, a detention basin or infiltration basin), retain water in a permanent pool (a retention basin), or be planted mainly with wetland vegetation (most constructed stormwater wetlands).

Stormwater management measure means any structural or nonstructural strategy, practice, technology, process, program, or other method intended to control or reduce stormwater runoff and associated pollutants, or to induce or control the infiltration or groundwater recharge of stormwater or to eliminate illicit or illegal non-stormwater discharges into stormwater conveyances.

Tidal Flood Hazard Area means a flood hazard area, which may be influenced by stormwater runoff from inland areas, but which is primarily caused by the Atlantic Ocean.

Urban Coordinating Council Empowerment Neighborhood means a neighborhood given priority access to State resources through the New Jersey Redevelopment Authority.

Urban Enterprise Zones means a zone designated by the New Jersey Enterprise Zone Authority pursuant to the New Jersey Urban Enterprise Zones Act, N.J.S.A. 52:27H-60 et. seq.

Urban Redevelopment Area is defined as previously developed portions of areas: (1) Delineated on the State Plan Policy Map (SPPM) as the Metropolitan Planning Area (PA1), Designated Centers, Cores or Nodes; (2) Designated as CAFRA Centers, Cores or Nodes; (3) Designated as Urban Enterprise Zones; and (4) Designated as Urban Coordinating Council Empowerment Neighborhoods.

Waters of the State means the ocean and its estuaries, all springs, streams, wetlands, and bodies of surface or ground water, whether natural or artificial, within the boundaries of the State of New Jersey or subject to its jurisdiction.

Wetlands or **wetland** means an area that is inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence

of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation.

19-1.4 General Standards

a Design and Performance Standards for Stormwater Management Measures

1 Stormwater management measures for major development shall be developed to meet the erosion control, groundwater recharge, stormwater runoff quantity, and stormwater runoff quality standards in Subsection 19-1.5. To the maximum extent practicable, these standards shall be met by incorporating nonstructural stormwater management strategies into the design. If these strategies alone are not sufficient to meet these standards, structural stormwater management measures necessary to meet these standards shall be incorporated into the design.

2 The standards in this section apply only to development exceeding the Stormwater Management Threshold outlined in Subsection 19-1.2.c, Applicability, and are intended to minimize the impact of stormwater runoff on water quality and water quantity in receiving water bodies and maintain groundwater recharge. The standards do not apply to new development to the extent that alternative design and performance standards are applicable under a regional stormwater management plan or Water Quality Management Plan adopted in accordance with Department rules.

19-1.5 General Stormwater Management Requirements for Major Development

a The development shall incorporate a maintenance plan for the stormwater management measures incorporated into the design of a major development in accordance with Subsection 19-1.11.

b Stormwater management measures shall avoid adverse impacts of concentrated flow on habitat for threatened and endangered species as documented in the Department' Landscape Project or Natural Heritage Database established under N.J.S.A. 13:1B-15.147 through 15.150, particularly *Helonias bullata* (swamp pink) and/or *Clemmys muhlnebergi* (bog turtle).

c The following linear development projects are exempt from the groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements of Subsections 19-1.5.f and 19-1.5.g:

1. The construction of an underground utility line provided that the disturbed areas are re-vegetated upon completion;

2. The construction of an aboveground utility line provided that the existing conditions are maintained to the maximum extent practicable; and

3. The construction of a public pedestrian access, such as a sidewalk or trail with a maximum width of 14 feet, provided that the access is made of permeable material.

d A waiver from strict compliance from the groundwater recharge, stormwater runoff quantity, and stormwater runoff quality requirements of Subsections 19-1.5.f and 19-1.5.g may be obtained for the enlargement of an existing public roadway or railroad; or the construction or enlargement of a public pedestrian access, provided that the following conditions are met:

1 The applicant demonstrates that there is a public need for the project that cannot be accomplished by any other means;

2 The applicant demonstrates through an alternatives analysis, that through the use of nonstructural and structural stormwater management strategies and measures, the option selected complies with the requirements of Subsections 19-1.5.f and 19-1.5.g to the maximum extent practicable;

3 The applicant demonstrates that, in order to meet the requirements of Subsections 19-1.5.f and 19-1.5.g, existing structures currently in use, such as homes and buildings, would need to be condemned; and

4 The applicant demonstrates that it does not own or have other rights to areas, including the potential to obtain through condemnation lands not falling under 19-1.5.d.3 above within the upstream drainage area of the receiving stream, that would provide additional opportunities to mitigate the requirements of Subsections 19-1.5.f and 19-1.5.g that were not achievable on-site.

e Nonstructural Stormwater Management Strategies

1 To the maximum extent practicable, the standards in Subsections 19-1.5.f and 19-1.5.g shall be met by incorporating nonstructural stormwater management strategies set forth at Subsection 19-1.5.e into the design. The applicant shall identify the nonstructural

measures incorporated into the design of the project. If the applicant contends that it is not feasible for engineering, environmental, or safety reasons to incorporate any nonstructural stormwater management measures identified in Paragraph 2 below into the design of a particular project, the applicant shall identify the strategy considered and provide a basis for the contention.

2 Nonstructural stormwater management strategies incorporated into site design shall:

(a) Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss;

(b) Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces;

(c) Maximize the protection of natural drainage features and vegetation;

(d) Minimize the decrease in the "time of concentration" from pre-construction to post construction. "Time of concentration" is defined as the time it takes for runoff to travel from the hydraulically most distant point of the watershed to the point of interest within a watershed;

(e) Minimize land disturbance including clearing and grading;

(f) Minimize soil compaction;

(g) Provide low-maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers and pesticides;

(h) Provide vegetated open-channel conveyance systems discharging into and through stable vegetated areas;

(i) Provide other source controls to prevent or minimize the use or exposure of pollutants at the site, in order to prevent or minimize the release of those pollutants into stormwater runoff. Such source controls include, but are not limited to:

(i) Site design features that help to prevent accumulation of trash and debris in drainage systems, including features that satisfy Subsection 19.1.5.e.3 below;

(ii) Site design features that help to prevent discharge of trash and debris from drainage systems;

(iii) Site design features that help to prevent and/or contain spills or other harmful accumulations of pollutants at industrial or commercial developments; and

(iv) When establishing vegetation after land disturbance, applying fertilizer in accordance with the requirements established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24- 39 et seq., and implementing rules.

3 Site design features identified under Subsection 19-1.5.e.2(i)(ii) above shall comply with the following standard to control passage of solid and floatable materials through storm drain inlets. For purposes of this paragraph, "solid and floatable materials" means sediment, debris, trash, and other floating, suspended, or settleable solids. For exemptions to this standard see Subsection 19-1.5.e.3(c) below.

(a) Design engineers shall use either of the following grates whenever they use a grate in pavement or another ground surface to collect stormwater from that surface into a storm drain or surface water body under that grate:

(i) The New Jersey Department of Transportation (NJDOT) bicycle safe grate, which is described in Chapter 2.4 of the NJDOT Bicycle Compatible Roadways and Bikeways Planning and Design Guidelines (April 1996); or

(ii) A different grate, if each individual clear space in that grate has an area of no more than seven (7.0) square inches, or is no greater than 0.5 inches across the smallest dimension.

Examples of grates subject to this standard include grates in grate inlets, the grate portion (non-curb opening portion) of combination inlets, grates on storm sewer manholes, ditch grates, trench grates, and grates of spacer bars in slotted drains. Examples of ground surfaces include surfaces of roads (including bridges), driveways, parking areas, bikeways, plazas, sidewalks, lawns, fields, open channels, and stormwater basin floors.

(b) Whenever design engineers use a curb-opening inlet, the clear space in that curb opening (or each individual clear space, if

the curb opening has two or more clear spaces) shall have an area of no more than seven (7.0) square inches, or be no greater than two (2.0) inches across the smallest dimension.

(c) This standard does not apply:

(i) Where the review agency determines that this standard would cause inadequate hydraulic performance that could not practicably be overcome by using additional or larger storm drain inlets that meet these standards;

(ii) Where flows from the water quality design storm as specified in Subsection 19-1.5.g.1 are conveyed through any device (e.g., end of pipe netting facility, manufactured treatment device, or a catch basin hood) that is designed, at a minimum, to prevent delivery of all solid and floatable materials that could not pass through one of the following:

- A rectangular space four and five-eighths inches long and one and one-half inches wide (this option does not apply for outfall netting facilities); or

- A bar screen having a bar spacing of 0.5 inches.

(iii) Where flows are conveyed through a trash rack that has parallel bars with one-inch (1")spacing between the bars, to the elevation of the water quality design storm as specified in Subsection 19-1.5.g.1; or

(iv) Where the New Jersey Department of Environmental Protection determines, pursuant to the New Jersey Register of Historic Places Rules at N.J.A.C. 7:4-7.2(c), that action to meet this standard is an undertaking that constitutes an encroachment or will damage or destroy the New Jersey Register listed historic property.

4 Any land area used as a nonstructural stormwater management measure to meet the performance standards in Subsections 19-1.5.f and 19-1.5.g shall be dedicated to a government agency, subjected to a conservation restriction filed with the appropriate County Clerk's office, or subject to an approved equivalent restriction that ensures that measure or an equivalent stormwater management measure approved by the reviewing agency is maintained in perpetuity.

5 Guidance for nonstructural stormwater management strategies is available in the New Jersey Stormwater Best Management Practices (BMP) Manual. The BMP Manual may be obtained from the address identified in Subsection 19-1.8, or found on the Department's website at www.njstormwater.org.

f Erosion Control, Groundwater Recharge and Runoff Quantity Standards

1 This subsection contains minimum design and performance standards to control erosion, encourage and control infiltration and groundwater recharge, and control stormwater runoff quantity impacts of major development.

(a) The minimum design and performance standards for erosion control are those established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq. and implementing rules.

(b) The minimum design and performance standards for groundwater recharge are as follows:

(i) The design engineer shall, using the assumptions and factors for stormwater runoff and groundwater recharge calculations at Subsection 19-1.6, either:

(1) Demonstrate through hydrologic and hydraulic analysis that the site and its stormwater management measures maintain 100 percent of the average annual pre-construction groundwater recharge volume for the site; or

(2) Demonstrate through hydrologic and hydraulic analysis that the increase of stormwater runoff volume from pre-construction to post-construction for the 2-year storm is infiltrated

(ii) This groundwater recharge requirement does not apply to projects within the "urban redevelopment area," or to projects subject to Subsection 19-1.5.f.1(b)(iii) below.

(iii)The following types of stormwater shall not be recharged:

(1) Stormwater from areas of high pollutant loading. High pollutant loading areas are areas in industrial and

commercial developments where solvents and/or petroleum products are loaded/unloaded, stored, or applied, areas where pesticides are loaded/unloaded or stored; areas where hazardous materials are expected to be present in greater than "reportable quantities" as defined by the United States Environmental Protection Agency (EPA) at 40 CFR 302.4; areas where recharge would be inconsistent with Department approved remedial action work plan or landfill closure plan and areas with high risks for spills of toxic materials, such as gas stations and vehicle maintenance facilities; and

(2) Industrial stormwater exposed to "source material." "Source material" means any material(s) or machinery, located at an industrial facility that is directly or indirectly related to process, manufacturing or other industrial activities, which could be a source of pollutants in any industrial stormwater discharge to groundwater. Source materials include, but are not limited to, raw materials; intermediate products; final products; waste materials; by-products; industrial machinery and fuels, and lubricants, solvents, and detergents that are related to process, manufacturing, or other industrial activities that are exposed to stormwater.

(iv) The design engineer shall assess the hydraulic impact on the groundwater table and design the site so as to avoid adverse hydraulic impacts. Potential adverse hydraulic impacts include, but are not limited to, exacerbating a naturally or seasonally high water table so as to cause surficial ponding, flooding of basements, or interference with the proper operation of subsurface sewage disposal systems and other subsurface structures in the vicinity or down gradient of the groundwater recharge area.

(c) In order to control stormwater runoff quantity impacts, the design engineer shall, using the assumptions and factors for stormwater runoff calculations at Subsection 19-1.6, complete one of the following:

(i) Demonstrate through hydrologic and hydraulic analysis that for stormwater leaving the site, post-construction runoff hydrographs for the two, 10, and 100-year storm events do

not exceed, at any point in time, the pre-construction runoff hydrographs for the same storm events;

(ii) Demonstrate through hydrologic and hydraulic analysis that there is no increase, as compared to the pre-construction condition, in the peak runoff rates of stormwater leaving the site for the two, 10, and 100-year storm events and that the increased volume or change in timing of stormwater runoff will not increase flood damage at or downstream of the site. This analysis shall include the analysis of impacts of existing land uses and projected land uses assuming full development under existing zoning and land use ordinances in the drainage area;

(iii) Design stormwater management measures so that the post-construction peak runoff rates for the 2, 10 and 100 year storm events are 50, 75 and 80 percent, respectively, of the preconstruction peak runoff rates. The percentages apply only to the post-construction stormwater runoff that is attributable to the portion of the site on which the proposed development or project is to be constructed. The percentages shall not be applied to post-construction stormwater runoff into tidal flood hazard areas if the increased volume of stormwater runoff will not increase flood damages below the point of discharge; or

(iv) In tidal flood hazard areas, stormwater runoff quantity analysis in accordance with (i), (ii) and (iii) above shall only be applied if the increased volume of stormwater runoff could increase flood damages below the point of discharge.

2 Any application for a new agricultural development that meets the definition of major development in Subsection 19-1.3 shall be submitted to the appropriate Soil Conservation District for review and approval in accordance with the requirements of this Subsection and any applicable Soil Conservation District guidelines for stormwater runoff quantity and erosion control. For the purposes of this Subsection, "agricultural development" means land uses normally associated with the production of food, fiber and livestock for sale. Such uses do not include the development of land for the processing or sale of food and the manufacturing of agriculturally related products.

g Stormwater Runoff Quality Standards

1 Stormwater management measures shall be designed to reduce the post-construction load of total suspended solids (TSS) in stormwater runoff by 80 percent of the anticipated load from the developed site, expressed as an annual average. Stormwater management measures shall only be required for water quality control if an additional 1/4 acre of impervious surface is being proposed on a development site. The requirement to reduce TSS does not apply to any stormwater runoff in a discharge regulated under a numeric effluent limitation for TSS imposed under the New Jersey Pollution Discharge Elimination System (NJPDES) rules, N.J.A.C. 7:14A, or in a discharge specifically exempt under a NJPDES permit from this requirement. The water quality design storm is 1.25 inches of rainfall in two hours. Water quality calculations shall take into account the distribution of rain from the water quality design storm, as reflected in Table 1. The calculation of the volume of runoff may take into account the implementation of non-structural and structural stormwater management measures.

Table 1: Water Quality Design Storm Distribution

Time (Minutes)	Cumulative Rainfall (Inches)	Time (Minutes)	Cumulative Rainfall (Inches)
0	0.0000	65	0.8917
5	0.0083	70	0.9917
10	0.0166	75	1.0500
15	0.0250	80	1.0840
20	0.0500	85	1.1170
25	0.0750	90	1.1500
30	0.1000	95	1.1750
35	0.1330	100	1.2000
40	0.1660	105	1.2250
45	0.2000	110	1.2334
50	0.2583	115	1.2417
55	0.3583	120	1.2500
60	0.6250		

2 For purposes of TSS reduction calculations, Table 2 below presents the presumed removal rates for certain BMPs designed in accordance with the New Jersey Stormwater Best Management Practices Manual. The BMP Manual may be obtained from the address identified in Subsection 19-1.8, or found on the Department's website at www.njstormwater.org. The BMP Manual and other sources of technical guidance are listed in Subsection 19-

1.8. Total Suspended Solids (TSS) reduction shall be calculated based on the removal rates for the BMPs in Table 2 below. Alternative removal rates and methods of calculating removal rates may be used if the design engineer provides documentation demonstrating the capability of these alternative rates and methods to the review agency. A copy of any approved alternative rate or method of calculating the removal rate shall be provided to the Department at the following address: Division of Watershed Management, New Jersey Department of Environmental Protection, P.O. Box 418 Trenton, New Jersey, 08625-0418.

3 If more than one BMP in series is necessary to achieve the required 80 percent TSS reduction for a site, the applicant shall utilize the following formula to calculate TSS reduction:

$$R = A + B - (A \times B)/100$$

Where

R = total TSS percent load removal from application of both BMPs
A = the TSS percent removal rate applicable to the first BMP
B = the TSS percent removal rate applicable to the second BMP

Table 2: TSS Removal Rates for BMPs

Best Management Practice	TSS Percent Removal Rate
Bioretention Systems	90
Constructed Stormwater Wetland	90
Extended Detention Basin	40-60
Infiltration Structure	80
Manufactured Treatment Device	See Subsection 19-2.7.c
Sand Filter	80
Vegetative Filter Strip	60-80
Wet Pond	50-90

4 If there is more than one onsite drainage area, the 80 percent TSS removal rate shall apply to each drainage area, unless the runoff from the sub-areas converge on site in which case the removal rate can be demonstrated through a calculation using a weighted average.

5 Stormwater management measures shall also be designed to reduce, to the maximum extent feasible, the post-construction nutrient load of the anticipated load from the developed site in stormwater runoff generated from the water quality design storm. In achieving reduction of nutrients to the maximum extent feasible, the design of the site shall include nonstructural strategies and

structural measures that optimize nutrient removal while still achieving the performance standards in Subsections 19-1.5.f and 19-1.5.g.

6 Additional information and examples are contained in the New Jersey Stormwater Best Management Practices Manual, which may be obtained from the address identified in Subsection 19-1.8.

7 In accordance with the definition of FW1 at N.J.A.C. 7:9B-1.4, stormwater management measures shall be designed to prevent any increase in stormwater runoff to waters classified as FW1.

8 Special water resource protection areas shall be established along all waters designated Category One at N.J.A.C. 7:9B, and perennial or intermittent streams that drain into or upstream of the Category One waters as shown on the USGS Quadrangle Maps or in the County Soil Surveys, within the associated HUC14 drainage area. These areas shall be established for the protection of water quality, aesthetic value, exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, and exceptional fisheries significance of those established Category One waters. These areas shall be designated and protected as follows:

(a) The applicant shall preserve and maintain a special water resource protection area in accordance with one of the following:

(i) A 300-foot special water resource protection area shall be provided on each side of the waterway, measured perpendicular to the waterway from the top of the bank outwards or from the centerline of the waterway where the bank is not defined, consisting of existing vegetation or vegetation allowed to follow natural succession is provided.

(ii) Encroachment within the designated special water resource protection area under Subsection 19-1.5.g.8(a)(i) above shall only be allowed where previous development or disturbance has occurred (for example, active agricultural use, parking area or maintained lawn area). The encroachment shall only be allowed where applicant demonstrates that the functional value and overall condition of the special water resource protection area will be maintained to the maximum extent practicable. In no case shall the remaining special water resource protection area

be reduced to less than 150 feet as measured perpendicular to the top of bank of the waterway or centerline of the waterway where the bank is undefined. All encroachments proposed under this subparagraph shall be subject to review and approval by the Department.

(b) All stormwater shall be discharged outside of and flow through the special water resource protection area and shall comply with the Standard for Off-Site Stability in the "Standards For Soil Erosion and Sediment Control in New Jersey," established under the Soil Erosion and Sediment Control Act , N.J.S.A. 4:24-39 et seq.

(c) If stormwater discharged outside of and flowing through the special water resource protection area cannot comply with the Standard For Off-Site Stability in the "Standards for Soil Erosion and Sediment Control in New Jersey," established under the Soil Erosion and Sediment Control Act , N.J.S.A. 4:24-39 et seq., then the stabilization measures in accordance with the requirements of the above standards may be placed within the special water resource protection area, provided that:

(i) Stabilization measures shall not be placed within 150 feet of the Category One waterway;

(ii) Stormwater associated with discharges allowed by this Subsection shall achieve a 95 percent TSS post-construction removal rate;

(iii) Temperature shall be addressed to ensure no impact on the receiving waterway;

(iv) The encroachment shall only be allowed where the applicant demonstrates that the functional value and overall condition of the special water resource protection area will be maintained to the maximum extent practicable;

(v) A conceptual project design meeting shall be held with the appropriate Department staff and Soil Conservation District staff to identify necessary stabilization measures; and

(vi) All encroachments proposed under this Subsection shall be subject to review and approval by the Department.

(d) A stream corridor protection plan may be developed by a regional stormwater management planning committee as an element of a regional stormwater management plan, or by a municipality through an adopted municipal stormwater management plan. If a stream corridor protection plan for a waterway subject to Subsection 19-1.5.g.8 has been approved by the Department of Environmental Protection, then the provisions of the plan shall be the applicable special water resource protection area requirements for that waterway. A stream corridor protection plan for a waterway subject to Subsection 19-1.5.g.8 shall maintain or enhance the current functional value and overall condition of the special water resource protection area as defined in 19-1.5.g.8.(a)(i) above. In no case shall a stream corridor protection plan allow the reduction of the Special Water Resource Protection Area to less than 150 feet as measured perpendicular to the waterway subject to this subsection.

(e) Paragraph 19-1.5.g.8 does not apply to the construction of one individual single family dwelling that is not part of a larger development on a lot receiving preliminary or final subdivision approval on or before February 2, 2004, provided that the construction begins on or before February 2, 2009.

19-1.6 Calculation of Stormwater Runoff and Groundwater Recharge

a Stormwater runoff shall be calculated in accordance with the following:

1 The design engineer shall calculate runoff using one of the following methods:

(a) The USDA Natural Resources Conservation Service (NRCS) methodology, including the NRCS Runoff Equation and Dimensionless Unit Hydrograph, as described in the NRCS National Engineering Handbook Section 4 – Hydrology and Technical Release 55 – Urban Hydrology for Small Watersheds; or

(b) The Rational Method for peak flow and the Modified Rational Method for hydrograph computations.

2 For the purpose of calculating runoff coefficients and groundwater recharge, there is a presumption that the pre-construction condition of a site or portion thereof is a wooded land use with good

hydrologic condition. The term "runoff coefficient" applies to both the NRCS methodology at Subsection 19-1.6.a.1(a) and the Rational and Modified Rational Methods at Subsection 19-1.6.a.1(b). A runoff coefficient or a groundwater recharge land cover for an existing condition may be used on all or a portion of the site if the design engineer verifies that the hydrologic condition has existed on the site or portion of the site for at least five years without interruption prior to the time of application. If more than one land cover have existed on the site during the five years immediately prior to the time of application, the land cover with the lowest runoff potential shall be used for the computations. In addition, there is the presumption that the site is in good hydrologic condition (if the land use type is pasture, lawn, or park), with good cover (if the land use type is woods), or with good hydrologic condition and conservation treatment (if the land use type is cultivation).

3 In computing pre-construction stormwater runoff, the design engineer shall account for all significant land features and structures, such as ponds, wetlands, depressions, hedgerows, or culverts that may reduce pre-construction stormwater runoff rates and volumes.

4 In computing stormwater runoff from all design storms, the design engineer shall consider the relative stormwater runoff rates and/or volumes of pervious and impervious surfaces separately to accurately compute the rates and volume of stormwater runoff from the site. To calculate runoff from unconnected impervious cover, urban impervious area modifications as described in the NRCS Technical Release 55 – Urban Hydrology for Small Watersheds and other methods may be employed.

5 If the invert of the outlet structure of a stormwater management measure is below the flood hazard design flood elevation as defined at N.J.A.C. 7:13, the design engineer shall take into account the effects of tailwater in the design of structural stormwater management measures.

b Groundwater recharge may be calculated in accordance with the following:

1 The New Jersey Geological Survey Report GSR-32 *A Method for Evaluating Ground-Water Recharge Areas in New Jersey*, incorporated herein by reference as amended and supplemented. Information regarding the methodology is available from the New

Jersey Stormwater Best Management Practices Manual; at http://www.state.nj.us/dep/njgs/; or at New Jersey Geological Survey, 29 Arctic Parkway, P.O. Box 427 Trenton, New Jersey 08625-0427; (609) 984-6587.

19-1.7 Standards for Structural Stormwater Management Measures

a Standards for structural stormwater management measures are as follows:

1 Structural stormwater management measures shall be designed to take into account the existing site conditions, including, for example, environmentally critical areas, wetlands; flood-prone areas; slopes; depth to seasonal high water table; soil type, permeability and texture; drainage area and drainage patterns; and the presence of solution-prone carbonate rocks (limestone).

2 Structural stormwater management measures shall be designed to minimize maintenance, facilitate maintenance and repairs, and ensure proper functioning. Trash racks shall be installed at the intake to the outlet structure as appropriate, and shall have parallel bars with one-inch (1") spacing between the bars to the elevation of the water quality design storm. For elevations higher than the water quality design storm, the parallel bars at the outlet structure shall be spaced no greater than one-third (1/3) the width of the diameter of the orifice or one-third (1/3) the width of the weir, with a minimum spacing between bars of one-inch and a maximum spacing between bars of six inches. In addition, the design of trash racks must comply with the requirements of Subsection 19-1.9.d.

3 Structural stormwater management measures shall be designed, constructed, and installed to be strong, durable, and corrosion resistant. Measures that are consistent with the relevant portions of the Residential Site Improvement Standards at N.J.A.C. 5:21-7.3, 7.4, and 7.5 shall be deemed to meet this requirement.

4 At the intake to the outlet from the stormwater management basin, the orifice size shall be a minimum of two and one-half inches in diameter.

5 Stormwater management basins shall be designed to meet the minimum safety standards for stormwater management basins at Subsection 19-1.9.

b Stormwater management measure guidelines are available in the New Jersey Stormwater Best Management Practices Manual. Other

stormwater management measures may be utilized provided the design engineer demonstrates that the proposed measure and its design will accomplish the required water quantity, groundwater recharge and water quality design and performance standards established by Subsection 19-1.5 of this chapter.

c Manufactured treatment devices may be used to meet the requirements of Subsection 19-1.5 of this chapter, provided the pollutant removal rates are verified by the New Jersey Corporation for Advanced Technology and certified by the Department.

19-1.8 Sources for Technical Guidance

a Technical guidance for stormwater management measures can be found in the documents listed at 1 and 2 below, which are available from Maps and Publications, New Jersey Department of Environmental Protection, 428 East State Street, P.O. Box 420, Trenton, New Jersey, 08625; Telephone (609) 777-1038.

1 Guidelines for stormwater management measures are contained in the New Jersey Stormwater Best Management Practices Manual, as amended. Information is provided on stormwater management measures such as: bio-retention systems, constructed stormwater wetlands, dry wells, extended detention basins, infiltration structures, manufactured treatment devices, pervious paving, sand filters, vegetative filter strips, and wet ponds.

2 The New Jersey Department of Environmental Protection Stormwater Management Facilities Maintenance Manual, as amended.

b Additional technical guidance for stormwater management measures can be obtained from the following:

1 The "Standards for Soil Erosion and Sediment Control in New Jersey" promulgated by the State Soil Conservation Committee and incorporated into N.J.A.C. 2:90. Copies of these standards may be obtained by contacting the State Soil Conservation Committee or any of the Soil Conservation Districts listed in N.J.A.C. 2:90-1.3(a)4. The location, address, and telephone number of each Soil Conservation District may be obtained from the State Soil Conservation Committee, P.O. Box 330, Trenton, New Jersey 08625; (609) 292-5540;

2 The Rutgers Cooperative Extension Service, 732-932-9306; and

3 The Freehold Soil Conservation Districts, 4000 Kozlowski Road, Freehold New Jersey, 07728, (732)683-8500.

19-1.9 Safety Standards for Stormwater Management Basins

a This section sets forth requirements to protect public safety through the proper design and operation of stormwater management basins. This section applies to any new stormwater management basin.

b Requirements for Trash Racks, Overflow Grates and Escape Provisions

1 A trash rack is a device designed to catch trash and debris and prevent the clogging of outlet structures. Trash racks shall be installed at the intake to the outlet from the stormwater management basin to ensure proper functioning of the basin outlets in accordance with the following:

(a) The trash rack shall have parallel bars, with no greater than six inch spacing between the bars.

(b) The trash rack shall be designed so as not to adversely affect the hydraulic performance of the outlet pipe or structure.

(c) The average velocity of flow through a clean trash rack is not to exceed 2.5 feet per second under the full range of stage and discharge. Velocity is to be computed on the basis of the net area of opening through the rack.

(d) The trash rack shall be constructed and installed to be rigid, durable, and corrosion resistant, and shall be designed to withstand a perpendicular live loading of 300 lbs/ft sq.

2 An overflow grate is designed to prevent obstruction of the overflow structure. If an outlet structure has an overflow grate, such grate shall meet the following requirements:

(a) The overflow grate shall be secured to the outlet structure but removable for emergencies and maintenance.

(b) The overflow grate spacing shall be no less than two inches across the smallest dimension.

(c) The overflow grate shall be constructed and installed to be rigid, durable, and corrosion resistant, and shall be designed to withstand a perpendicular live loading of 300 lbs./ft sq.

3 For purposes of this paragraph, escape provisions means the permanent installation of ladders, steps, rungs, or other features that provide easily accessible means of egress from stormwater management basins. Stormwater management basins shall include escape provisions as follows:

(a) If a stormwater management basin has an outlet structure, escape provisions shall be incorporated in or on the structure. With the prior approval of the reviewing agency identified in Subsection 19-1.9.c a freestanding outlet structure may be exempted from this requirement.

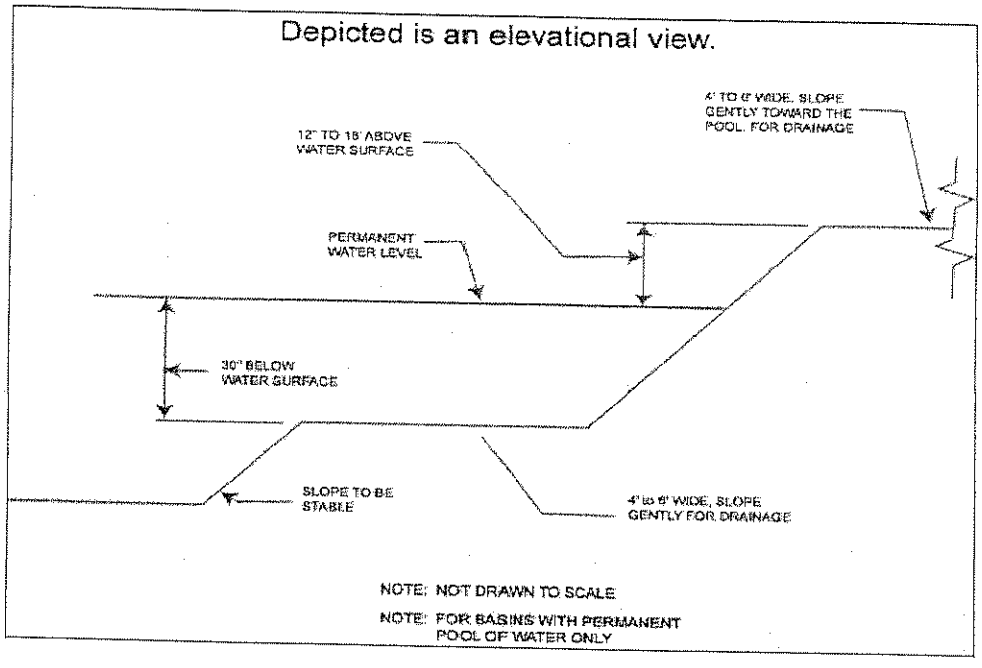
(b) Safety ledges shall be constructed on the slopes of all new stormwater management basins having a permanent pool of water deeper than two and one-half feet. Such safety ledges shall be comprised of two steps. Each step shall be four to six feet in width. One step shall be located approximately two and one-half feet below the permanent water surface, and the second step shall be located one to one and one-half feet above the permanent water surface. See Subsection 19-1.9.d for an illustration of safety ledges in a stormwater management basin.

(c) In new stormwater management basins, the maximum interior slope for an earthen dam, embankment, or berm shall not be steeper than 3 horizontal to 1 vertical.

c Variance or Exemption from Safety Standards

1 A variance or exemption from the safety standards for stormwater management basins may be granted only upon a written finding by the appropriate reviewing agency (municipality, county or Department) that the variance or exemption will not constitute a threat to public safety.

d Illustration of Safety Ledges in a New Stormwater Management Basin



19-1.10 Requirements for a Site Development Stormwater Plan

a Submission of Site Development Stormwater Plan

1 Whenever an applicant seeks municipal approval of a development subject to this ordinance, the applicant shall submit all of the required components of the Checklist for the Site Development Stormwater Plan at Subsection 19-1.10.c below as part of the submission of the applicant's application for subdivision or site plan approval.

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

3 The applicant shall submit 15 copies of the materials listed in the checklist for site development stormwater plans in accordance with Subsection 19-1.10.c of this ordinance.

b Site Development Stormwater Plan Approval

The applicant's Site Development project shall be reviewed as a part of the subdivision, site plan, or development application review process by the Planning Board, Zoning Board of Adjustment or official from which municipal approval is sought. The Board and/or Zoning Officer

shall consult the Borough Engineer or other such engineer (as appropriate) to determine if all of the checklist requirements have been satisfied and to determine if the project meets the standards set forth in this ordinance.

c Checklist Requirements

The following information shall be required:

1 Topographic Base Map

(a) The reviewing engineer may require upstream tributary drainage system information as necessary. It is recommended that the topographic base map of the site be submitted which extends a minimum of 200 feet beyond the limits of the proposed development, at a scale of 1"=200' or greater, showing 2- foot contour intervals. The map as appropriate may indicate the following: existing surface water drainage, shorelines, steep slopes, soils, erodible soils, perennial or intermittent streams that drain into or upstream of the Category One waters, wetlands and flood plains along with their appropriate buffer strips, marshlands and other wetlands, pervious or vegetative surfaces, existing man-made structures, roads, bearing and distances of property lines, and significant natural and manmade features not otherwise shown.

2 Environmental Site Analysis

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

3 Project Description and Site Plan(s)

(a) A map (or maps) at the scale of the topographical base map indicating the location of existing and proposed buildings, roads, parking areas, utilities, structural facilities for stormwater management and sediment control, and other permanent structures. The map(s) shall also clearly show areas where alterations occur in the natural terrain and cover, including lawns and other landscaping, and seasonal high

ground water elevations. A written description of the site plan and justification of proposed changes in natural conditions may also be provided.

4 Land Use Planning and Source Control Plan

(a) This plan shall provide a demonstration of how the goals and standards of Subsections 19-1.4 through 19-1.7 are being met. The focus of this plan shall be to describe how the site is being developed to meet the objective of controlling groundwater recharge, stormwater quality and stormwater quantity problems at the source by land management and source controls whenever possible.

5 Stormwater Management Facilities Map

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

(i) Total area to be paved or built upon, proposed surface contours, land area to be occupied by the stormwater management facilities and the type of vegetation thereon, and details of the proposed plan to control and dispose of stormwater.

(ii) Details of all stormwater management facility designs, during and after construction, including discharge provisions, discharge capacity for each outlet at different levels of detention and emergency spillway provisions with maximum discharge capacity of each spillway.

6 Calculations

(a) Comprehensive hydrologic and hydraulic design calculations for the pre-development and post-development conditions for the design storms specified in Subsection 19-1.5 of this ordinance.

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

suitability and distribution of soils present at the location of the control measure.

7 Maintenance and Repair Plan

(a) The design and planning of the stormwater management facility shall meet the maintenance requirements of Subsection 19-1.11.

8 Waiver from Submission Requirements

(a) The municipal official or board reviewing an application under this ordinance may, in consultation with the municipal engineer, waive submission of any of the requirements in Subsections 19-1.10.c.1 through 19-1.10.c.6 of this Section when it can be demonstrated that the information requested is impossible to obtain or it would create a hardship on the applicant to obtain and its absence will not materially affect the review process.

19-1.11 <u>Maintenance and Repair</u>

a Applicability

1 Projects subject to review as in Subsection 19-1.2.c of this ordinance shall comply with the requirements of Subsections 19-1.11.b and 19-1.11.c.

b General Maintenance

1 The design engineer shall prepare a maintenance plan for the stormwater management measures incorporated into the design of a major development.

2 The maintenance plan shall contain specific preventative maintenance tasks and schedules; cost estimates, including estimated cost of sediment, debris, or trash removal; and the name, address, and telephone number of the person or persons responsible for preventative and corrective maintenance (including replacement). Maintenance guidelines for stormwater management measures are available in the New Jersey Stormwater Best Management Practices Manual. If the maintenance plan identifies a person other than the developer (for example, a public agency or homeowners' association) as having the responsibility for maintenance, the plan shall include documentation of such

person's agreement to assume this responsibility, or of the developer's obligation to dedicate a stormwater management facility to such person under an applicable ordinance or regulation.

3 Responsibility for maintenance shall not be assigned or transferred to the owner or tenant of an individual property in a residential development or project, unless such owner or tenant owns or leases the entire residential development or project.

4 If the person responsible for maintenance identified under Subsection 19-1.11.b above is not a public agency, the maintenance plan and any future revisions based on Subsection 19-1.11.b.7 below shall be recorded upon the deed of record for each property on which the maintenance described in the maintenance plan must be undertaken.

5 Preventative and corrective maintenance shall be performed to maintain the function of the stormwater management measure, including repairs or replacement to the structure; removal of sediment, debris, or trash; restoration of eroded areas; snow and ice removal; fence repair or replacement; restoration of vegetation; and repair or replacement of non-vegetated linings.

6 The person responsible for maintenance identified under Subsection 19-1.11.b.2 above shall maintain a detailed log of all preventative and corrective maintenance for the structural stormwater management measures incorporated into the design of the development, including a record of all inspections and copies of all maintenance-related work orders.

7 The person responsible for maintenance identified under Subsection 19-1.11.b.2 above shall evaluate the effectiveness of the maintenance plan at least once per year and adjust the plan and the deed as needed.

8 The person responsible for maintenance identified under Subsection 19-1.11.b.2 above shall retain and make available, upon request by any public entity with administrative, health, environmental, or safety authority over the site, the maintenance plan and the documentation required by Subsections 19-1.11.b.6 and 19-1.11.b.7 above.

9 The requirements of Subsections 19-1.11.b.3 and 19-1.11.b.4 do not apply to stormwater management facilities that are dedicated to and accepted by the municipality or another governmental agency.

10 In the event that the stormwater management facility becomes a danger to public safety or public health, or if it is in need of maintenance or repair, the municipality shall so notify the responsible person in writing. Upon receipt of that notice, the responsible person shall have fourteen (14) days to effect maintenance and repair of the facility in a manner that is approved by the municipal engineer or his designee. The municipality, in its discretion, may extend the time allowed for effecting maintenance and repair for good cause. If the responsible person fails or refuses to perform such maintenance and repair, the Borough may immediately proceed to do so and shall bill the cost thereof to the responsible person.

c Nothing in this Section shall preclude the municipality in which the major development is located from requiring the posting of a performance or maintenance guarantee in accordance with N.J.S.A. 40:55D-53.

19-2.13 Violations and Penalties

a Any person who violates any provision of this chapter shall, upon conviction thereof in Municipal Court, be punishable by imposition of a fine not less than $100.00 nor more than $2000.00.

b Each instance of engaging in a separate regulated activity, in violation of this chapter shall be deemed a separate offense.

c In addition, the Borough may institute civil action for injunctive or other relief to enforce the provisions of this chapter.

BE IT FURTHER ORDAINED, that if any provision, paragraph, section or subsection of this chapter be found unconstitutional or invalid by a court of competent jurisdiction, the remaining provisions of this chapter shall remain in full force and effect and shall have continuing validity; and

BE IT FURTHER ORDAINED, that all ordinances or parts of ordinances inconsistent with this ordinance are hereby repealed to the extent of such inconsistency; and

BE IT FURTHER ORDAINED, that the Borough Clerk is hereby directed, upon adoption of this Ordinance after public hearing thereon, to publish notice of the passage thereof and to file a copy of this ordinance as finally adopted with the Monmouth County Planning Board as required by N.J.S. 40:55D-16, and the Clerk shall also forthwith transmit a copy of this ordinance after final passage to the Borough Tax Assessor as required by N.J.S. 40:49-2.1; and

BE IT FURTHER ORDAINED, that this ordinance shall take effect immediately upon the approval by the County review agency, or sixty (60) days from the receipt of the ordinance by the County review agency if the county review agency should fail to act.

ATTEST:

Mary Sabik

Mary Sabik, Borough Clerk

APPROVAL:

Richard W. Ellison

Richard W. Ellison, Mayor

INTRODUCED ON FIRST READING: FEB 16 2006

FINAL ADOPTION: MAR 16 2006

NOTICE OF PENDING ORDINANCE

ORDINANCE NO. 2006-76

THIS ORDINANCE, THE SUMMARY TERMS OF WHICH ARE INCLUDED HEREIN, WAS INTRODUCED AND PASSED UPON FIRST READING AT A MEETING OF THE GOVERNING BODY OF THE BOROUGH OF UNION BEACH, IN THE STATE OF NEW JERSEY ON: THURSDAY, FEBRUARY 16TH, 2006.

IT WILL BE FURTHER CONSIDERED FOR FINAL PASSAGE, AFTER PUBLIC HEARING THEREON, AT A MEETING OF THE GOVERNING BODY TO BE HELD ON: THURSDAY, MARCH 16TH,2006 ,COMMENCING AT 8:00 P.M. O'CLOCK, AT THE MUNICIPAL BUILDING, COUNCIL CHAMBERS, 650 POOLE AVENUE, UNION BEACH, NEW JERSEY.

DURING THE WEEK PRIOR TO AND UP TO AND INCLUDING THE DATE OF SUCH MEETING, COPIES OF THE FULL ORDINANCE WILL BE AVAILABLE, AT NO COST, AND DURING REGULAR BUSINESS HOURS AT THE MUNICIPAL CLERK'S OFFICE, FOR THE MEMBERS OF THE GENERAL PUBLIC WHO SHALL REQUEST THE SAME.

THE SUMMARY OF THE TERMS OF SUCH ORDINANCE FOLLOWS:

TITLE: AN ORDINANCE AMENDING AN ORDINANCE ENTITLED "THE REVISED GENERAL ORDINANCES OF THE BOROUGH OF UNION BEACH, 1980," ENACTING CHAPTER XIX, (19) ENVIRONMENTAL PROTECTION, SECTION 1, 'STORMWATER MANAGEMENT AND CONTROL.'

PURPOSE: FLOOD CONTROL, GROUNDWATER RECHARGE, AND POLLUTANT REDUCTION THROUGH NONSTRUCTURAL OR LOW IMPACT TECHNIQUES SHALL BE EXPLORED BEFORE RELYING ON STRUCTURAL BEST MANAGEMENT PRACTICES, (BMPs) STRUCTURAL BMPs SHOULD BE INTEGRATED WITH NON-STRUCTURAL STORMWATER MANAGEMENT MEASURES AND PROPER MAINTENANCE PLANS. NONSTRUCTURAL MEASURES INCLUDE BOTH ENVIRONMENTALLY SENSITIVE SITE DESIGN AND SOURCE CONTROLS THAT PREVENT POLLUTANTS FROM BEING PLACED ON THE SITE. SOURCE CONTROL PLANS

(CONTINUED)

NOTICE OF PENDING ORDINANCE: (CONT'D.)

ORDINANCE NO: 2006-76:

PURPOSE: SHOULD BE DEVELOPED BASED UPON PHYSICAL SITE CONDITIONS AND THE ORIGIN, NATURE, AND THE ANTICIPATED LOADING OF POTENTIAL POLLUTANTS. MULTIPLE STORMWATER MANAGEMENT BMPs MAY BE NECESSARY TO ACHIEVE THE ESTABLISHED PERFORMANCE STANDARDS FOR WATER QUALITY, QUANTITY, AND GROUNDWATER RECHARGE.
IT IS THE PURPOSE OF THIS ORDINANCE TO ESTABLISH MINIMUM STORMWATER MANAGEMENT REQUIREMENTS AND CONTROLS FOR DEVELOPMENT, ETC.

THIS NOTICE IS PUBLISHED PURSUANT TO N.J.S.A. 40A:2-17.

PLEASE PUBLISH ONE TIME:

THURSDAY, MARCH 2ND, 2006

Mary Sabik

MARY SABIK, MUNICIPAL CLERK
BOROUGH OF UNION BEACH

ADVERTISEMENT: THE COURIER

PLEASE FURNISH AFFIDAVIT OF PUBLICATION

VIA FAX ON: FRIDAY, FEBRUARY 24, 2006

ORDINANCE NO. 2006- 86:

AN ORDINANCE AMENDING AN ORDINANCE ENTITLED "THE REVISED GENERAL ORDINANCES OF THE BOROUGH OF UNION BEACH, 1980," CHAPTER XIX, ENVIRONMENTAL PROTECTION, SECTION 1, STORMWATER MANAGEMENT AND CONTROL.

BE IT ORDAINED BY THE MAYOR AND COUNCIL OF THE BOROUGH OF UNION BEACH that Chapter XIX, Environmental Protection, Section 1, Stormwater Management and Control, is hereby amended as follows:

19-1.1 Title

Unchanged

19-1.2 Scope and Purpose

a. Policy Statement

Flood control, groundwater recharge, and pollutant reduction through nonstructural or low impact techniques shall be explored before relying on structural Best Management Practices (BMPs). Structural BMPs should be integrated with nonstructural stormwater management measures and proper maintenance plans. Nonstructural measures include both environmentally sensitive site design and source controls that prevent pollutants from being placed on the site. Source control plans should be developed based upon physical site conditions and the origin, nature, and the anticipated loading of potential pollutants. Multiple stormwater management BMPs may be necessary to achieve the established performance standards for water quality, quantity, and groundwater recharge.

b. Purpose

It is the purpose of this section to establish minimum stormwater management requirements and controls for development.

Certified A True Copy
Mary Sabik
Mary Sabik Boro. Clerk

c. Applicability

This section shall be applicable to all development which:

1. Requires a development permit as defined in Chapter XIII of the Code of the Borough of Union Beach; and/or

2. Requires Site Plan or subdivision approval as defined in Chapter XIII of the Code of the Borough of Union Beach; and/or

3. Constitutes a major development as defined by N.J.A.C. 7:8-1.2 et seq.

d. Compatibility with Other Permit and Ordinance Requirements

Development approvals issued pursuant to this section are to be considered an integral part of development approvals under the development permit, subdivision and site plan review process and do not relieve the applicant of the responsibility to secure required permits or approvals for activities regulated by any other applicable code, rule, act, or ordinance. In their interpretation and application, the provisions of this chapter shall be held to be the minimum requirements for the promotion of the public health, safety, and general welfare. This section is not intended to interfere with, abrogate, or annul any other ordinance, rule or regulation, statute, or other provision of law except that, where any provision of this section imposes restrictions different from those imposed by any other ordinance, rule or regulation, or other provision of law, the more restrictive provisions or higher standards shall control.

19-1.3 Definitions and Word Usage

For the purpose of this section, the following terms, phrases, words and their derivations shall have the meaning given herein. When not inconsistent with the contest, words used in the present tense include the future, works in the plural number include the singular and words in the singular number include the plural number. The word[k] "shall" is always mandatory and not merely directory.

Unless specifically defined below, words or phrases used in this section shall be interpreted so as to give them the meaning they have in common usage and to give this section its most reasonable application. The definitions below are the same as or based on the corresponding definitions in the Stormwater Management Rules at N.J.A.C. 7:8-1.2.

CAFRA Planning Map means the geographic depiction of the boundaries for coastal Planning Areas, CAFRA Centers, CAFRA Cores and CAFRA Nodes pursuant to N.J.A.C. 7:7E-5B.3.

CAFRA Centers, Cores or Nodes means those areas within boundaries accepted by the Department pursuant to N.J.A.C. 7:8E-5B.

Compaction means the increase in soil bulk density.

Core means a pedestrian-oriented area of commercial and civic uses serving the surrounding municipality, generally including housing and access to public transportation.

County review agency means an agency designated by the County Board of Chosen Freeholders to review municipal stormwater management plans and implementing ordinance(s). The county review agency may either be:

A county planning agency; or

A county water resource association created under N.J.S.A 58:16A-55.5, if the ordinance or resolution delegates authority to approve, conditionally approve, or disapprove municipal stormwater management plans and implementing ordinances.

Department means the New Jersey Department of Environmental Protection.

Designated Center means a State Development and Redevelopment Plan Center as designated by the State Planning Commission such as urban, regional, town, village, or hamlet.

Design engineer means a person professionally qualified and duly licensed in New Jersey to perform engineering services that may include, but not necessarily be limited to, development of project requirements, creation and development of project design and preparation of drawings and specifications.

Development means the division of a parcel of land into two or more parcels, the construction, reconstruction, conversion, structural alteration, relocation or enlargement of any building or structure, any mining excavation or landfill, and any use or change in the use of any building or other structure, or land or extension of use of land, by any person, for which permission is required under the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq. In the case of development of agricultural lands, development means: any activity that requires a State permit; any activity reviewed by the County Agricultural Board (CAB) and the State Agricultural Development Committee (SADC), and municipal review of any activity not exempted by the Right to Farm Act , N.J.S.A 4:1C-1 et seq.

Drainage area means a geographic area within which stormwater, sediments, or dissolved materials drain to a particular receiving water body or to a particular point along a receiving water body.

Environmentally critical areas means an area or feature which is of significant environmental value, including but not limited to: stream corridors; natural heritage priority sites; habitat of endangered or threatened species; large areas of contiguous open space or upland forest; steep slopes; and well head protection and groundwater recharge areas. Habitats of endangered or threatened species are identified using the Department's Landscape Project as approved by the Department's Endangered and Non-game Species Program.

Empowerment Neighborhood means a neighborhood designated by the Urban Coordinating Council "in consultation and conjunction with" the New Jersey Redevelopment Authority pursuant to N.J.S.A 55:19-69.

Erosion means the detachment and movement of soil or rock fragments by water, wind, ice or gravity.

Impervious surface means a surface that has been covered with a layer of material so that it is highly resistant to infiltration by water.

Infiltration is the process by which water seeps into the soil from precipitation.

Major development means any development that provides for ultimately disturbing one or more acres of land or increasing impervious surface by one-quarter acre or more. Disturbance for the purpose of this rule is the placement of impervious surface or exposure and/or movement of soil or bedrock or clearing, cutting, or removing of vegetation.

Municipality means any City, Borough, Town, Township, or Village.

Node means an area designated by the State Planning Commission concentrating facilities and activities which are not organized in a compact form.

Nutrient means a chemical element or compound, such as nitrogen or phosphorus, which is essential to and promotes the development of organisms.

Person means any individual, corporation, company, partnership, firm, association, Borough of Union Beach, or political subdivision of this State subject to municipal jurisdiction pursuant to the Municipal Land Use Law, N.J.S.A. 40:55D-1 et seq.

Pollutant means any dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, refuse, oil, grease, sewage sludge, munitions,

chemical wastes, biological materials, medical wastes, radioactive substance (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.), thermal waste, wrecked or discarded equipment, rock, sand, cellar dirt, industrial, municipal, agricultural, and construction waste or runoff, or other residue discharged directly or indirectly to the land, ground waters or surface waters of the State, or to a domestic treatment works. "Pollutant" includes both hazardous and non-hazardous pollutants.

Recharge means the amount of water from precipitation that infiltrates into the ground and is not evapo-transpired.

Sediment means solid material, mineral or organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water or gravity as a product of erosion.

Site means the lot or lots upon which a development is to occur or has occurred.

Soil means all unconsolidated mineral and organic material of any origin.

State Development and Redevelopment Plan Metropolitan Planning Area (PA1) means an area delineated on the State Plan Policy Map and adopted by the State Planning Commission that is intended to be the focus for much of the state's future redevelopment and revitalization efforts.

State Plan Policy Map is defined as the geographic application of the State Development and Redevelopment Plan's goals and statewide policies, and the official map of these goals and policies.

Stormwater means water resulting from precipitation (including rain and snow) that runs off the land's surface, is transmitted to the subsurface, or is captured by separate storm sewers or other sewage or drainage facilities, or conveyed by snow removal equipment.

Stormwater runoff means water flow on the surface of the ground or in storm sewers, resulting from precipitation.

Stormwater management basin means an excavation or embankment and related areas designed to retain stormwater runoff. A stormwater management basin may either be normally dry (that is, a detention basin or infiltration basin), retain water in a permanent pool (a retention basin), or be planted mainly with wetland vegetation (most constructed stormwater wetlands).

Stormwater management measure means any structural or nonstructural strategy, practice, technology, process, program, or other method intended to control or reduce stormwater runoff and associated pollutants, or to induce or

control the infiltration or groundwater recharge of stormwater or to eliminate illicit or illegal non-stormwater discharges into stormwater conveyances.

Tidal Flood Hazard Area means a flood hazard area, which may be influenced by stormwater runoff from inland areas, but which is primarily caused by the Atlantic Ocean.

Urban Coordinating Council Empowerment Neighborhood means a neighborhood given priority access to State resources through the New Jersey Redevelopment Authority.

Urban Enterprise Zones means a zone designated by the New Jersey Enterprise Zone Authority pursuant to the New Jersey Urban Enterprise Zones Act, N.J.S.A. 52:27H-60 et. seq.

Urban Redevelopment Area is defined as previously developed portions of areas: (1) Delineated on the State Plan Policy Map (SPPM) as the Metropolitan Planning Area (PA1), Designated Centers, Cores or Nodes; (2) Designated as CAFRA Centers, Cores or Nodes; (3) Designated as Urban Enterprise Zones; and (4) Designated as Urban Coordinating Council Empowerment Neighborhoods.

Waters of the State means the ocean and its estuaries, all springs, streams, wetlands, and bodies of surface or ground water, whether natural or artificial, within the boundaries of the State of New Jersey or subject to its jurisdiction.

Wetlands or **wetland** means an area that is inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation.

19-1.4 — 1.9

Unchanged

19-1.10 <u>Requirements for a Site Development Stormwater Plan</u>

a Submission of Site Development Stormwater Plan

1 Whenever an applicant seeks municipal approval of a development subject to this ordinance, the applicant shall submit all of the required components of the Checklist for the Site Development Stormwater Plan at Subsection 19-1.10.c below as part of the submission of the applicant's application for subdivision or site plan approval.

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

3 The applicant shall submit 15 copies of the materials listed in the checklist for site development stormwater plans in accordance with Subsection 19-1.10.c of this ordinance.

b Site Development Stormwater Plan Approval

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

c Checklist Requirements

The following information shall be required:

1 Topographic Base Map

(a) The reviewing engineer may require upstream tributary drainage system information as necessary. It is recommended that the topographic base map of the site be submitted which extends a minimum of 200 feet beyond the limits of the proposed development, at a scale of 1"=200' or greater, showing 2- foot contour intervals. The map as appropriate may indicate the following: existing surface water drainage, shorelines, steep slopes, soils, erodible soils, perennial or intermittent streams that drain into or upstream of the Category One waters, wetlands and flood plains along with their appropriate buffer strips, marshlands and other wetlands, pervious or vegetative surfaces, existing man-made structures, roads, bearing and distances of property lines, and significant natural and manmade features not otherwise shown.

2 Environmental Site Analysis

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

3 Project Description and Site Plan(s)

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

4 Land Use Planning and Source Control Plan

(a) This plan shall provide a demonstration of how the goals and standards of Subsections 19-1.4 through 19-1.7 are being met. The focus of this plan shall be to describe how the site is being developed to meet the objective of controlling groundwater recharge, stormwater quality and stormwater quantity problems at the source by land management and source controls whenever possible.

5 Stormwater Management Facilities Map

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

(i) Total area to be paved or built upon, proposed surface contours, land area to be occupied by the stormwater management facilities and the type of vegetation thereon, and details of the proposed plan to control and dispose of stormwater.

(ii) Details of all stormwater management facility designs, during and after construction, including discharge provisions, discharge capacity for each outlet at different levels of detention and emergency spillway provisions with maximum discharge capacity of each spillway.

6 Calculations

(a) Comprehensive hydrologic and hydraulic design calculations for the pre-development and post-development conditions for the design storms specified in Subsection 19-1.5 of this ordinance.

(b) When the proposed stormwater management control measures (e.g., infiltration basins) depend on the hydrologic properties of soils, then a

soils report shall be submitted. The soils report shall be based on onsite boring logs or soil pit profiles. The number and location of required soil borings or soil pits shall be determined based on what is needed to determine the suitability and distribution of soils present at the location of the control measure.

7 Maintenance and Repair Plan

(a) The design and planning of the stormwater management measures and facilities shall meet the maintenance requirements of Subsection 19-1.11.

8 Waiver from Submission Requirements

(a) The municipal official or board reviewing an application under this ordinance may, in consultation with the municipal engineer, waive submission of any of the requirements in Subsections 19-1.10.c.1 through 19-1.10.c.6 of this Section when it can be demonstrated that the information requested is impossible to obtain or it would create a hardship on the applicant to obtain and its absence will not materially affect the review process.

19-1.11 Maintenance and Repair

Unchanged

19-1.12[2.13] Violations and Penalties

a Any person who violates any provision of this chapter shall, upon conviction thereof in Municipal Court, be punishable by imposition of a fine not less than $100.00 nor more than $2000.00.

b Each instance of engaging in a separate regulated activity, in violation of this chapter shall be deemed a separate offense.

c In addition, the Borough may institute civil action for injunctive or other relief to enforce the provisions of this chapter.

BE IT FURTHER ORDAINED, that if any provision, paragraph, section or subsection of this chapter be found unconstitutional or invalid by a court of competent jurisdiction, the remaining provisions of this chapter shall remain in full force and effect and shall have continuing validity; and

BE IT FURTHER ORDAINED, that all ordinances or parts of ordinances inconsistent with this ordinance are hereby repealed to the extent of such inconsistency; and

BE IT FURTHER ORDAINED, that the Borough Clerk is hereby directed, upon adoption of this Ordinance after public hearing thereon, to publish notice of the passage thereof and to file a copy of this ordinance as finally adopted with the Monmouth County Planning Board as required by N.J.S. 40:55D-16, and the Clerk shall also forthwith transmit a copy of this ordinance after final passage to the Borough Tax Assessor as required by N.J.S. 40:49-2.1; and

BE IT FURTHER ORDAINED, that this ordinance shall take effect immediately upon the approval by the County review agency, or sixty (60) days from the receipt of the ordinance by the County review agency if the county review agency should fail to act.

ATTEST:

Mary Sabik
Mary Sabik, Borough Clerk

APPROVAL:

Richard W. Ellison
Richard W. Ellison, Mayor

INTRODUCED ON FIRST READING: JUL 20 2006

FINAL ADOPTION: AUG 17 2006

ORDINANCE NO. 2006-86: (CONTINUED)

NOTICE OF PENDING ORDINANCE

ORDINANCE NO. 2006-86:

THE ORDINANCE PUBLISHED HEREWITH WAS INTRODUCED AND PASSED UPON FIRST READING AT A MEETING OF THE GOVERNING BODY OF THE BOROUGH OF UNION BEACH IN THE COUNTY OF MONMOUTH, NEW JERSEY HELD ON THURSDAY, JULY 20TH, 2006. IT WILL BE FURTHER CONSIDERED FOR FINAL PASSAGE AFTER PUBLIC HEARING THEREON AT A MEETING OF SAID GOVERNING BODY TO BE HELD ON THURSDAY, AUGUST 17TH, 2006, IN THE MUNICIPAL BUILDING, 650 POOLE AVENUE, UNION BEACH, NEW JERSEY, AT 8:00 P.M. OR AS SOON THEREAFTER AS SAID MATTER CAN BE REACHED, AT WHICH TIME AND PLACE ALL PERSONS WHO MAY BE INTERESTED THEREIN WILL BE GIVEN AN OPPORTUNITY TO BE HEARD CONCERNING THE SAME.

A COPY OF THIS ORDINANCE HAS BEEN POSTED ON THE BULLETIN BOARD, AT THE MUNICIPAL BUILDING, UPON WHICH PUBLIC NOTICES ARE CUSTOMARILY POSTED, DURING THE WEEK PRIOR TO AND UP TO AND INCLUDING THE DATE OF SUCH MEETING. COPIES OF THE ORDINANCE ARE AVAILABLE TO THE GENERAL PUBLIC OF THE BOROUGH, WHO SHALL REQUEST SUCH COPIES AT THE OFFICE OF THE BOROUGH CLERK, 650 POOLE AVENUE, UNION BEACH, NEW JERSEY 07735.

PLEASE PUBLISH ONE TIME:

THURSDAY, AUGUST 3, 2006

Mary Sabik

MARY SABIK, BOROUGH CLERK
BOROUGH OF UNION BEACH
COUNTY OF MONMOUTH, NEW JERSEY

FURNISH AFFIDAVIT OF PUBLICATION

ADVERTISEMENT: THE COURIER
VIA FAX ON:
~~MAILED~~: JULY 28, 2006

APPENDIX 2
Major Development Stormwater Summary Report Form

Major Development Stormwater Summary

General Information	
1. Project Name:	
2. Municipality:	County: Block(s): Lot(s):
3. Site Location (State Plane Coordinates – NAD83):	E: N:
4. Date of Final Approval for Construction by Municipality: Date of Certificate of Occupancy:	
5. Project Type (check all that apply): Residential☐ Commercial☐ Industrial☐ Other (please specify) _____	
6. Soil Conservation District Project Number:	
7. Did project require an NJDEP Land Use Permit?	Yes◯ No◯ Land Use Permit #:
8. Did project require the use of any mitigation measures? If yes, which standard was mitigated? _____	Yes◯ No◯

Site Design Specifications	
1. Area of Disturbance (acres):	Area of Proposed Impervious (acres):
2. List all Hydrologic Soil Groups:	
3. Please Identify the Amount of Each Best Management Practices (BMPs) Utilized in Design Below: Bioretention Systems ___ Constructed Wetlands ___ Dry Wells ___ Extended Detention Basins ___ Infiltration Basins ___ Combination Infiltration/Detention Basins ___ Manufactured Treatment Devices___ Pervious Paving Systems ___ Sand Filters ___ Vegetative Filter Strips ___ Wet Ponds ___ Grass Swales ___ Subsurface Gravel Wetlands ___ Other _____	

Storm Event Information		
Storm Event - Rainfall (inches and duration):	2 yr.: _____	10 yr.: _____
	100 yr.: _____	WQDS: _____
Runoff Computation Method: NRCS: Dimensionless Unit Hydrograph☐ NRCS: Delmarva Unit Hydrograph☐ Rational☐ Modified Rational☐ Other: _____		

Basin Specifications (answer all that apply) *If more than one basin, attach multiple sheets*	
1. Type of Basin:	Surface/Subsurface (select one): Surface◯ Subsurface◯
2. Owner (select one): ◯Public ◯Private: If so, Name:	Phone number:
3. Basin Construction Completion Date:	
4. Drain Down Time (hr.):	
5. Design Soil Permeability (in./hr.):	
6. Seasonal High Water Table Depth from Bottom of Basin (ft.):	Date Obtained:
7. Groundwater Recharge Methodology (select one):	2 Year Difference◯ NJGRS◯ Other◯ NA◯
8. Groundwater Mounding Analysis (select one):	Yes◯ No◯ If, Yes Methodology Used:
9. Maintenance Plan Submitted:	Yes◯ No◯ Is the Basin Deed Restricted: Yes◯ No◯

Comments:

Name of Person Filling Out This Form: _____ Signature: _____

Title: _____ Date: _____ 2/2/2018

Basin Specifications (answer all that apply) *If more than one basin, attach multiple sheets*
1. Type of Basin: Surface/Subsurface (select one): Surface ◯ Subsurface ◯
2. Owner (select one): ◯ Public ◯ Private: If so, Name: Phone number:
3. Basin Construction Completion Date:
4. Drain Down Time (hr.):
5. Design Soil Permeability (in./hr.):
6. Seasonal High Water Table Depth from Bottom of Basin (ft.): Date Obtained:
7. Groundwater Recharge Methodology (select one): 2 Year Difference ◯ NJGRS ◯ Other ◯ NA ◯
8. Groundwater Mounding Analysis (select one): Yes ◯ No ◯ If, Yes Methodology Used:
9. Maintenance Plan Submitted: Yes ◯ No ◯ Is the Basin Deed Restricted: Yes ◯ No ◯

Basin Specifications (answer all that apply) *If more than one basin, attach multiple sheets*
1. Type of Basin: Surface/Subsurface (select one): Surface ◯ Subsurface ◯
2. Owner (select one): ◯ Public ◯ Private: If so, Name: Phone number:
3. Basin Construction Completion Date:
4. Drain Down Time (hr.):
5. Design Soil Permeability (in./hr.):
6. Seasonal High Water Table Depth from Bottom of Basin (ft.): Date Obtained:
7. Groundwater Recharge Methodology (select one): 2 Year Difference ◯ NJGRS ◯ Other ◯ NA ◯
8. Groundwater Mounding Analysis (select one): Yes ◯ No ◯ If, Yes Methodology Used:
9. Maintenance Plan Submitted: Yes ◯ No ◯ Is the Basin Deed Restricted: Yes ◯ No ◯

Basin Specifications (answer all that apply) *If more than one basin, attach multiple sheets*
1. Type of Basin: Surface/Subsurface (select one): Surface ◯ Subsurface ◯
2. Owner (select one): ◯ Public ◯ Private: If so, Name: Phone number:
3. Basin Construction Completion Date:
4. Drain Down Time (hr.):
5. Design Soil Permeability (in./hr.):
6. Seasonal High Water Table Depth from Bottom of Basin (ft.): Date Obtained:
7. Groundwater Recharge Methodology (select one): 2 Year Difference ◯ NJGRS ◯ Other ◯ NA ◯
8. Groundwater Mounding Analysis (select one): Yes ◯ No ◯ If, Yes Methodology Used:
9. Maintenance Plan Submitted: Yes ◯ No ◯ Is the Basin Deed Restricted: Yes ◯ No ◯

Name of Person Filling Out This Form: ________________________ Signature: ________________________

Title: ____ Date: ____________________________

BOROUGH OF UNION BEACH

APPENDIX 3 – LOCAL PUBLIC EDUCATION PROGRAM

Statewide Basic Requirement:

Local Public Education Program - Tier A Municipalities shall implement a Public Education and Outreach Program that focuses on educational and pollution prevention activities about the impacts of stormwater discharges on surface water and groundwater and to involve the public in reducing pollutants in stormwater and mitigating flow.

The Tier A Municipality shall annually conduct activities that total at least 12 points and include activities from at least three of the five categories as set forth in the Table (Points System for Public Education and Outreach Activities) below. At a minimum, at least one of the activities shall involve educating businesses and the general public of hazards associated with illicit connections and improper disposal of waste. Records shall be kept necessary to demonstrate compliance with this requirement, including date of activities and any other relevant documentation.

Category 1: General Public Outreach		
Activity	**Description**	**Points**
Website & Social Media	Maintain a stormwater related page on the municipal website or on a municipal social media site. The web page may include links to other stormwater related resources, including the NJDEP stormwater website (www.njstormwater.org).	1
Newspaper Ad	Use Department created and approved stormwater education materials available on www.cleanwaternj.org to publish an ad in a newspaper or newsletter that serves the municipality.	1
Radio/ Television	Broadcast a radio or television public service announcement from www.cleanwaternj.org on a local radio or municipal public service channel.	1
Green Infra-structure Signage	Post signs at municipally-owned green infrastructure sites that describe the function and importance of the infrastructure, contact phone number, municipal identification number, and/or website for more information. *New signs receive 0.5 credits per sign. Existing signs that are maintained or upgraded receive 0.25 credits per sign. A maximum of 5 credits are allowed.	5*
Billboard/ Sign	Produce and maintain (for credit in subsequent years) a billboard or sign which can be displayed on a bus, bus stop shelter, recreation field (outfield sign), or other similar public venue.	2
Mural	Produce and maintain (for credit in subsequent years) the planning and painting of a stormwater pollution themed mural, storm drain art or other artwork at a local downtown/commercial area or other similar public venue.	2
Stormwater Facility Signage	Post signs at municipally-owned stormwater management basins or other structural stormwater related facilities that describe the function and importance of the facility, contact phone number, municipal identification number, and/or website for more information. *New signs receive 0.5 credits per sign. Existing signs that are maintained or upgraded receive 0.25 credits per sign. A maximum of 5 credits are allowed.	5*

Category 2: Targeted Audiences Outreach		
Activity	**Description**	**Points**
Stormwater Display	Present a stormwater related display or materials at any municipal event (e.g., Earth Day, town picnic), at the municipal building or other similar public venue.	1
Promotional Item	Distribute an item or items with a stormwater related message (e.g., refrigerator magnets, temporary tattoos, key chains, bookmarks, pet waste bag dispensers, coloring books, and pens or pencils). Municipality must initially have available a minimum number of the items equal to 10% of the municipal population.	2
Mailing or e-Mailing Campaign	Provide information to all known owners of stormwater facilities not owned or operated by the municipality (i.e., privately owned) highlighting the importance of proper maintenance of stormwater measures. For assistance, see information at www.nj.gov/dep/stormwater/maintenance_guidance.htm.	3
Mailing or e-Mailing Campaign	Distribute any of the Department's educational brochures, tip cards, or a municipally produced equivalent (e.g., community calendar, newsletter, or recycling schedule) via a mailing to every resident and business in the municipality.	2
Ordinance Education	Distribute a letter or e-mail from the mayor or municipal official to every resident and business in the municipality highlighting the requirements and environmental benefits of the Pet Waste, Wildlife Feeding, Litter Control, Improper Disposal of Waste, Containerized Waste/Yard Waste Collection, Private Storm Drain Inlet Retrofitting and Illicit Connection ordinances. Provide a link to the municipal website where subject ordinances are posted.	3
Category 3: School / Youth Education and Activities		
Activity	**Description**	**Points**
School Presen-tations	Provide water-related educational presentation(s) and/or activities to local preschool, elementary, middle, and/or high school classes using municipal staff or local partner organizations. Topics could include stormwater, nonpoint source pollution, watersheds, water conservation and water quality. For ideas, see information at www.nj.gov/dep/seeds. *Presentations receive 1 credit/presentation, with a maximum of 5 credits allowed.	5*
Water Education Workshops	Provide water-related professional development workshops for local teachers from a registered NJ Department of Education Professional Development Provider.	2
Storm Drain Labeling	Organize a project to label and/or maintain storm drain labels (that are not already precast with a message) with a scout troop, local school district, or faith-based group, or other community youth group for a minimum of 40 labels. This project could also include stenciling over precast labels to improve legibility.	3
Educational Contest for Schools	Organize an educational contest with a local school district or a local community organization serving youth to design a poster, magnet, rain stick, rain barrel or other craft/art object. Contest themes shall have an appropriate stormwater message. Winning entries are to be displayed at publicly accessible locations within the municipality such as at the town hall, library, post office, or school. The winning design should be shown on the municipality's website or social media site, if practical.	3
AmeriCorps Event	Coordinate an event (e.g. volunteer stream monitoring, educational presentations, or stormwater awareness project) through AmeriCorps NJ Watershed Ambassador Program.	4
Clean-up	Sponsor or organize a litter clean up for a scout troop, local school district, faith-based group or other community youth group along a local waterway, public park, stormwater facility, or in an area with storm drains that discharge to a local lake or waterway.	3

Category 4: Watershed/Regional Collaboration		
Activity	**Description**	**Points**
Regional Stormwater Collaboration	Participate in a regional stormwater, community collaborative or other watershed-based group on a regular basis to discuss impaired waterbodies, TMDLs, regional stormwater related issues, or watershed restoration plans that address those waterbodies. Evaluate, develop and implement remedies that resolve stormwater-related issues within the affected waterbody or watershed.	3
Green Infrastructure Workshop	Organize or participate in a rain barrel, rain garden or other green infrastructure workshop on a regional or watershed basis. This could be a partnership exercise with a local watershed organization, utility, university, school, youth/faith-based group, and/or other organization.	3
Community Activity	Organize or participate in the organization of a regional or watershed-based event to carry out stormwater activities such as stormwater facility maintenance or litter clean-up. The municipality may identify and enter into a partnership agreement with a local group such as a watershed organization, utility, university, school, youth/faith-based group, and/or other organization to carry out these activities	3
Category 5: Community Involvement Activities		
Activity	**Description**	**Points**
Volunteer Stormwater Assessment or Stream Monitoring	Establish a volunteer stormwater facility assessment (inspection, inventory and/or mapping) or stream monitoring program for a waterbody within the municipality in order to gauge the health of the waterway through chemical, biological or visual monitoring protocols. Contact NJDEP's AmeriCorps NJ Watershed Ambassador Program or review USEPA National Directory of Volunteer Monitoring Programs.	3
Rain Barrel Workshop	Organize or participate in a rain barrel workshop. This could be a partnership exercise with a local watershed organization, university, school, youth/faith-based group, and/or other nonprofit.	3
Rain Garden Workshop	Organize or participate in a rain garden training or installation workshop. This could be a partnership exercise with a local watershed organization, university, school, youth/faith-based group, and/or other nonprofit.	3
Community Event	Organize or participate in the organization of a community event to carry out stormwater activities such as stormwater measure maintenance or a stream buffer restoration. The municipality may identify and enter into a partnership agreement with a local group such as a watershed organization, university, utility, school, youth/faith-based group, and/or other nonprofit to carry out these activities.	3
Community Involvement	Organize a project with a local organization to create and post signs at either green and/or gray stormwater infrastructure sites or facilities that describe the function and importance of the facility, contact phone number, municipal identification number, and/or website for more information. *Signs receive 0.5 credits per sign. A maximum of 5 credits are allowed.	5*

To comply with the Local Public Education requirement outlined above, the Borough will conduct the following activities:

- **WEBSITE (1 POINT)** – The Borough will maintain a stormwater related page on their municipal website that includes stormwater related information and links to the Clean Water website and the NJDEP stormwater website.

- **MAILING CAMPAIGN (2 POINTS) –** The Borough will distribute the NJDEP provided brochure to all residents and businesses along with one of its municipal mailings.

- **ORDINANCE EDUCATION (3 POINTS)** – The Borough will distribute a letter from the mayor to all residents and business along with one of its municipal mailings highlighting the requirements and benefits of the stormwater related ordinances adopted.

- **COMMUNITY ACTIVITY (3 Points)** - The Borough annually participates with Clean Ocean Action for the annual Beach Sweeps project to carry out litter clean-up along the shorefront.

- **STORMWATER DISPLAY (1 POINT)** – The Borough will coordinate a display at the Union Beach Borough Hall, located at at 650 Poole Avenue every year.

  During this event, Borough personnel will setup a booth at the site and distribute the following educational materials, which cover topics such as stormwater/nonpoint source pollution, storm drain inlet labeling, fertilizer/pesticide education, waste disposal, pet waste, litter, improper disposal of waste, wildlife feeding, and yard waste:

  - How Does Urbanization Change a Watershed?
  - Alternatives to Pesticide
  - Using Leaf Compost
  - Yard Trimmings Management Strategies in New Jersey
  - Home Composting
  - Vermicomposting
  - Minimizing Waste Disposal: Grass Clippings
  - Backyard Leaf Composting
  - What is Ground Water?
  - What is Nonpoint Source Pollution?
  - What's a Watershed?
  - Clean Water Raingers Coloring Book
  - Clean Water Raingers Handbook
  - NJ Clean Communities Litter Activity Book

Additional Measures:

Additional activities will be evaluated and coordinated as needed throughout the reaminder of the permit year in order to complete accumulating the minimum 12 points required.

Other activites that are under consideration may include coordinating with the NJ Watershed Ambassadors Program to conduct free classroom workshops, and/or presentations at the local public schools, providing magnets, buttons, bookmarks, or pencils that portray the message of stormwater prevention at future annual educational events or coordinating stream/water body cleanups with local organizations. Final determination of additional activities to be conducted is to be determined at a later date and will be documented appropriately to record the date and event held for future reporting purposes in the Borough's Annual Inspection and Recertification Report.

NJDEP STORMWATER AND PET WASTE BROCHURES

Solutions to Stormwater Pollution
Pet Waste

Solutions to Stormwater Pollution

Easy Things You Can Do Every Day To Protect Our Water

A Guide to Healthy Habits for Cleaner Water

Pollution on streets, parking lots and lawns is washed by rain into storm drains, then directly to our drinking water supplies and the ocean and lakes our children play in. Fertilizer, oil, pesticides, detergents, pet waste, grass clippings: You name it and it ends up in our water.

Stormwater pollution is one of New Jersey's greatest threats to clean and plentiful water, and that's why we're all doing something about it.

By sharing the responsibility and making small, easy changes in our daily lives, we can keep common pollutants out of stormwater. It all adds up to cleaner water, and it saves the high cost of cleaning up once it's dirty.

As part of New Jersey's initiative to keep our water clean and plentiful and to meet federal requirements, many municipalities and other public agencies including colleges and military bases must adopt ordinances or other rules prohibiting various activities that contribute to stormwater pollution. Breaking these rules can result in fines or other penalties.

As a resident, business, or other member of the New Jersey community, it is important to know these easy things you can do every day to protect our water.

Limit your use of fertilizers and pesticides

- Do a soil test to see if you need a fertilizer.
- Do not apply fertilizers if heavy rain is predicted.
- Look into alternatives for pesticides.
- Maintain a small lawn and keep the rest of your property or yard in a natural state with trees and other native vegetation that requires little or no fertilizer.
- If you use fertilizers and pesticides, follow the instructions on the label on how to correctly apply it.

Make sure you properly store or discard any unused portions.

Properly use and dispose of hazardous products

- Hazardous products include some household or commercial cleaning products, lawn and garden care products, motor oil, antifreeze, and paints.
- Do not pour any hazardous products down a storm drain because storm drains are usually connected to local waterbodies and the water is not treated.

- If you have hazardous products in your home or workplace, make sure you store or dispose of them properly. Read the label for guidance.
- Use natural or less toxic alternatives when possible.
- Recycle used motor oil.
- Contact your municipality, county or facility management office for the locations of hazardous-waste disposal facilities.

Keep pollution out of storm drains

- Municipalities and many other public agencies are required to mark certain storm drain inlets with messages reminding people that storm drains are connected to local waterbodies.
- Do not let sewage or other wastes flow into a stormwater system.

Clean up after your pet

- Many municipalities and public agencies must enact and enforce local pet-waste rules.
- An example is requiring pet owners or their keepers to pick up and properly dispose of pet waste dropped on public or other people's property.
- Make sure you know your town's or agency's requirements and comply with them. It's the law. And remember to:
  - Use newspaper, bags or pooper-scoopers to pick up wastes.
  - Dispose of the wrapped pet waste in the trash or un-wrapped in a toilet.
  - Never discard pet waste in a storm drain.

Don't feed wildlife

- Do not feed wildlife, such as ducks and geese, in public areas.
- Many municipalities and other public agencies must enact and enforce a rule that prohibits wildlife feeding in these areas.

Don't litter

- Place litter in trash receptacles.
- Recycle. Recycle. Recycle.
- Participate in community cleanups.

Dispose of yard waste properly

- Keep leaves and grass out of storm drains.
- If your municipality or agency has yard waste collection rules, follow them.
- Use leaves and grass clippings as a resource for compost.
- Use a mulching mower that recycles grass clippings into the lawn.

Contact information

For more information on stormwater related topics, visit www.njstormwater.org or www.nonpointsource.org

Additional information is also available at U. S. Environmental Protection Agency Web sites www.epa.gov/npdes/stormwater or www.epa.gov/nps

New Jersey Department of Environmental Protection
Division of Water Quality
Bureau of Nonpoint Pollution Control
Municipal Stormwater Regulation Program
(609) 633-7021

www.cleanwaternj.org

CLEAN WATER
It's Up to You New Jersey

Pet Waste Pollutes Our Waters

What You Can Do To Help Protect Our Water

Clean and plentiful water is important to our families, our environment, our economy and our quality of life.

Did you know that animal waste from pets can pollute our waters? When left on the ground, pet waste is washed by rain and melting snow and ice into storm drains that carry it to our rivers, lakes, the ocean and drinking water.

Animal waste contains a high concentration of nutrients as well as bacteria and disease-causing microorganisms that can cause problems.

What you can do

Pet owners or anyone who takes your pet for walks must properly dispose of the waste by picking it up, wrapping it and either placing it in the trash or flushing it unwrapped down the toilet.

Your municipality is required to adopt and enforce local pet-waste laws. At a minimum, your community must require that pet owners or their keepers **immediately** and **properly** dispose of their pet's solid waste deposited on **any public or private property not owned or possessed by that person.** People with assistance animals such as Seeing Eye dogs are exempt.

Make sure you know what your municipality requires – and follow it.

Thank you for doing your part to keep New Jersey's waters clean.

For more information, please contact the following:

New Jersey Department of Environmental Protection
Division of Water Quality
Bureau of Nonpoint Pollution Control
Municipal Stormwater Regulation Program
(609) 633-7021

Visit www.njstormwater.org or www.nonpointsource.org

Additional information is also available at U. S. Environmental Protection Agency Web sites www.epa.gov/npdes/stormwater or www.epa.gov/nps

Jon S. Corzine, Governor
Lisa P. Jackson, Commissioner

CLEAN WATER
It's Up to You New Jersey

SAMPLE ORDINANCE EDUCATION LETTER

[DATE]

RESIDENT
[ADDRESS LINE 1]
[ADDRESS LINE 2]

Re: Stormwater Management
Best Practices and Ordinance Education

Dear Resident,

You may not be aware that pollution on streets, parking lots and lawns is washed by rain into our storm drains, and into our drinking water supplies and oceans and lakes that we fish in and our children play in. Stormwater pollution is one of New Jersey's greatest threats to clean and plentiful water, and that's why we must all do something about it. By practicing healthy household habits, homeowners can keep common pollutants like pesticides, pet waste, grass clippings, and automotive fluids off the ground and out of stormwater.

Stormwater management is not only critical to our environment, it is critical to our own health and well-being. As part of New Jersey's initiative to keep our water clean and plentiful and to meet federal requirements, the Borough is working with the New Jersey Department of Environmental Projection (NJDEP) in various initiatives to protect our water bodies.

One such initiative is the adoption of various stormwater related ordinances prohibiting various activities that contribute to stormwater pollution. A summary of these ordinances is listed below. Failure to comply can result in the assessment of fines or other penalties.

- Litter Prohibitions – This ordinance is provided to keep litter such as garbage, refuse, rubbish or other unconsumed substance or waste material from being washed into the municipal separate storm sewer system (MS4), where it would cause pollution of our waterways.

- Soiling and Defecating – Domesticated Animals – This ordinance is provided to keep pet feces or droppings from being washed into the Borough's MS4, where it would cause pollution of our waterways.

- Wildlife Feeding – This ordinance prohibits the feeding of unconfined wildlife in any public park or other property owned and operated by the Borough in order to keep wildlife from concentrating in small areas and their feces from causing pollution of our waterways.

- Separation and Collection of Building Materials, Debris, Garbage, Recyclable Material, Paper and Trash – This ordinance prohibits the sweeping, raking, blowing or other placement of yard waste that is not containerized at the curb or along the street at least ten feet away from any

storm drain inlet and no more than five days prior to a scheduled and announced pickup to avoid the yard waste entering the Borough's MS4 and causing pollution of our waterways.

- Stormwater - Improper Disposal of Waste – This ordinance prohibits the spilling, dumping or disposal of materials other than stormwater in such a manner as to cause the discharge of pollutants into the Borough's MS4 system. Exceptions to this ordinance are listed and can include but not be limited to water line flushing and discharges from potable water sources, irrigation water, flow from firefighting activities, sidewalk, driveway and street wash water, etc.

- Stormwater - Illicit Connections – This ordinance prohibits the illicit connection to the Borough's MS4 in order to protect public health, safety and welfare. This includes both residential and non-residential areas. Examples of prohibited materials include domestic sewage, industrial waste, non-contact cooling water, and process water.

- Private Storm Drain Inlet Retrofitting – This ordinance is provided to require the retrofitting of existing storm drain inlets which are in direct contact with repaving, repairing, reconstruction or resurfacing or alteration of facilities on private properties, to prevent the discharge of solids and floatables (such as plastic bottles, cans and other litter) into the Borough's MS4, where it would cause pollution of our waterways.

Copies of these ordinances can be viewed or downloaded from the Borough's website (www.unionbeachnj.gov).

Very Truly Yours,

_____

Mayor Paul Smith
Borough of Union Beach

OTHER NJDEP EDUCATIONAL BROCHURES

How Does Urbanization Change a Watershed?
Alternatives to Pesticide
Using Leaf Compost
Yard Trimmings Management Strategies in New Jersey
Home Composting
Vermicomposting
Minimizing Waste Disposal: Grass Clippings
Backyard Leaf Composting
What is Ground Water?
What is Nonpoint Source Pollution?
What's a Watershed?
Clean Water Raingers Coloring Book
Clean Water Raingers Handbook
NJ Clean Communities Litter Activity Book

NJ Department of Environmental Protection
Division of Watershed Management
PO Box 418
Trenton, NJ 08625-0418
609-984-0058

WATER RESOURCE PROTECTION PRACTICES

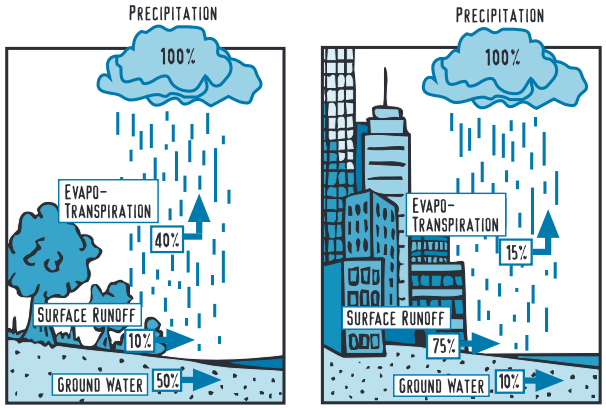
State of New Jersey
Christine Todd Whitman, Governor
Department of Environmental Protection
Robert C. Shinn, Jr., Commissioner

Printed on Recycled Paper
Reprinted March 1999

How does urbanization change a watershed?

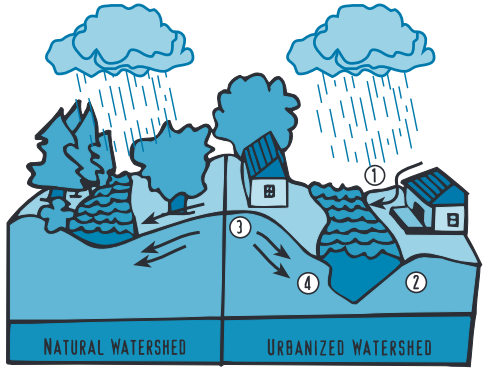
Urbanization (or development) has a great effect on local water resources. It changes how water flows in the watershed and what flows in the water. Both surface and ground water flow are changed.

As a watershed becomes developed, trees, shrubs and other plants are replaced with impervious surfaces (roads, rooftops, parking lots and other hard surfaces that do not allow stormwater to soak into the ground). Without the plants to store and slow the flow of stormwater, the rate of stormwater runoff is increased. Less stormwater is able to soak into the ground because sidewalks, roads, parking lots and rooftops block this infiltration. This means a greater volume of water reaches the waterway faster and less of that water is able to infiltrate to ground water. This in turn leads to more flooding after storms but reduced flow in streams and rivers during dry periods. The reduced amount of infiltrating water can lower ground water levels, which in turn can stress local waterways that depend on steadier flows of water.



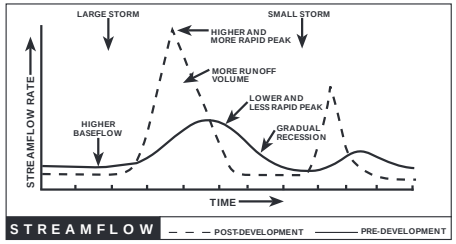
NATURAL WATERSHED URBANIZED WATERSHED

In the stream, more erosion of stream banks and scouring of channels will occur due to volume increase. This in turn degrades habitat for plant and animal life that depend on clear water. Sediment from eroded stream banks clogs the gills of fish and blocks light needed for plants. The sediment settles to fill in stream channels, lakes and reservoirs. This also increases flooding and the need for dredging to clear streams or lakes for boating.

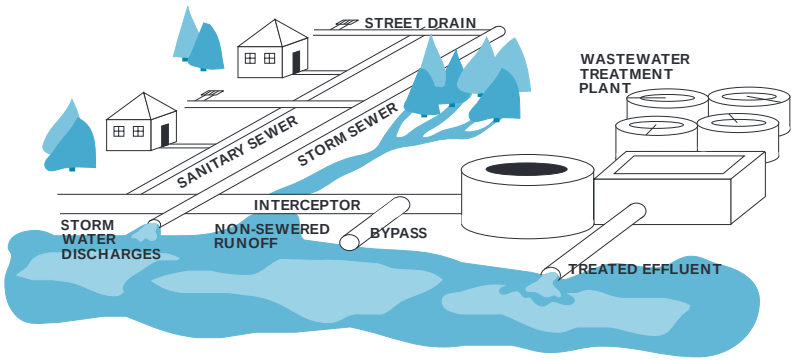


① INCREASED RUNOFF ② STREAMBANK EROSION ③ DECREASED INFILTRATION
④ DECREASED GROUND WATER FLOW TO STREAM

In addition to the high flows caused by urbanization, the increased runoff also contains increased contaminants. These include litter, cigarette butts and other debris from sidewalks and streets, motor oil poured into storm sewers, heavy metals from brake linings, settled air pollutants from car exhaust and pesticides and fertilizers from lawn care. These contaminants reach local waterways quickly after a storm.



Stormwater Sewer Basics



Stormwater flows into the stormwater system through a storm drain. These are frequently located along the curbs of parking lots and roadways. The grate that prevents larger objects from flowing into the storm sewer system is called a catch basin. Once below ground, the stormwater flows through pipes which lead to an outfall where the stormwater enters a stream, river or lake. In most areas of New Jersey, the stormwater sewer goes directly to local waterway without any treatment.

In some areas of the state, the outfall may lead to a stormwater management basin. These basins control the flow of stormwater and can also improve water quality, depending on how they are designed. These basins are frequently seen in newer commercial and residential areas.

In some older urban areas of the state, the stormwater and sanitary sewer systems may be combined. Here both stormwater and sewage from households and businesses travel together in the same pipes. Both stormwater and sewage are treated at sewage treatment plants except during heavy rains. During these occasions, both the stormwater and untreated sewage exceed the capacity of the treatment plant and this overflow is directed into local waterways.

Protecting Stormwater Sewers

In the first rush of water from a rainstorm, much of the debris and other pollutants that had settled on the land surface and in the stormwater sewer since the last storm will be picked up and carried into the local stream. This can significantly add to water quality problems. It is therefore important to protect the stormwater system from sources of pollution.

The following should never be dumped down storm drains, road gutters or catch basins: motor oil, pet waste, grass trimmings, leaves, debris and hazardous chemicals of any kind. Anything dumped in our stormwater collection systems will be carried into our streams.

Controlling Stormwater Flow

Managing stormwater to reduce the impact of development on local watersheds and aquifers relies on minimizing the disruption in the natural flow - both quality and quantity of stormwater. By designing with nature, the impact of urbanization can be greatly reduced.

This can be accomplished by following these principles:

- minimizing impervious surfaces;
- maximizing natural areas or areas of dense vegetation;
- structural stormwater controls such as stormwater management basins; and
- practicing pollution prevention by avoiding contact between stormwater and pollutants.

You Can Make a Difference in Your Own Backyard

Managing stormwater in your own backyard is important. As an integral part of the watershed you live in, what you do in your backyard makes a difference. Here are some examples of what you can do at home:

1. Reduce impervious surfaces by using pavers or bricks rather than concrete for a driveway or sidewalk.
2. Divert rain from paved surfaces onto grass to permit gradual infiltration.
3. Landscape with the environment in mind. Choose the appropriate plants, shrubs and trees for the soil in your yard; don't select plants that need lots of watering (which increases surface runoff), fertilizers or pesticides.
4. Maintain your car properly so that motor oil, brake linings, exhaust and other fluids don't contribute to water pollution.
5. Keep stormwater clean. Never dump litter, motor oil, animal waste, or leaves into storm drains or catch basins.

Alternatives to Pesticides

When planting a garden this year, consider using alternative methods to control pests, rather than chemical pesticides. Here are a few you might try.

HANDPICKING is time-consuming but unbeatable. Use gloves to remove visible offending insect and weed pests.

BARRIERS AND TRAPS - Barriers and traps are types of mechanical controls that can be employed to capture or impede pests.

COLLARS: To stop hatching larvae from burrowing into the soil surrounding your plants, use "collars" made of stiff paper, heavy plastic or tar paper. Cut a piece a foot square and fit snugly around the stem of the plant and press into the soil an inch or so deep. Use a paper clip to hold in place. This prevents cutworms and other burrowing insects from getting into the soil around your plants.

NETTING: Fine netting such as cheese cloth, placed over the bed, will protect seedlings from chewing insects, keep cats and birds away, and prevent flying insects from laying eggs.

COFFEE CAN TRAP**:** An effective technique for trapping non-flying insects is to bury a tin can in the bed of your garden so that the lip of the can is flush with the soil surface. Some bugs will fall in the can and be unable to get out. The can should be emptied often. This trap also collects beneficial insects and is a good way to monitor the insect population in your garden.

STICKY BOARD**:** A board or thick piece of paper painted yellow and coated with a sticky substance such as tanglefoot will attract and intercept aphids and other small flying insects.

TRAP PLANTS - Some insects, if given a choice, will opt to feed on one type of plant or another. For example: maggots prefer radishes over corn and tomato worms prefer dill over tomatoes. Therefore, certain plants can be strategically placed so that they lure harmful insects away from plants you wish to protect. These are commonly referred to as "trap plants." Once the trap plant has become infested, the target insect can be picked off and dropped in soapy water or the entire plant can be pulled up and disposed of.

BENEFICIAL INSECTS - It is important to recognize that not all insects in a garden are "pests." A garden and its surroundings contain many insects that are actually beneficial to the garden because they feed on insects that are harmful. Therefore, it is good to learn how to identify garden insects and determine whether they are harmful or beneficial. Many gardening books provide illustrations of the most common beneficial and harmful insects and will provide information on how to promote the population of beneficial insects such as ladybugs, bees, green lacewings, praying mantises, dragonflies, predacious mites and thrips, predacious wasps and spiders. Some companies such as seed catalogues sell beneficial insects by mail order.

COMPANION PLANTING - Some plants possess the natural ability to repel certain types of insects. Companion planting is the practice of strategically placing insect-repelling plants next to crops that will benefit from their natural properties. For example, planting garlic among vegetables helps fend off

Japanese beetles, aphids, the vegetable weevil, and spider mites; basil planted near tomatoes repels tomato horn worms; and marigolds interplanted with cucurbits (i.e., zucchini, cucumbers, etc.) discourage cucumber beetles.

CROP ROTATION - Planting different kinds of vegetables in each different section of your garden plot each year will help reduce pest infestation. In the fall, some insects lay their eggs in the soil a couple of inches below the surface. The eggs hatch in the spring and immediately begin the search for their food source. Many insects will feed on only one or types of vegetables. If the plant they prefer to eat is located several feet or yards away, the insect must migrate to the source. Many will die along the way or fall prey to birds and other insects. Also, certain families of plants (e.g., potatoes and peppers - nightshade family) attract the same pests.

In addition, many crops predominately absorb a particular nutrient from the soil. By rotating your crops each year, the soil in a particular section of the garden will have the opportunity to rest and regenerate.

DIVERSIFIED PLANTING - A common practice among home gardeners is to plant a single crop in a straight row. This encourages pest infestation because it facilitates easy travel of an insect or disease from one host plant to another. By intermingling different types of plants and by not planting in straight rows, an insect is forced to search for a new host plant thus exposing itself to predators. Also, this approach corresponds well with companion planting.

If you must use pesticides, consider the following:

LOW TOXICITY PESTICIDES - Formulated, biodegradable pest-control substances are commercially available. Although these products are pesticides, they have low toxicity to mammals and do not last long in the environment. The local County Extension Service can provide information on these and other pesticide products.

For more information, contact:

Ann R. Waters, Outreach Coordinator
Pesticide Control Program
CN 411, Trenton, NJ 08625
Phone: (609) 984-5014
Email: awaters@dep.state.nj.us

THE STATE UNIVERSITY OF NEW JERSEY
RUTGERS COOPERATIVE EXTENSION
New Jersey Agricultural Experiment Station
www.rce.rutgers.edu

FS117

Fact sheet

Using Leaf Compost

Roy L. Flannery, Specialist in Soils, Emeritus and
Franklin Flower, Specialist in Environmental Science, Emeritus

Composting involves primarily the microbial decomposition of organic matter. Compost - the end product - is a dark, friable, partially decomposed substance similar to natural organic matter found in the soil. The organic matter content of soils is very important. It influences the physical condition, water-holding capacity, and temperature of the soil, and especially the soil bacterial processes which affect the availability of mineral salts to plants.

Why Compost Leaves

If newly fallen leaves are added directly to the soil without first being composted, the microbes that decompose the leaves compete with growing plants for soil nitrogen. The temporary nitrogen shortage caused by the microbes can reduce plant growth. To reduce or eliminate this competition for nitrogen, composting of the leaves is recommended prior to incorporating them into soils.

Need for Organic Matter

Most New Jersey soils need an increase of 1/2 to 1% in organic matter. Sandy soils, such as loamy sands and sands, and soils with very high clay content are improved the most by an increase in organic matter content.

Benefits of Adding Leaf Compost to Soil

- Among the benefits derived from adding leaf compost to New Jersey soils are:
- Drought damage to plants is reduced because of an increased water-holding capacity of the soils.
- Soil tilth is improved making the soils easier to cultivate.
- Very small amounts of the 16 essential elements needed for plant growth are supplied.
- Adverse effects of excessive alkalinity, acidity, or over-fertilization are reduced by the added buffering of the soil.
- The cation exchange capacity of soils is increased, enabling the soils to hold more plant nutrients for longer periods.
- Decomposition of the organic matter produces organic acids which combine with iron and aluminum ions, thereby reducing their potential toxicity to plants. This also makes more phosphorus available for plants because free iron and aluminum can tie up the phosphates.
- The added organic matter provides a food source for desirable soil micro-organisms.
- When incorporated into the soil, or used in a thin mulch 1/16- to 1/8-inch thick, compost helps seeds to germinate.

Overall, compost improves the physical, chemical, and biological properties of soils. Leaf compost, however, is not normally considered a fertilizer as it is too low in nutrient content. It serves primarily as an organic amendment and a soil conditioner. The nitrogen content of composted leaves on a dry basis is about 1/2 to 1% by weight. For other materials commonly added to backyard leaf compost piles, the nitrogen content is: blood meal 10-14%; grass clippings 2-4%; coffee grounds 1 1/2-2%; eggshells 1-2%; horse manure 1-5%; cow manure 1-1 1/2%; poultry manure 3-5%; ammonium sulfate 20 1/2%; urea 45%; bone meal 1 1/2-4%; and cotton seed meal 6-7%.

When Compost is Ready to Use

When compost is ready to use (6 to l8 months after starting) its temperature will generally have decreased to slightly above air temperature. Finished compost will usually be drier than leaves during composting. The material also will be crumbly in texture. Before using compost, "screening" may be necessary to remove the larger partially decomposed materials. These materials will sometimes be present in composting piles because not all items decompose at the same rate. The undecomposed organic matter clumps may be broken up and added to another active compost pile for additional decomposition.

Adding Leaf Compost to the Soil

A good rate of organic matter to work into the top 6 1/2 to 7 inches of most New Jersey cultivated soils is 0.5 to 1.0% organic matter by weight. This is equivalent to adding 900 to 1,800 wet pounds (25 to 50 bushels) of leaf compost per 1,000 square feet of area. To accomplish this, spread a 3/8- to 3/4-inch depth of leaf compost uniformly over the soil surface and mix into the top 6 to 8 inches of soil.

Little or no nitrogen will be released from compost for plant use during the season immediately following incorporation into the soil. It is generally necessary to add nitrogen to soils containing compost to prevent the compost from "robbing" the soil of nitrogen and creating deficiency problems in plants grown in the soil. Adding 1 to 1 1/2 lbs. of 10% nitrogen fertilizer to each 100 lbs. (about 3 bushels) of leaf compost is recommended.

The preceding recommendations supply only the needs of the leaf compost. Most plants require an additional 1 to 3 lbs. of actual nitrogen per 1,000 square feet for normal feeding. This nitrogen should be applied to the soil in addition to that applied in the leaf compost.

Using Leaf Compost as a Mulch

Leaf compost can also be used as an organic mulch on the surface of soil in place of peatmoss, straw, etc. Organic mulches are valuable because they:

- Reduce rainfall runoff, thereby making more water available for plant growth.
- Decrease water evaporation losses from the soil.
- Keep the soils cooler in hot weather and warmer in cold weather.
- Reduce alternate freezing and thawing of soils which can injure the fibrous roots of plants.
- Help to prevent soil erosion by wind or water.
- Keep soils friable, therefore easier to cultivate.
- Increase biological activity of earthworms and other soil organisms.
- Prevent soil spattering on leaves, flowers, or fruits such as strawberries.
- Reduce soil compaction from rain and irrigation water.
- Help to control weeds.
- Present a pleasing appearance.

Recommended thicknesses of mulch layers: 2-3 inches for deciduous shrubs and trees, vegetables, and rosebeds; 3 inches for flower beds; and 3-4 inches for shallow-rooted, acid-loving plants.

Other Uses for Leaf Compost

Leaf compost may also be used in potting soil. However, no more than 25 to 30% of the potting soil should be leaf compost. Frequently leaf compost will continue to decompose. If more that 25 to 30% of the potting soil is leaf compost, there will be a significant volume reduction of the potting soil after 1 year.

Composting generally destroys most weed seeds contained in the compost material; however, not all of them will be destroyed. Some are heat resistant, and others will not be fully exposed to the high temperatures. If a completely pasteurized leaf compost is desired for potting soil, it will be necessary to heat it in an oven until the temperature of the center of the mass reaches 180°F and is maintained for 30 minutes.

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FS806

Fact sheet

Yard Trimmings Management Strategies in New Jersey

Jonathan H. Forsell, Agricultural and Resource Management Agent, Essex County

Introduction

Most yard debris consists of leaves, grass clippings, prunings, branches, trunks of trees, and their root systems. There are various options for managing these materials. The following are some guidelines to assist decision makers and others in determining best management strategies.

Materials Management Guidelines

Leaves: In New Jersey, leaves were banned from landfills, transfer stations, and incinerators in 1988. Collected leaves are generally composted at municipal, regional, commercial, or farm sites in large windrows (elongated piles) using the Leaf Composting Manual for New Jersey Municipalities as a guide. Municipal, regional, and private facilities can use a Type 1.11 simplified New Jersey Department of Environmental Protection (NJDEP) permit, if fewer than 20,000 cubic yards of leaves are composted annually, or a more detailed Type 2.1 permit, if the volume is greater.

Farmers can accept leaves for composting with the simplified permit if the volume is less than 20,000 cubic yards or can receive leaves to be mulched into the soil at no greater than a six-inch depth on the soil and within seven days from delivery without need of a permit. This requires that the leaves be incorporated into the soil no later than the next tillage season.

Backyard composting (household scale) is the most cost-effective method of leaf composting because of avoided collection costs, tipping fees, permits, equipment, and management costs. Refer to fact sheets FS074 and FS117. Further detailed information about composting and trimmings management can be obtained through Rutgers Cooperative Extension and the NJDEP, Bureau of Resource Recovery.

Grass Clippings: Ideally, lawns should be mowed frequently (about five-day intervals) removing only one-third of the grass blade. The clippings will biodegrade at the soil surface providing nitrogen and organic matter. Although any type mower may be used, mulching mowers or mulching attachments on traditional rotary machines can improve the results by chopping more finely. If clippings are long and clump on the lawn, the excess can be raked up and used as a nitrogen source in the backyard composting pile. Permits can be issued by the

NJDEP to include a limited volume of grass clippings in large-scale leaf composting facilities, but the rules are quite stringent to prevent odor problems, which are common, when grass is composting in an anaerobic (oxygen- deficient) environment. A one-year farm grass clippings demonstration permit is available to farmers from NJDEP to apply grass around seasonal crops under a nutrient management plan.

Prunings: Trimmings from trees, shrubs, hedges, and perennials are composted at some permitted facilities, but can also be composted in the backyard pile. A shredder-grinder is helpful to break down larger woody material to a more compostable size.

Tree Limbs: Limbs can be cut for firewood or chipped to make a mulch for landscape use. If finely ground, the product can be composted, but at a slower rate than leaves or grass clippings. Woodchips can be used as a carbon source, when composting sewage sludge.

Tree Trunks: Trunks are usually cut, split, and dried for use as firewood. Some desirable species are used to make furniture and cabinetry, and others are ground for mulch or pulp.

Tree Root Systems: Excavated tree roots are generally ground into mulch material. Massive root systems and trunks that are not made into firewood or mulch cannot be stockpiled at a site and are classified as Type 13 Bulky Waste, which must be hauled away for grinding or other processing.

Summary

Because yard trimmings are recyclable through composting or other means, it is prudent for government, businesses, farmers, and other people to avoid non-recycling avenues for managing this important fraction of the solid waste stream.

References

1. **Backyard Leaf Composting**, FS074, Franklin Flower and Peter F. Strom, Dept. of Environmental Science, Cook College.

2. **Grass—Cut It and Leave It**, NJDEP Division of Solid Waste Management, Office of Recycling, in cooperation with Rutgers Cooperative Extension. 1991.

3. **Leaf Composting Manual for New Jersey Municipalities**, Peter F. Strom and Melvin Finstein, Dept. of Environmental Science, Cook College and NJDEP. 1989.

4. **Using Leaf Compost**, FS117, Roy Flannery and Franklin Flower.

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FS811

Fact sheet

Home Composting

William T. Hlubik, Middlesex County Agricultural Agent; Jonathan Forsell, Former Essex County Agricultural Agent (deceased); Richard Weidman, Middlesex County Program Associate; and Mark Winokur, Former Program Assistant

What is Composting?

Composting is a natural process where organic materials decompose and are recycled into a dark, crumbly, earthy smelling soil conditioner known as "compost". Compost improves soil structure and moisture retention, and contributes to healthy plant growth by providing plant nutrients.

Why Should I Compost?

- Composting can save money!
- Reduces fertilizer and water use
- Avoids garbage collection and landfill fees
- Reduces the need for soil and plant amendments
- Composting helps the environment
- Reduces the volume of garbage going to landfills, transfer stations and incinerators
- Composting benefits your soil and plants
- Improves soil structure and texture
- Increases aeration and water holding
- Promotes soil fertility
- Stimulates healthy root development
- Aids in erosion control
- Reduces chemical inputs
- Composting is easy
- Save time bagging grass and leaves
- Quick and fun way to do part for the environment

Compost Ingredients

Do Compost:

- ✓ Vegetable food scraps
- ✓ Grass clippings
- ✓ Leaves
- ✓ Flowers
- ✓ Weeds
- ✓ Sawdust and wood ash
- ✓ Chopped twigs and branches
- ✓ Coffee grounds w/filters

Don't compost:

- × Meat scraps
- × Diseased or insect infested plants
- × Weeds with seeds
- × Dog and Cat feces
- × Food with grease or soap residues

Composting Methods

Slow Harvest: Ready in 12-18 Months

Made by adding layers of available yard waste over several months.

1. Set compost bin where is will get rain.
2. Put yard waste in bin as it is generated in your yard. The material at the bottom and in the center will compost first.

Fast Harvest: Ready in 5-15 Weeks

Made by mixing equal weights of green and brown materials at once.

1. Add green materials such as grass clippings or vegetable scraps mixed with brown materials such as leaves (no woody-type materials should be included).
2. Add water to pile until it's as wet as a wrung out sponge.
3. Turn pile with a pitch fork or compost aerator tool twice a week for faster compost production (less often in wintertime).

Types of Compost Bins

Compost can be made in open piles. However, to help keep a pile neat and maintain conditions needed for rapid decomposition, consider simple homemade or store bought bins. See back page for demonstration sites in New Jersey.

Homemade Bins:

- Made from wood pallets
- Made from snow fences

Store Bought:

- Compost Tumbler
- Durable Plastic Bin

Troubleshooting

Here is how to solve problems should they occur:

Symptom	Problem	Solution
Pile has a rotten odor	Not enough air	Turn pile
Pile has ammonia odor	Too many greens	Add brown material like leaves/straw
Pile is dry	Not enough water; too much woody material	Turn and moisten; add fresh greens
Low pile temperature (pile is not composting)	Pile is too small	Add new materials
	Insufficient moisture	Add water
	Poor aeration	Turn pile
	Lack of nitrogen	Mix in greens like grass or food scraps
	Cold weather	Insulate pile with layer of straw or cover with tarp
Pests (rats, raccoons, insects)	Presence of meat or fatty food scraps	Remove from pile

Keys to Good Compost

Water: The microorganisms in the compost pile need water to live. Water pile only as needed, to maintain compost as moist as a wrung out sponge. Don't let your pile dry out completely.

Nutrients: The microorganisms in the pile need carbon for energy and nitrogen for protein in order to survive. A good balance can be achieved by mixing two parts of nitrogen rich green materials such as grass clippings, with one part of carbon rich brown materials such as leaves. However, carbon-rich leaves by themselves will compost.

Aeration: To speed up decomposition, turn the pile frequently using a pitch fork. This provides the microorganisms with enough oxygen to thrive so they can heat up the compost. Placing large branches at the bottom of the pile will also help add air to the pile. Minimal turning would be once per month and less frequently during the year.

Surface area: The more surface area the microorganisms have to work on, the faster materials will decompose. Consider chopping materials, particularly brush or branches which have a diameter of ¼ inch or more. Pile size is also important. For quicker decomposition, pile should be at least 3 feet x 3 feet to hold the heat of microbial activity, but not so large (larger than 5 feet x 5 feet) that air can't reach microbes at the center of the pile.

Use for Compost

Mulch: Spread compost around flower and vegetable plantings, trees, shrubs, and on exposed slopes. This will smother weeds, keep plant roots moist, and prevent soil erosion.

Soil Conditioner: Mix 1-3 inches of compost into vegetable and flower beds before planting. This returns organic matter to the soil in a usable form.

Potting Mix: Make your own mix by using equal parts of compost and sand or soil. Make sure compost is fully decomposed and screened.

Resources

Some books to help you along…

Backyard Composting, Harmonious Technologies, P.O. Box 1865-100 Ojai, CA 93024

How to Grow More Vegetables, John Jeavons, Ecology Action, 5798 Ridgewood Rd. Willits, CA 09590

Let it Rot, Stu Campbell, Storey Communications, Inc., Schoolhouse Rd., RD #1, Box 105, Pownal, VT 05261

The Rodale Guide to Composting, R.A. Simpson, Rodale Press, 33 E. Miner St., Emmaus, PA 18098

Worms Eat My Garbage, Mary Appelhof, Flower Press, 10322 Shaver Rd., Kalamazoo, MI 49002

For additional information on composting or where to get compost materials, call your Rutgers Cooperative Extension county office, found in the telephone directory blue pages, under "County Government" or your county recycling office.

Compost Deconstruction Areas

These areas in New Jersey have various types of compost bins on display. Call ahead for hours and when tours or workshops are given.

Atlantic County
Atlantic County Utilities Authority Geo Garden
6700 Delilah Rd.,
Egg Harbor Township, NJ
Contact: (609) 646-6600

Burlington County
Burlington County Resource Recovery Geo Garden Complex, Rt 543,
Border of Florence and Mansfield Township
Contact: (609) 499-5210

Mazza & Sons, Inc. Recycling Facility
3230 Shafto Rd.,
Tinton Falls, NJ
Contact: (732) 922-9292

Middlesex County
Davidson's Mill Pond Park, Riva Avenue, South Brunswick, NJ
Contact: (732) 745-3443

Monmouth County
Deep Cut Park, Red Hill Rd.,
Middletown, NJ
Contact: (732) 842-4000

Morris County
Frelinghuysen Arboretum, 53 E. Hanover Ave.,
Morris Township, NJ
Contact: (973) 326-7600

Passaic County
Passaic County Office of Recycling
1310 Rt. 23 N,
Wayne, NJ
Contact: (973) 305-5734

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FS805

Fact sheet

Vermicomposting
(Worm Composting)

Jonathan H. Forsell, Agricultural/Resource Management Agent, Essex County

Kitchen wastes, such as fruits, vegetables, coffee grounds, tea bags, and eggshells, are a part of the solid waste stream. Most of this material is disposed of as garbage at transfer stations, landfills, and incinerators at a high economic and environmental cost to citizens. A positive alternative is to compost kitchen scraps using red worms to make a valuable compost for use as a soil amendment or as a starter mix for house plants or seedlings. **Note**: Avoid meats, oils, and grease in the compost system.

Worm composting is enjoyable, and it demonstrates the natural process of decompostion and the life cycle of the organisms involved.

Materials

- A worm bin can be made from an old dresser drawer, a 5-gallon plastic bucket, or from wood. A wooden box should be approximately 2 ft. X 2 ft. X 8 in. high. Do not use cedar, as it is toxic to the worms.

- Bedding material: shredded, moist newspaper, cardboard, and/or leaf compost.

- Watering can or container to provide water for the system.

- Red worms (Eisenia foetida) 1 pound. They can be ordered from:

  Flowerfield Enterprises
  10332 Shaver Road
  Kalamazoo, MI 49002

  Lower East Side Ecological Center
  P. O. Box 20488
  New York, NY 10009

Procedure

1. Shred newspapers or cardboard or use leaf compost. Moisten this material and place it in the bin loosely to provide for air circulation.

2. Add 1 lb. of red worms to the bin. They will crawl to the bottom of the bedding material to avoid the light.

3. Place food scraps except animal products (meats, greases, etc.) under the bedding. The worms can consume 3 to 3 1/2 lbs. of kitchen waste per week while making vermicompost.

4. Keep the bin covered loosely with plastic or newspaper to retain moisture. The box should be checked every day or two

for moisture. When the surface or edges of the bedding begin to dry, add water.

Summary

The process takes about 3 to 4 months to produce a finished vermicompost product, which looks like brown coffee grounds. The compost consists of worm castings, partially decomposed kitchen waste, and some undecomposed bedding. The worms eat not only the food, but also the newspaper or other bedding. Vermicompost can be mixed into garden soil to improve structure and to provide nutrients, can be used as mulch, or as a potting soil mix.

To separate the compost, place it on a table under lights. The worms will go to the bottom of the pile away from the light. Remove the finished compost and start the process over again. Because the worms have reproduced, you can separate out the surplus and start a new box. Always keep the bin at a temperature above freezing and below 95° F. The bin should be kept indoors in winter, but can be placed in the shade in summer. Stop feeding for several days or weeks before ready to use.

References

Appelhof, Mary. 1982. Worms Eat My Garbage. Flower Press, Kalamazoo, MI.

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FS389

Fact sheet

Minimizing Waste Disposal: Grass Clippings

Peter F. Strom, Ph.D., Associate Professor of Environmental Science; James A. Murphy, Ph.D., Specialist in Turfgrass Management; and Henry W. Indyk, Ph.D., Specialist Emeritus in Turfgrass Management

Since refuse disposal costs have dramatically increased, and some landfills no longer accept grass clippings, many individuals and governmental agencies are seeking alternatives for disposal of clippings. During the maximum grass growing period, the municipal refuse load in some New Jersey suburban communities may contain nearly one-third grass clippings. Collected clippings become anaerobic very quickly because of their high demand for oxygen. After becoming anaerobic they emit strongly unpleasant odors. Therefore, grass clippings (in quantity) are difficult to handle and to process.

From our own experience with the handling and disposal of grass clippings, and discussions with others such as lawn care professionals, we suggest considering the following methods to reduce landfilling:

1. RETURN TO LAWN — It is most desirable to leave grass clippings uncollected on the lawn so that they are recycled, contributing to soil organic matter and supplying part of the fertilizer needs of the lawn. Adopt a mowing schedule to keep clippings short enough to filter through growing grass and not remain as a mat on top of the lawn. Research and experience indicate that only 1/3 of the grass length should be removed during mowing. Never allow the lawn grass to double its height between mowings. This approach not only eliminates clipping collection and disposal problems, but also can contribute to improvement of the lawn.

Clippings are not a cause of thatch in lawns. Rather, thatch is formed primarily from a dense accumulation of grass roots and stemmy material. Returning clippings along with proper mowing frequency will not increase disease problems.

Use caution when removing collection bags from mowers. Some machines are not designed to operate safely without a bag or other attachment in place. If you are unsure, check with your equipment supplier.

2. GARDEN MULCH — Grass clippings can be used as a garden mulch. To minimize any tendency to protect slugs, clippings can be dried in the sun for a day prior to being used in this way. Clippings can be spread on garden soil to check weed growth, reduce soil spattering and crusting, moderate soil temperatures, etc. As a precaution, do not use grass clippings from herbicide-treated lawns until after two grass cuttings have been made.

3. SOIL INCORPORATION — Clippings can serve as a source of organic matter for soil improvement when incorporated into the garden.

4. BACKYARD COMPOSTING — Grass clippings can be composted, particularly when incorporated into a backyard leaf composting pile. However, grass has a high nitrogen content, a much higher demand for oxygen than leaves, and a tendency to mat, thereby greatly reducing the passage of oxygen. Composting piles containing

grass clippings thus readily become anaerobic. This, in turn, can produce strong, unpleasant odors. These odors are particularly noticeable when the pile is disturbed.

Because of these problems, grass clippings should not be composted alone, but rather mixed with composting leaves. The partially decayed leaves which now (6-9 months after leaf fall) have a low demand for oxygen, will serve as a bulking agent permitting more oxygen to reach the grass. Grass, which is high in nitrogen, will provide a more rapid decomposition of the remaining leaves as long as it remains under aerobic conditions. Grass clippings will also contribute to a better end product (higher nitrogen content) than that obtained from composting leaves alone. One must be aware, however, that an excess of damp grass in the pile will soon become anaerobic, produce very unpleasant odors, and reduce the rate of decomposition. The objective is to keep the material **aerobic**. Also, to ensure that excess nitrogen is not given off as ammonia, do not add more than 1 part fresh grass clippings to 3 parts partially composted leaves.

The resulting compost can be used as a soil amendment, as a mulch for gardens, flower or shrub beds, or as a potting medium.

5. MUNICIPAL COMPOSTING — Some grass clippings can be incorporated into a municipal leaf composting operation. However, problems that may be experienced with backyard grass composting could be greatly magnified at a municipal facility. Even grass stored for one day or less in plastic bags or the back of a lawn maintenance pick-up truck may emit very unpleasant odors when being unloaded at the site. For this reason, grass clippings are banned at many leaf composting facilities, unless they are very isolated. Research is continuing in this area, but other problems include the high cost of collection and an inadequate supply of leaves for the amount of clippings.

Partially composted leaves should be mixed with the grass in a 3:1 ratio, or more. Because the leaves have already decomposed by the time the grass comes to the site, however, this means the ratio actually collected must be at least 6:1. For most towns this would be possible only if most of the grass clippings are handled directly by residents on their own property.

6. CLIPPING REDUCTION — Fertilizing and watering above the requirements of the grasses may be more detrimental than beneficial to the lawn. One of the effects is increased production of clippings. (Another is potential ground or surface water pollution.) Judicious and proper use of fertilizer and water can provide an attractive lawn with a reduction in the costs, effort, susceptibility to disease, and amount of clippings produced. A fertilization program should emphasize fertilizing the lawn in the fall season rather than in the spring. This can be effective not only in reducing the amount of clippings produced, but also in contributing to a better lawn.

Two related fact sheets: “Backyard Leaf Composting” (FS074) and “Using Leaf Compost” (FS117), and assistance with procedures covered above, may be obtained from the Rutgers Cooperative Extension office in your county. The telephone number appears under County Government in your local phone directory.

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FS074

Fact sheet

Backyard Leaf Composting

Franklin Flower, Extension Specialist Emeritus in Environmental Science
Peter Strom, Assistant Professor in Environmental Science

Many New Jersey homeowners have an excessive quantity of leaves in the fall. One alternative for deal-ing with leaves is backyard composting. This process involves primarily the microbial decomposition of organic matter. Compost - the end result - is a dark, friable, partially decomposed substance similar to natural organic matter found in the soil.

The Composting Process

Composting speeds natural decomposition under semi-controlled conditions. Raw organic materials can be converted into compost by microorganisms. As microorganisms decompose organic matter, temperatures within the pile increase, sometimes approaching l50 degrees F. at the center. These inside-pile temperatures speed the process, and kill many weed and disease organisms.

Leaves may be composted by piling them in a heap. Locate the pile where drainage is adequate and there is no standing water. The composting pile should be damp enough that when a sample taken from the interior is squeezed by hand a few drops of water will appear. A shaded area will reduce moisture evaporation from the surface, but tree roots may grow into the pile. If the surface of the pile becomes excessively dry, it will not compost, and those leaves may blow away.

The leaf pile should be at least 4 feet in diameter and 3 feet in height. If it is too small, it is difficult to maintain adequate temperatures for rapid decomposition. The maximum size should be about 5 feet in height and l0 feet in diameter. If the pile is too large, the interior will not obtain the oxygen needed for adequate, odor-free decomposition. If more material is available, lengthen the pile into a rectangular shape while keeping it l0 feet wide and 5 feet high. If there is sufficient space and material, two or three piles will provide greater flexibility. One pile can contain compost for immediate use; the second is actively composting; and the third receives newly fallen leaves. If there is space for only one pile, new material may be added gradually to the top while removing the decomposed product from the bottom.

Containing the Pile

Composting may be done in a loose pile. However, for the most efficient use of space, it can be contained in a bin or other enclosure. The sides of this bin should be loose enough to permit air movement. One side should be open, or easily opened, for turning the pile and for removing the finished compost.

Woven wire or wooden slat fencing, or cement blocks on their sides have been used successfully. Wood gradually decomposes, and wire fencing may rust, so these materials will need periodic replacement. Wooden stakes driven into the ground may attract termites, so lumber treated with wood preservative or metal snow-fence posts may be better.

Constructing the Pile

Many instruction sheets advocate constructing the pile in layers that may include grass clippings, fertilizer, limestone, manure, soil, and leaves. However, we have found this practice to be unnecessary. The pile can be constructed of leaves only. A small amount of grass clippings may be added to the leaves as the pile is being constructed. However, because of its high demand for oxygen, too much grass tends to cause an anaerobic (without oxygen) condition. This greatly reduces the composting rate, and can produce unpleasant odors. Fresh vegetable peelings may be included, but do not add meat or grease because they may cause odors or attract pests.

Unless leaves are collected in a very wet condition, add water while placing them in the pile. Without moisture, the microorganisms will not function. Moist-en to the point

where it is possible to squeeze droplets of water from a hand-held mass of leaves.

Dead leaves lack adequate nitrogen for rapid decomposition. Therefore, a high-nitrogen fertilizer added to the pile may speed up decomposition. However, since leaves fall only for about 2 months a year, there are l0 months for decomposition before space is needed for the next batch. So, while it is generally unnecessary to add fertilizer, for more rapid decomposition and a product with a higher nutritive content, 5 ounces (about 1/2 cup) of 10% nitrogen fertilizer per 20-gallon can of hand-compacted leaves could be added. Fresh manure could be substituted, but it may cause odor problems.

Ordinarily it is unnecessary to add ground limestone because the pile seldom becomes too acidic. If fertilizer has been added, an equivalent quantity of limestone will counteract any acidity. Little or no limestone should be added if the compost is to be used on acid-loving plants.

Some guides on leaf composting recommend adding layers of soil periodically to the piles to supply the microorganisms needed for decomposition. We have not found this practice to be necessary, because leaves, themselves, contain a multitude of microorganisms. Available commercial activators or starters definitely are not needed.

Avoid packing the materials too tightly. Too much compaction will limit movement of air through the pile. Shredding the leaves generally speeds up composting.

To reduce weed germination, weeds in flower or with seeds should not be composted. Also, it is best to avoid composting diseased plants, or herbicide-treated lawn clippings until after at least three mowings.

Care of the Pile

The composting pile must be kept moist, but not soggy, for proper decomposition. Inadequate moisture reduces microbial activity, while excessive water may cause anaerobic conditions. A thin outer layer of dry leaves is unavoidable.

The pile should be periodically turned or mixed. The main objectives of turning are to shift materials from the outer parts of the pile closer to the center for better decomposition, and to incorporate oxygen. During warm weather, turn the pile once a month. In cool weather frequent turning is not recommended because it allows too much heat to escape. Piles should be turned immediately if ammonia or other offensive odors are detected. If space is available, turning may be accomplished by shifting the entire pile to an adjacent area or bin.

Within a few weeks after starting, the pile should be hot in the center. Heating generally indicates that the pile is decomposing properly. Failure to heat may be caused by too little or too much water, improper aeration, packing too tightly, or a pile that is too small. As leaves decompose, they should shrink to less than one-half of their original volume. During dry weather it may be necessary to add more water. The moisture content of the interior of the pile should be observed while turning.

Using Leaf Compost

Finished compost should be dark and crumbly with much of the original appearance no longer visible. It should have an earthy odor. Normally, compost will be ready in 4-9 months.

The major horticultural use for leaf compost is to improve the organic content of soil. Most New Jersey soils need an increase of 1/2 to 1% in organic content, particularly to improve moisture-holding capacity and tilth. Leaf compost is not normally a fertilizer, because it is too low in nutrients. Compost serves primarily as an organic amendment and as a soil conditioner. Soil mulch is another valuable use for leaf compost.

Based in part on Experiment Station Research Project No. 07526.

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RUTGERS COOPERATIVE EXTENSION
N.J. AGRICULTURAL EXPERIMENT STATION
RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY
NEW BRUNSWICK

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Division of Watershed Management
PO Box 418
Trenton, NJ 08625-0418
609-984-0058

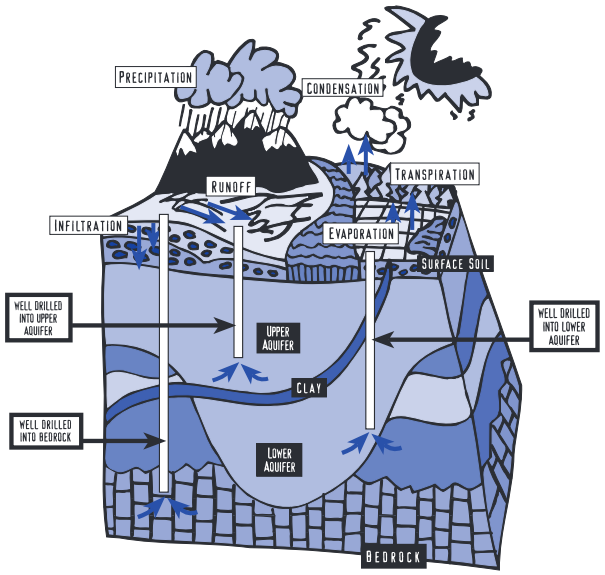
WATER RESOURCE PROTECTION PRACTICES

State of New Jersey
Christine Todd Whitman, Governor
Department of Environmental Protection
Robert C. Shinn, Jr., Commissioner

Printed on Recycled Paper

WHAT IS GROUND WATER?

Where does the water that rains on your home go? After it leaves your lawn, street or sidewalk, where is it headed? Does it wander into a wetlands? Does it puddle in your backyard? Does it zip down a sink hole? If it soaks into the ground, it becomes ground water.



A sizable amount of rainwater runoff seeps into the ground to become ground water. Ground water moves into water-filled layers of porous geologic formations called aquifers. If the aquifer is close to the surface, its ground water can flow into nearby waterways or wetlands, providing a base flow. Depending on your location, aquifers containing ground water can range from a few feet below the surface to several hundred feet underground. Aquifer recharge areas are locations where rainwater and other precipitation seeps into the earth's surface to enter an aquifer. Contrary to popular belief, aquifers are not flowing underground streams or lakes.

Ground water moves at an irregular pace, seeping from more porous soils, from shallow to deeper areas and from places where it enters the Earth's surface to where it is discharged or withdrawn. A system of more than 100 aquifers is scattered throughout New Jersey, covering 7,500 square miles.

WHY IS GROUND WATER IMPORTANT?

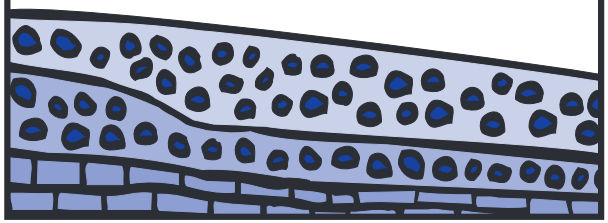
Ground water is the primary drinking water source for half of the state's population. Most of this water is obtained from individual domestic wells or public water supplies which tap into aquifers. New Jersey agriculture also depends on a steady supply of clean ground water for irrigation.

GROUND WATER COMPLICATIONS

Humans have an impact on ground water in a number of ways. One way people influence ground water is by changing where stormwater flows. By changing the contour of the land and adding impervious surfaces such as roads, parking lots and rooftops, people change how and where water goes. When it rains, the stormwater in a developed area is less able to soak into the ground because the land is now covered with roads, rooftops and parking lots. Less ground water will be recharged and more water will flow directly into streams and rivers.

Another way people affect ground water is by adding potential pollution sources. How the land above ground water is used by people, whether it is farms, houses or shopping centers, has a direct impact on ground water quality. As rain washes over a parking lot, it might pick up road salt and motor oil and carry these pollutants to a local aquifer. On a farm or suburban lawn, snow melt might soak fertilizers and pesticides into the ground.

When properly used, the amount of ground water pumped out for human purposes is less than what nature supplies to recharge the aquifer. If overused, more water is pumped out than is recharged. With less ground water in the aquifer, it becomes more difficult to use and more susceptible to pollution and salt water intrusion.

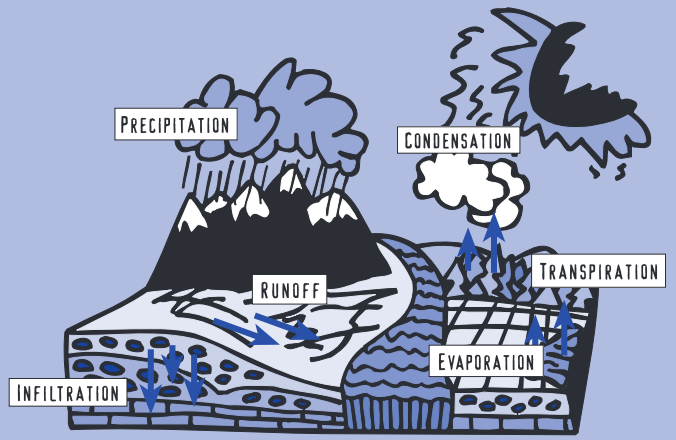


WATER CONSERVATION

Conserving water through efficient water use can help prevent pollution. Using less water reduces the runoff of agricultural pollutants pesticides and fertilizers. Diverting less water from waterways or aquifers leaves more water in streams or lakes, protecting existing ecosystems such as wetlands (which absorb certain types of pollution) and water supplies.

Water conservation can also save money by reducing pumping and treatment costs both before water reaches your home and after it leaves. Reduced water use may extend the life of existing sewage treatment facilities. It can also eliminate the need to develop a new water supply. New wells and reservoirs are expensive and time consuming to locate and build.

THE WATER CYCLE



For millions of years, water has been used. It is constantly being recycled and reused. It is important to understand how water moves through the Earth's water cycle, which is defined as the movement of water from the Earth's surface into the atmosphere and back to the Earth's surface again.

When it rains, the rainwater flows overland into waterways or is absorbed by the ground or plants. Water evaporates from land and water bodies, becoming water vapor in the atmosphere. Water is also released from trees and other plants through "transpiration." The water vapor from evaporation and transpiration forms clouds in the atmosphere which in turn provide precipitation (rain, hail, snow, sleet) to start the cycle over again. This process of water recycling, known as the water cycle, repeats itself continuously.

What is Nonpoint Source Pollution?

Nonpoint Source Pollution, or people pollution, is a contamination of our ground water, waterways, and ocean that results from everyday activities such as fertilizing the lawn, walking pets, changing motor oil and littering. With each rainfall, pollutants generated by these activities are washed into storm drains that flow into our waterways and ocean. They also can soak into the ground contaminating the ground water below.

Each one of us, whether we know it or not, contributes to nonpoint source pollution through our daily activities. As a result, nonpoint source pollution is the BIGGEST threat to many of our ponds, creeks, lakes, wells, streams, rivers and bays, our ground water and the ocean.

The collective impact of nonpoint source pollution threatens aquatic and marine life, recreational water activities, the fishing industry, tourism and our precious drinking water resources. Ultimately, the cost becomes the burden of every New Jersey resident.

But there's good news - in our everyday activities we can stop nonpoint source pollution and keep our environment clean. Simple changes in YOUR daily lifestyle can make a tremendous difference in the quality of New Jersey's water resources. Here are just a few ways you can reduce nonpoint source pollution.

LITTER: Place litter, including cigarette butts and fast food containers, in trash receptacles. Never throw litter in streets or down storm drains. Recycle as much as possible.

FERTILIZERS: Fertilizers contain nitrates and phosphates that, in abundance, cause blooms of algae that can lead to fish kills. Avoid the overuse of fertilizers and do not apply them before a heavy rainfall.

PESTICIDES: Many household products made to exterminate pests also are toxic to humans, animals, aquatic organisms and plants. Use alternatives whenever possible. If you do use a pesticide, follow the label directions carefully.

HOUSEHOLD HAZARDOUS PRODUCTS: Many common household products (paint thinners, moth balls, drain and oven cleaners, to name a few) contain toxic ingredients. When improperly used or discarded, these products are a threat to public health and the environment. Do not discard with the regular household trash. Use natural and less toxic alternatives whenever possible. Contact your County Solid Waste Management Office for information regarding household hazardous waste collection in your area.

MOTOR OIL: Used motor oil contains toxic chemicals that are harmful to animals, humans and fish. Do not dump used motor oil down storm drains or on the ground. Recycle all used motor oil by taking it to a local public or private recycling center.

CAR WASHING: Wash your car only when necessary. Consider using a commercial car wash that recycles its wash water. Like fertilizers, many car detergents contain phosphate. If you wash your car at home, use a non-phosphate detergent.

PET WASTE: Animal wastes contain bacteria and viruses that can contaminate shellfish and cause the closing of bathing beaches. Pet owners should use newspaper, bags or scoopers to pick up after pets and dispose of wastes in the garbage or toilet.

SEPTIC SYSTEMS: An improperly working septic system can contaminate ground water and create public health problems. Avoid adding unnecessary grease, household hazardous products and solids to your septic system. Inspect your tank annually and pump it out every three to five years depending on its use.

BOAT DISCHARGES: Dumping boat sewage overboard introduces bacteria and viruses into the water. Boat owners should always use marine sanitation devices and pump-out facilities at marinas.

As you can see, these suggestions are simple and easy to apply to your daily lifestyle. Making your commitment to change at least one habit can result in benefits that will be shared by all of us and add to the health and beauty of New Jersey's water resources.



What's a watershed?

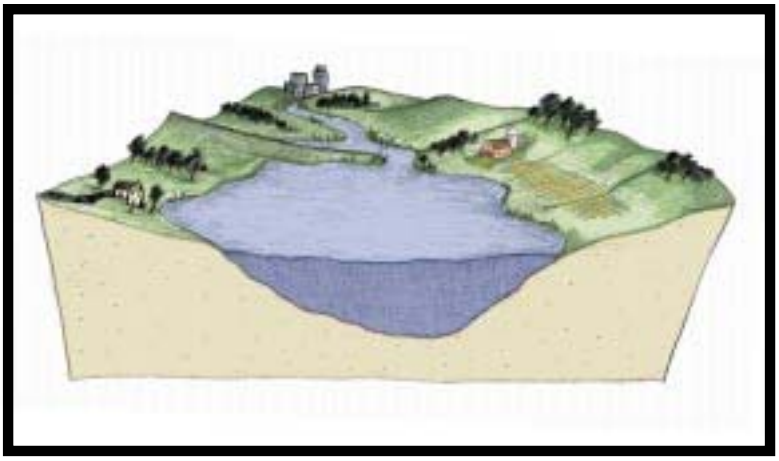
No matter where you are in New Jersey, you are in a watershed. Watersheds are everywhere ... from your front doorstep to the local park to the shopping mall to the creek down the road. Watersheds are the link between our land, our water and our communities because the quality of our water is linked to how we use the watershed surrounding it.

So what is a watershed?





What's a watershed?



A watershed is the area of land that drains into a body of water such as a river, lake, stream or bay. It is separated from other watersheds by high points in the area such as hills or slopes. It includes not only the waterway itself but also the entire land area that drains to it. For example, the watershed of a lake would include not only the streams entering that lake but also the land area that drains into those streams and eventually the lake. Drainage basins generally refer to large watersheds that encompass the watersheds of many smaller rivers and streams.

What's the water cycle?

For millions of years, water has been used. It is constantly being recycled and reused. It is important to understand how water moves through the Earth's water cycle, which is defined as the movement of water from the Earth's surface into the atmosphere and back to the Earth's surface again.

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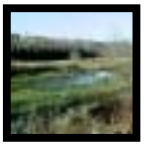
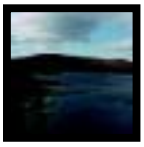
What's your watershed address?

Where does the water that rains on your home go? After it leaves your lawn, street or sidewalk where is it headed? Does it flow downhill straight to a nearby stream or lake? Does it wander into a wetlands? Does it puddle in your backyard? Does it zip down a storm drain to a local creek?

That destination, whether it's a puddle, a pond, a bay or a lake, is your watershed address. It could be Duck Pond, Spring Lake, Millstone River, Barnegat Bay or Beaver Brook. Just like there are towns within counties within states, there are subwatersheds within watersheds within drainage basins. For example, the rain that falls on your driveway might flow into Lake Hopatcong, which flows into the Musconetcong River, which flows into the Delaware River. So your watershed address would be Lake Hopatcong, Musconetcong River, Delaware River even though your mail finds you through Jefferson Township, Morris County, New Jersey.





What's ground water?

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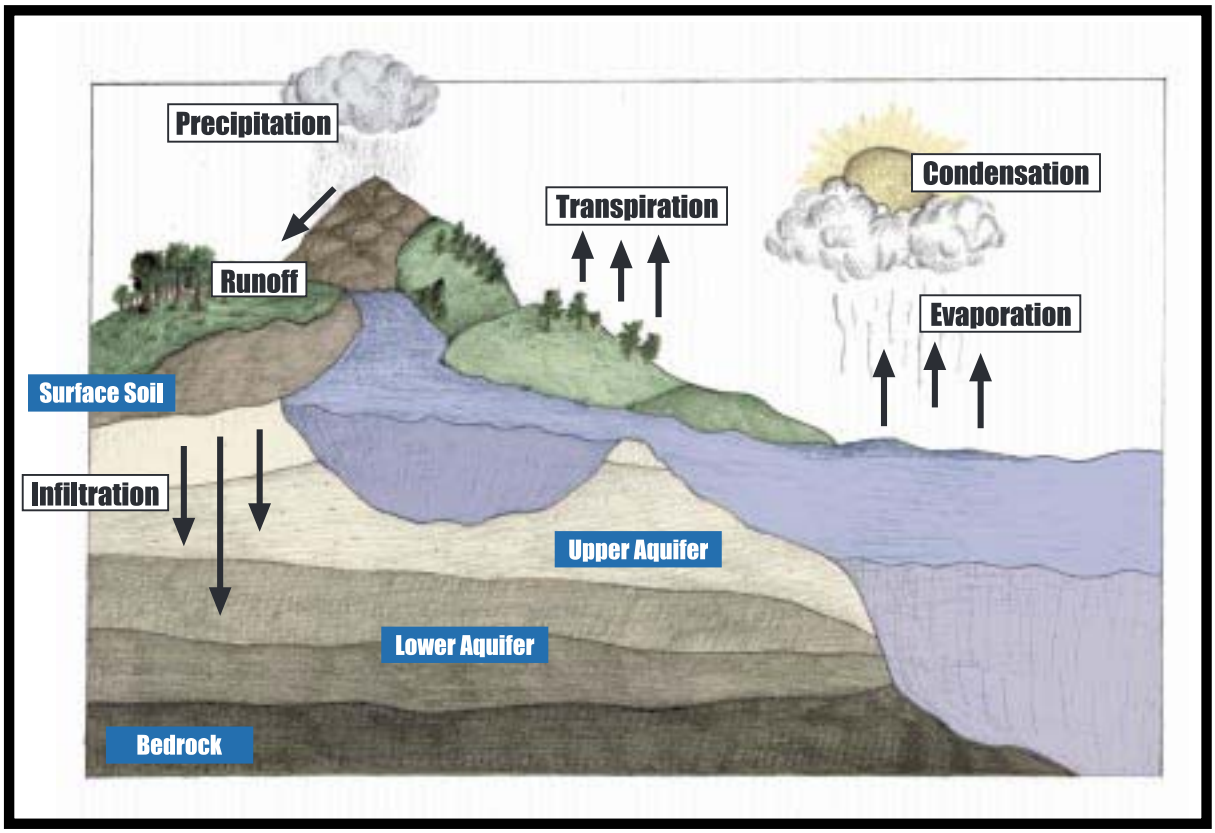
Why is ground water important?
Ground water is the primary drinking water source for half of the state's population. Most of this water is obtained from individual domestic wells or public water supplies which tap into aquifers. New Jersey agriculture also depends on a steady supply of clean ground water for irrigation.



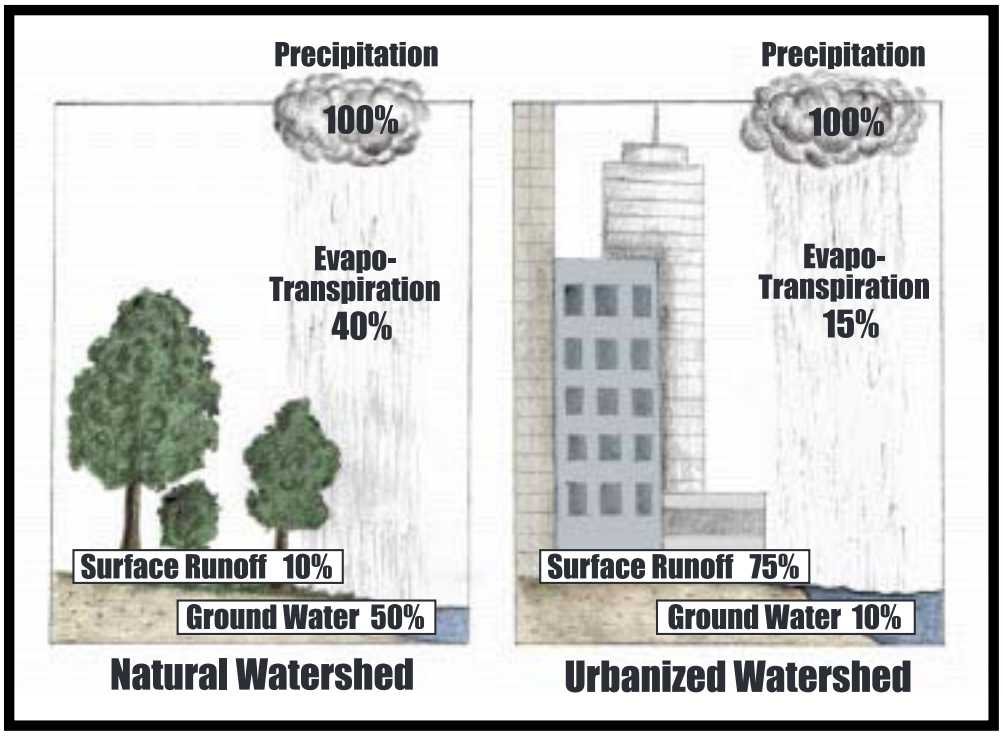
How does urbanization change a watershed?

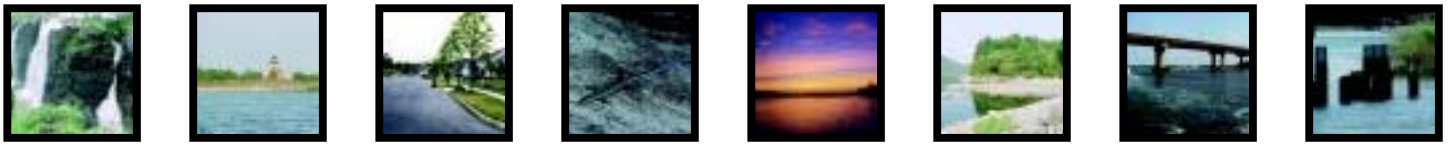
Urbanization (or development) has a great effect on local water resources. It changes how water flows in the watershed and what flows in the water. Both surface and ground water flow are changed.

As a watershed becomes developed, trees, shrubs and other plants are replaced with impervious surfaces (roads, rooftops, parking lots and other hard surfaces that do not allow stormwater to soak into the ground). Without the plants to store and slow the flow of stormwater, the rate of stormwater runoff is increased. Less stormwater soaks into the ground because the sidewalks, roads, parking lots and rooftops block this infiltration. This means a greater volume of water reaches the waterway faster and less water infiltrates to ground water. This in turn leads to more flooding after storms and reduced flow in streams and rivers during dry periods. The reduced amount of infiltrating water can lower ground water levels, which in turn can stress local waterways that depend on steadier flows of water.

In the stream, more erosion of stream banks and scouring of channels will occur due to volume increase. This in turn degrades habitat for plant and animal life that depend on clean water. Sediment from eroded stream banks clogs the gills of fish and blocks light needed for plants. The sediment settles to fill in stream channels, lakes and reservoirs. This also increases flooding and the need for dredging to clear streams or lakes for boating.

In addition to the high flows caused by urbanization, the increased runoff also contains increased contaminants. These include litter, cigarette butts and other debris from sidewalks and streets, motor oil poured into storm sewers, heavy metals from brake linings, settled air pollutants from car exhaust and pesticides and fertilizers from lawn care. These contaminants reach local waterways quickly after a storm.





What's watershed management?

The watershed management approach seeks to effectively protect our water resources by taking into account the entire watershed. Successful watershed management requires the participation and involvement of the entire community within the watershed boundaries, including industry, government, business and citizens. Since everyone may contribute to watershed problems, all should be involved in identifying both the problems and the solutions.

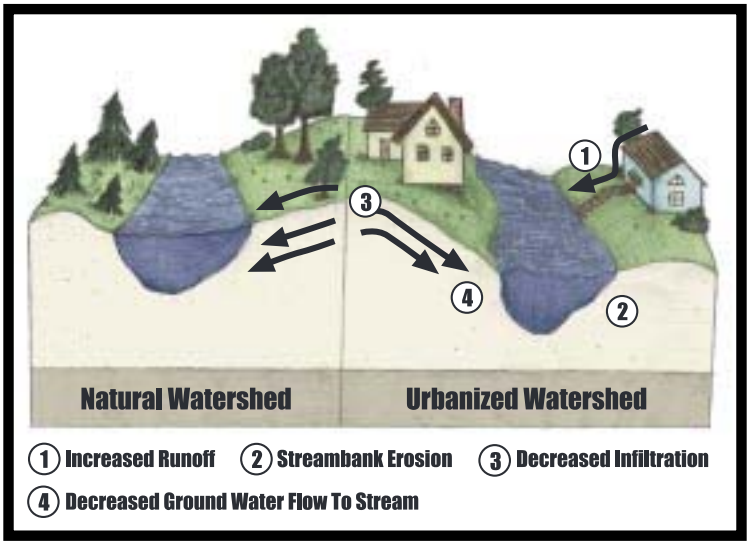
One of the first steps in watershed management is problem identification. Does the local lake choke with weeds in the summer? Are failing septic systems closing shellfish beds? Is increased runoff causing stream banks to erode?

Once the problems and their causes have been identified, practical solutions must be chosen. The watershed community must identify traditional or innovative solutions that will work in their area. These solutions can range from changes to municipal stormwater ordinances to homeowner education about lawn care to stream bank restoration projects.

Identifying which solutions are right for a particular watershed is a crucial component of the watershed management process. Different solutions work in different communities. Developed with the watershed community of industry, government, business and citizens, watershed management planning reflects the concerns and priorities of that community.

Once solutions have been identified, they must be implemented to be successful. This can be the most difficult part of the process. How can implementation be ensured? Who will carry out the plan? Is the community committed to implementing the plan? Are there resources available to do it?

The advantage of watershed management planning is that it addresses all sources of pollution within the watershed and is developed by the community most affected by it. Nonpoint source pollution is particularly suited to this approach because it is frequently beyond the scope of traditional regulatory programs. The plan can incorporate solutions ranging from change in local land use to integrated pest management. Each plan will uniquely fit the problems and solutions of its watershed.



New Jersey's five watershed bureaus and 20 watershed management areas

Northwest Bureau
(609) 633-3812

1. Upper Delaware River
2. Walkill, Pochuck, Papakating
11. Central Delaware Tributaries

Northeast Bureau
(609) 633-1179

3. Pompton, Pequannock, Wanaque, Ramapo
4. Lower Passaic, Saddle
5. Hackensack, Pascack, Hudson
6. Upper and Mid-Passaic, Whippany, Rockaway

Raritan Bureau
(609) 633-7020

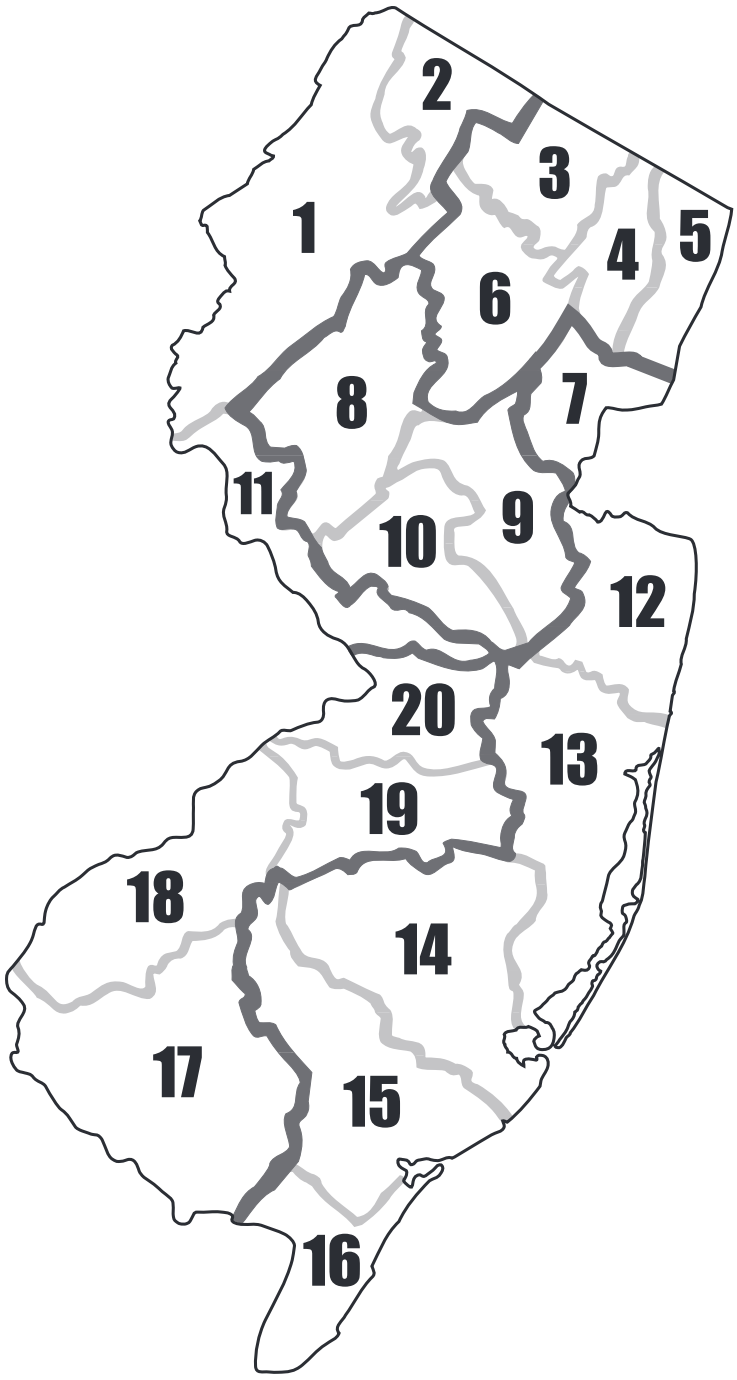
7. Elizabeth, Rahway, Woodbridge
8. North and South Branch Raritan
9. Lower Raritan, South River, Lawrence Brook
10. Millstone River

Atlantic Coastal Bureau
(609) 984-6888

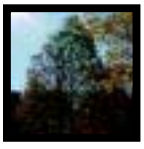
12. Monmouth Watersheds
13. Barnegat Bay Watersheds
14. Mullica, Wading River
15. Great Egg Harbor, Tuckahoe
16. Cape May Watersheds

Lower Delaware Bureau
(609) 633-1441

17. Maurice, Salem, Cohansey
18. Lower Delaware Tributaries
19. Rancocas Creek
20. Crosswicks Creek





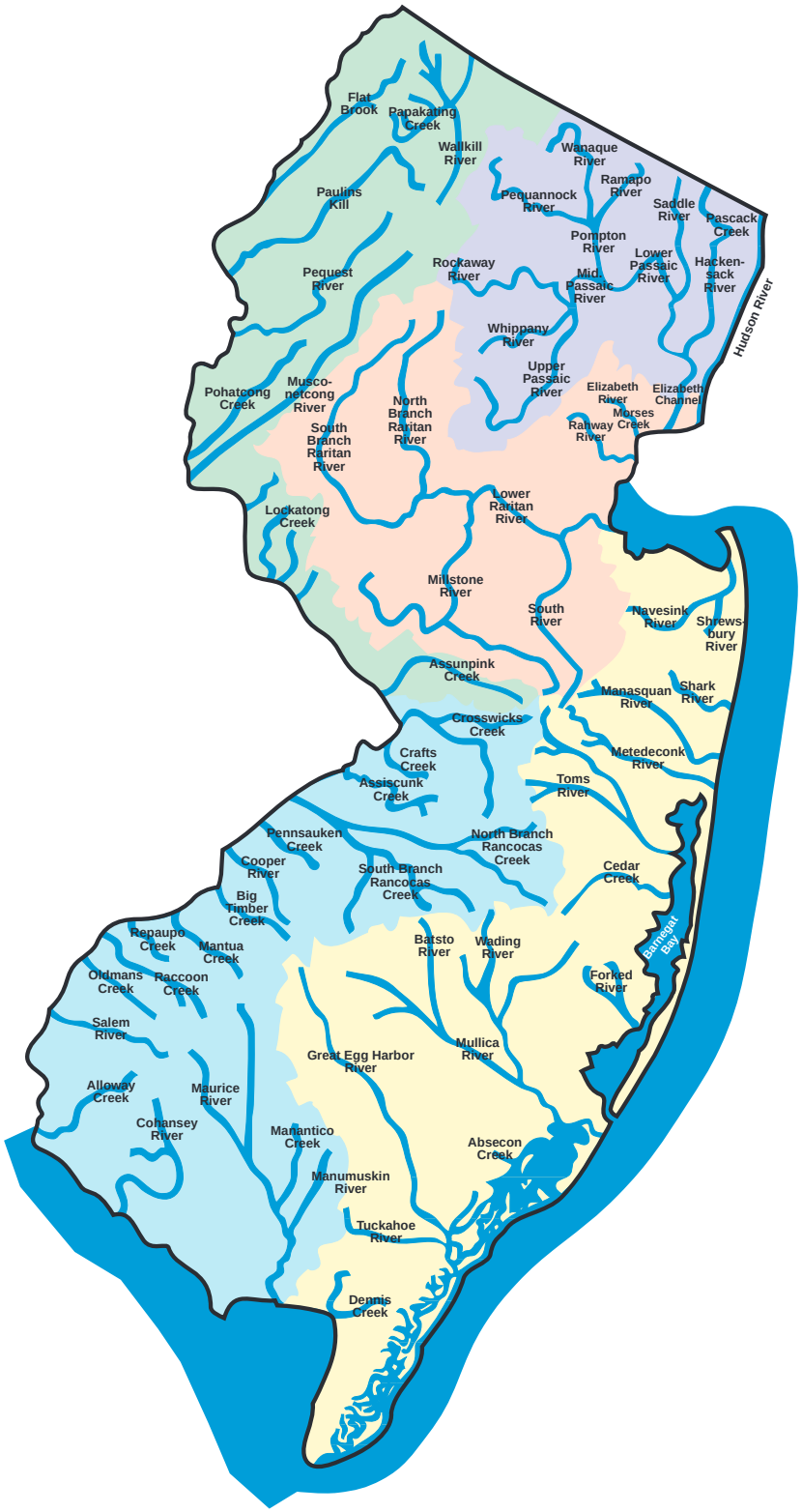





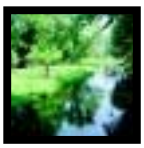
New Jersey's five watershed regions and major waterways

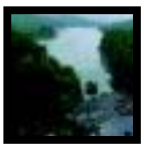
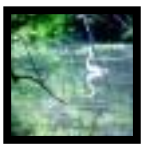
watershed regions

- Atlantic Coastal
- Lower Delaware
- Northeast
- Northwest
- Raritan





Watershed protection and nonpoint source pollution
what you can do today!

One way you can protect your watershed is to reduce nonpoint source pollution. Nonpoint source pollution or "people pollution" is contamination of our watersheds, ground water, waterways and ocean that results from everyday activities such as fertilizing the lawn, walking pets, changing motor oil and littering. With each rainfall, pollutants generated by these activities are washed from the entire watershed into local waterways. They can also soak into the ground contaminating the ground water below.

But there is good news - in our everyday activities we can stop nonpoint source pollution and keep our environment clean. Simple changes in your daily lifestyle can make a tremendous difference in the quality of New Jersey's water resources. Here are a few ways that you can reduce nonpoint source pollution:

Place litter in trash receptacles. Never throw litter, including cigarette butts and fast food containers, in streets or down storm drains. Recycle as much as possible.

Avoid the overuse of fertilizers. Do not apply them before a heavy rainfall. Do a soil test to see if fertilizers are necessary. Fertilizers contain nitrates and phosphates that, in abundance, cause blooms of algae that can lead to fish kills.

Use alternative to pesticides whenever possible. If you do use a pesticide, follow the label directions carefully. Many household products made to exterminate pests are also toxic to humans, animals, aquatic organisms and plants.

Pick up after your pet. Pet owners should use newspaper, bags or scoopers to pick up after their pets and dispose of wastes in the garbage or toilet, not the storm drain. Animal wastes contain bacteria and viruses that can contaminate shellfish and cause the closing of bathing beaches. Animal waste also contains nutrients that can cause algae blooms that are unsightly and can lead to fish kills.

Do not feed ducks and geese. Feeding ducks, geese and other waterfowl causes them to concentrate in small areas resulting in concentrated animal waste, causing the same problems as pet waste.

Dispose of household hazardous waste properly. Do not pour household hazardous products down any drain or toilet. Do not discard with the regular household trash. Use natural and less toxic alternatives whenever possible. Contact your County Solid Waste Management Office for information regarding household hazardous waste collection in your area. Many common household products (paint thinners, mothballs, drain and oven cleaners, to name a few) contain toxic ingredients. When improperly used or discarded, these products are a threat to public health and the environment.

Recycle all used motor oil. Do not dump used motor oil down storm drains or on the ground. Take it to a local public or private recycling center. Used motor oil contains toxic chemicals that are harmful to animals, humans and fish.

Wash your car only when necessary. Consider using a commercial car wash that recycles its wash water. Like fertilizers, many car detergents contain phosphate. If you wash your car at home, use a non-phosphate detergent.

Treat your septic system with respect. Avoid adding unnecessary grease, household hazardous products and solids to your septic system. Conserve water. Inspect your tank annually and pump it out every three to five years depending on its use. An improperly working septic system can contaminate ground water and create public health problems.

Use marine sanitation devices and pump-out facilities at marinas when boating. Observe the state's no discharge zones. Dumping boat sewage overboard introduces bacteria and viruses into the water.

For additional information please contact:
New Jersey Department of Environmental Protection Watershed Management
P.O. Box 418 401 East State Street Trenton New Jersey 08625-0418
609-292-2113 www.state.nj.us/ dep/ watershedmgt

COLORING BOOK

HEY KIDS,

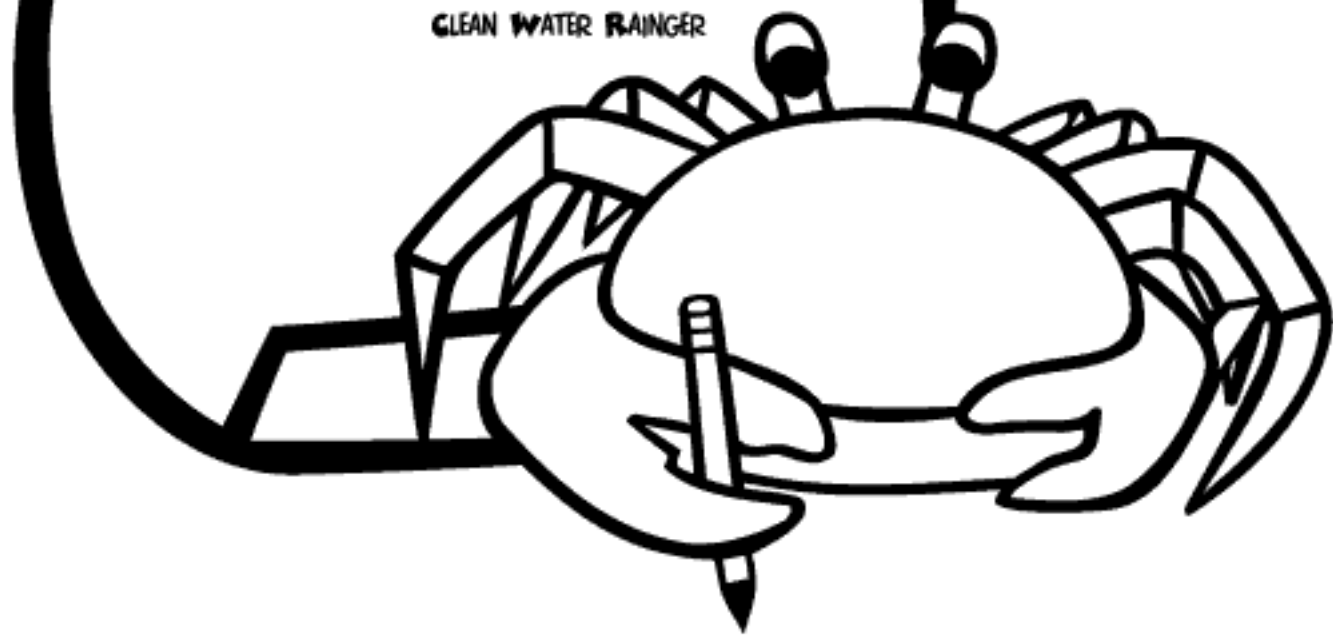
ARE YOU INTERESTED IN KEEPING NEW JERSEY'S WATER CLEAN? WELL, WE NEED YOUR HELP! NOT LONG AGO, MY FRIENDS AND I FOUND THAT ONE OF NEW JERSEY'S BIGGEST WATER POLLUTION PROBLEMS COMES FROM PEOPLE -- FROM HOW WE LIVE OUR DAILY LIVES. THAT MEANS THINGS LIKE LITTERING, NOT CLEANING UP AFTER PETS, USING TOO MANY PESTICIDES, AND DUMPING MOTOR OIL DOWN STORM DRAINS. WITH CLOSE TO EIGHT MILLION PEOPLE LIVING IN THE STATE, WHAT EVERYBODY DOES CAN REALLY ADD UP.

THIS COLORING BOOK TELLS THE STORY OF HOW WE FOUND THE SOURCE OF THE PROBLEM, AND IT TELLS WHY WE STARTED THE CLEAN WATER RANGER TEAM.

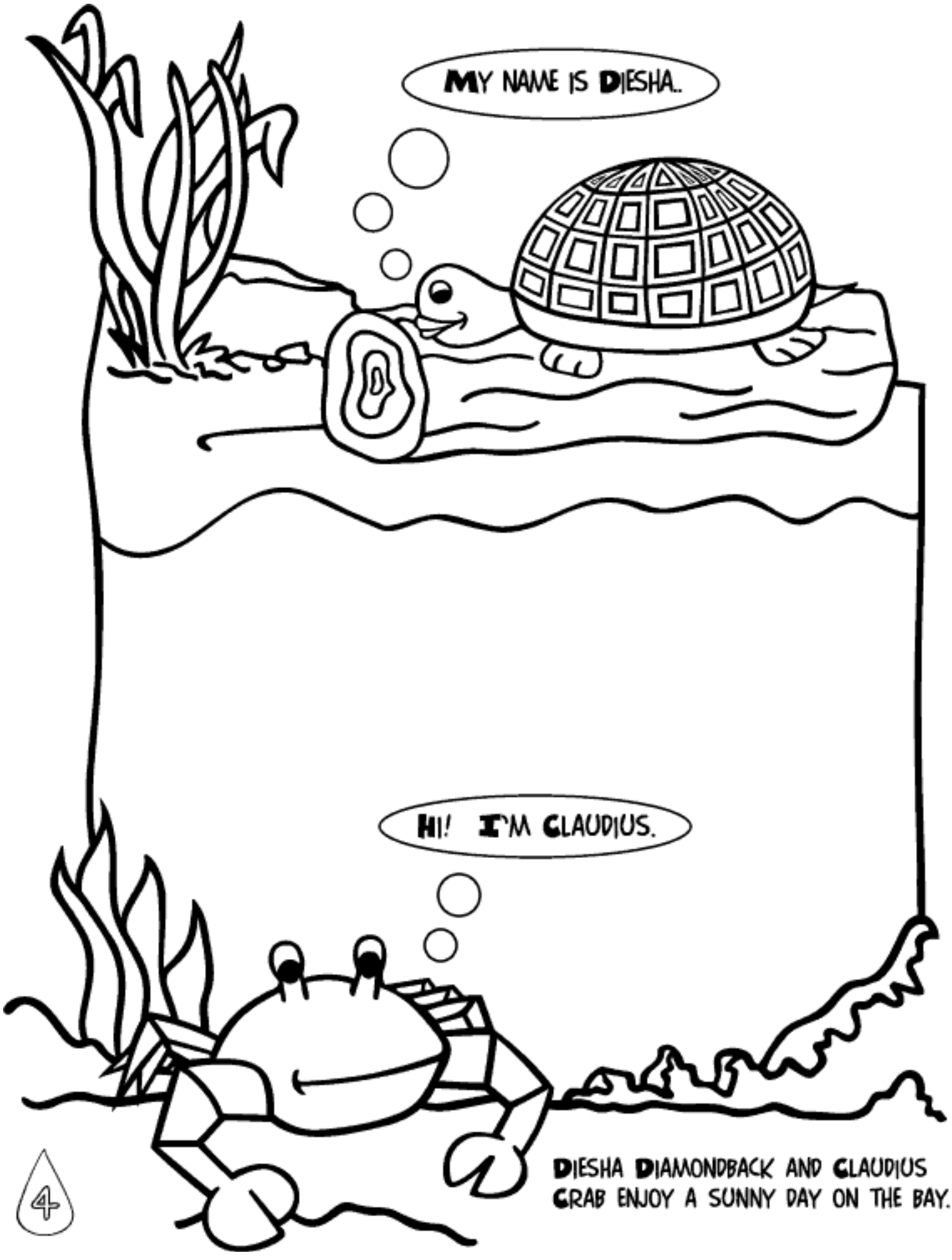
YOUR FRIEND,

Claudius Crab

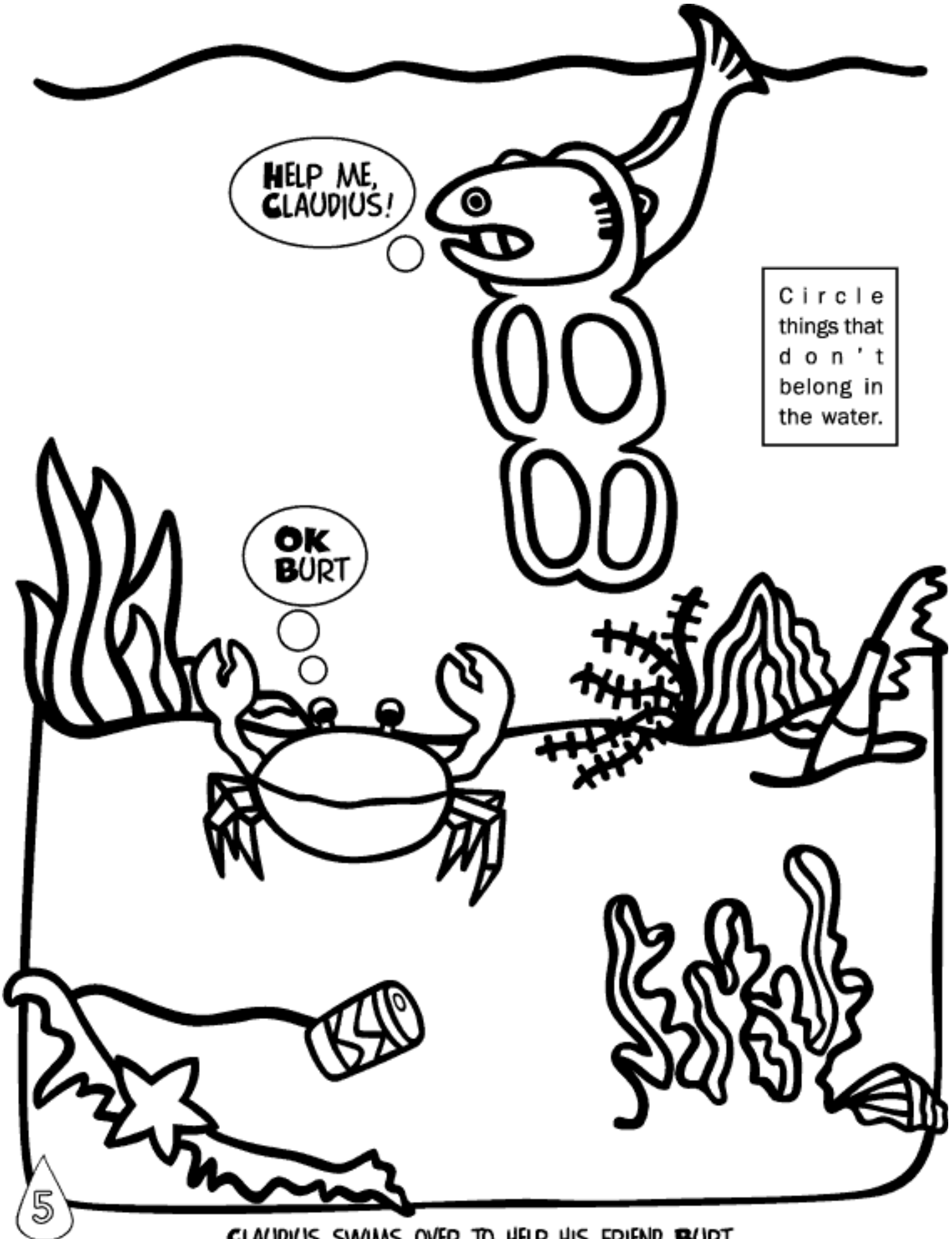
CLEAN WATER RANGER



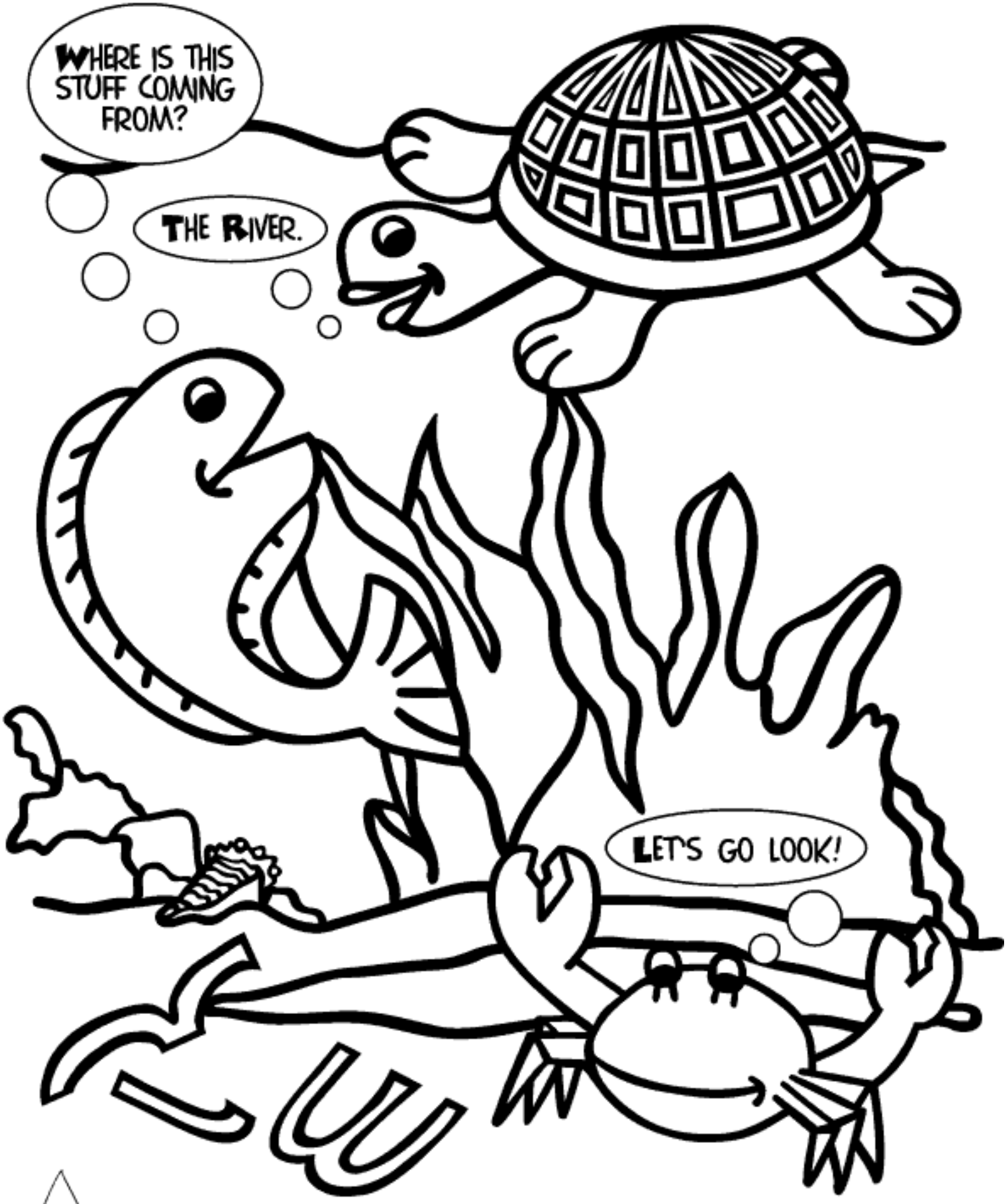
HOWIE THE GREAT BLUE HERON LIVES NEAR NEW JERSEY'S RIVERS, STREAMS, LAKES AND BAYS. HIS FRIENDS MARSHALL MUSKRAT, BURT BASS AND FRANCINE FROG, LIVE THERE TOO.



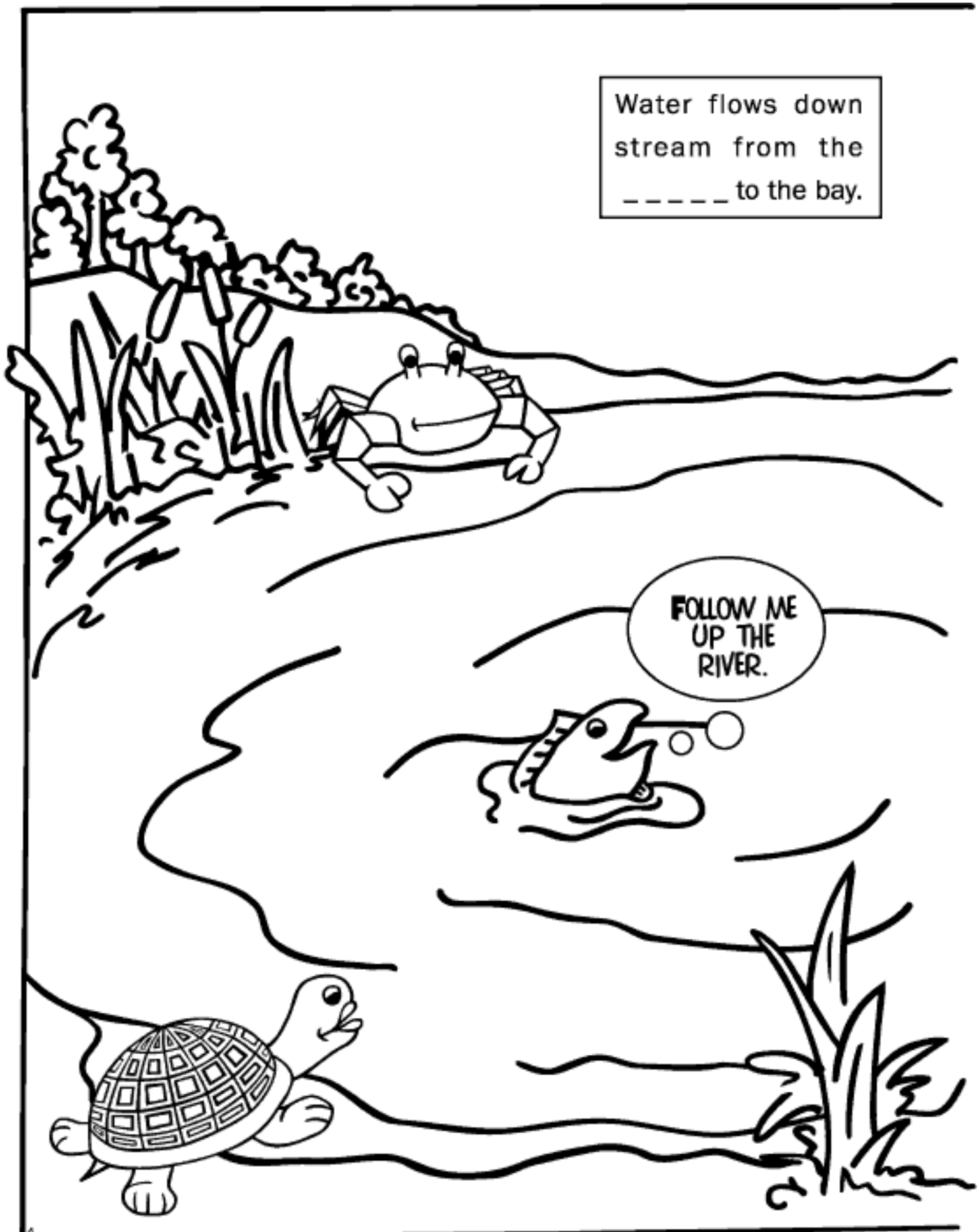
DIESHA DIAMONDBACK AND CLAUDIUS CRAB ENJOY A SUNNY DAY ON THE BAY.



CLAUDIUS SWIMS OVER TO HELP HIS FRIEND BURT.

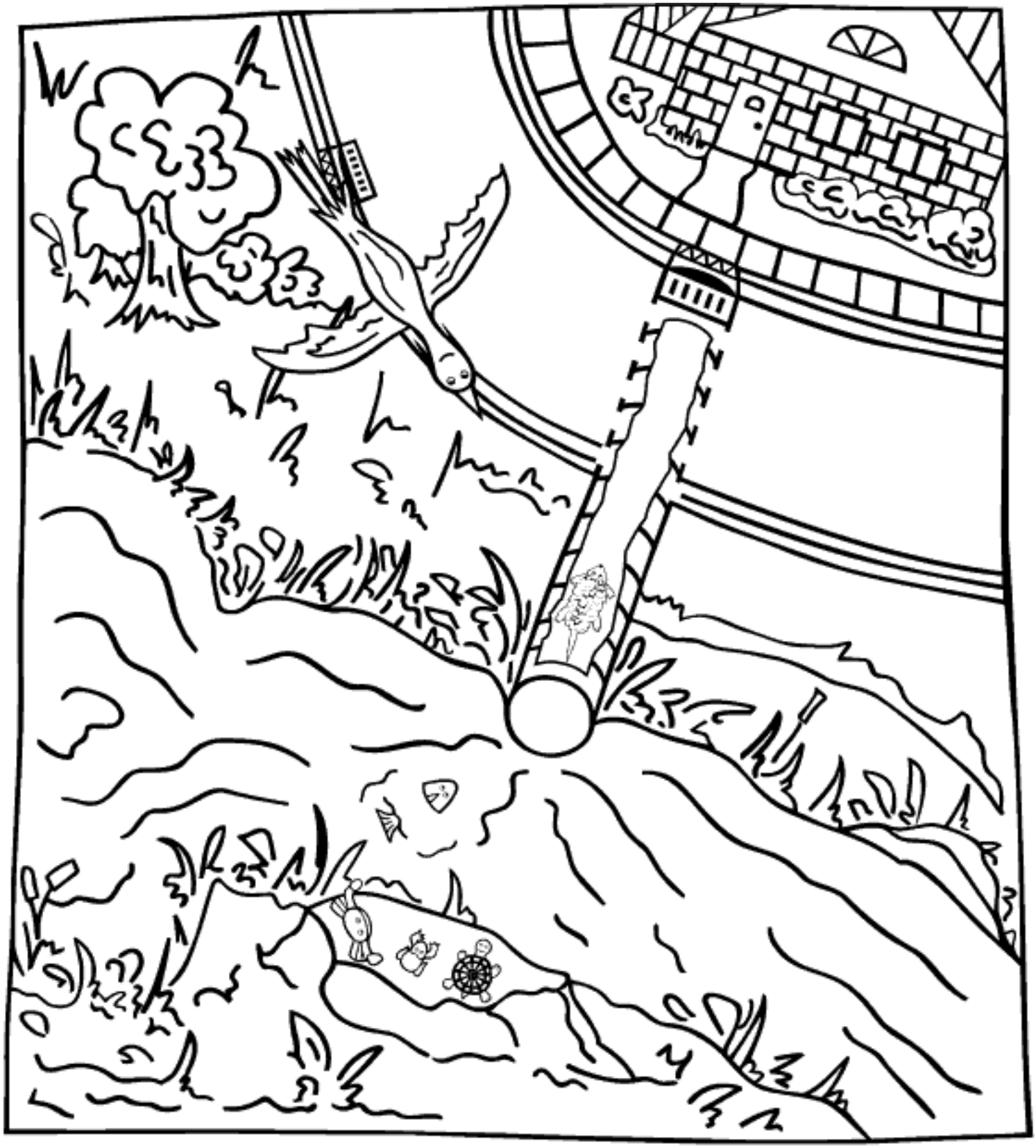


DIESHA AND HER FRIENDS WANT TO FIND WHERE THE LITTER IS COMING FROM.



CLAUDIUS, BURT AND DIESHA GO UP STREAM IN SEARCH OF THE POLLUTION SOURCE.

AS DIESHA, BURT AND CLAUDIUS SWIM UP STREAM, THEY MEET UP WITH THEIR FRIENDS, FRANCINE AND MARSHALL. THEY ALSO FIND A STORMPIPE. MARSHALL VOLUNTEERS TO GO UP THE PIPE.



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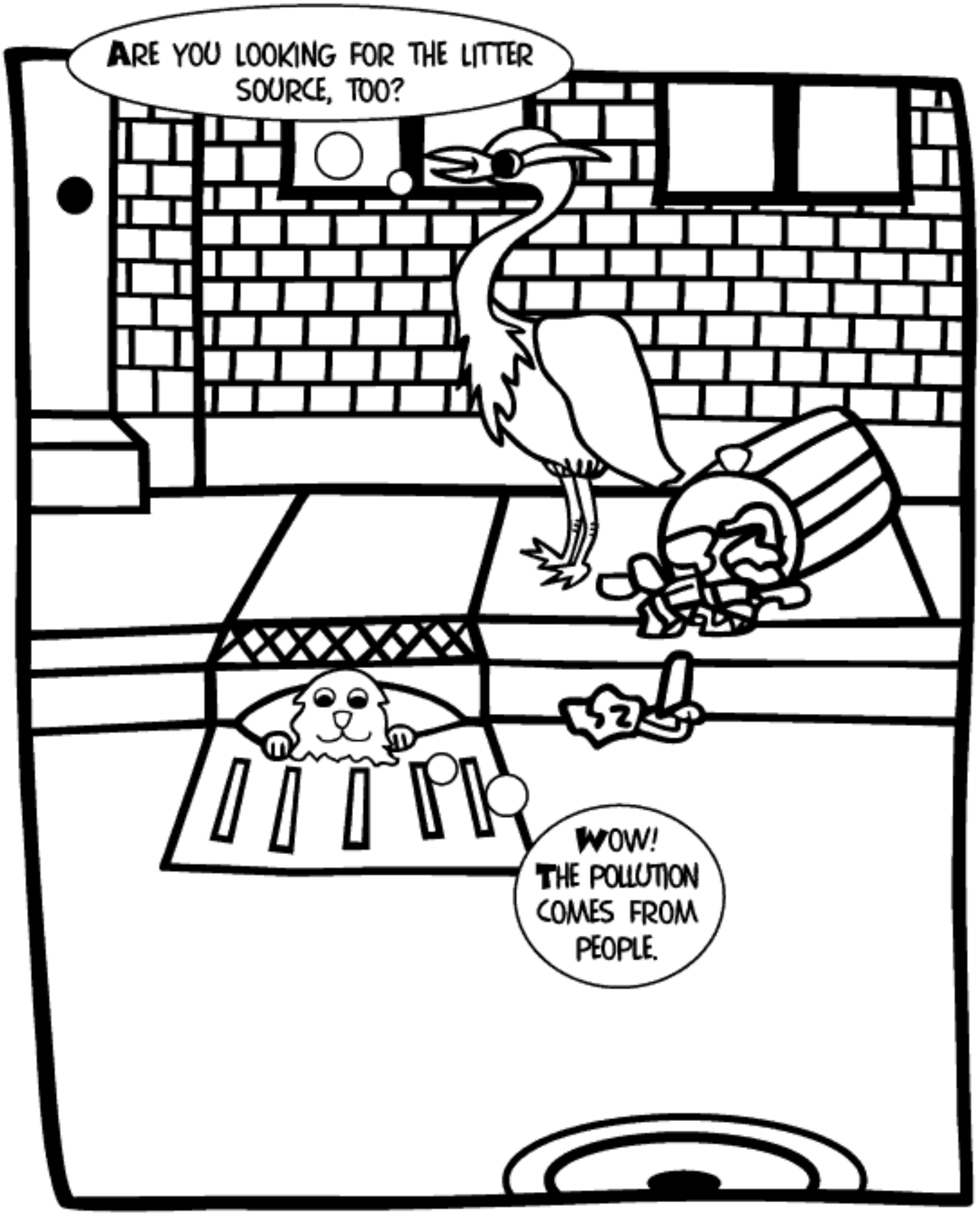
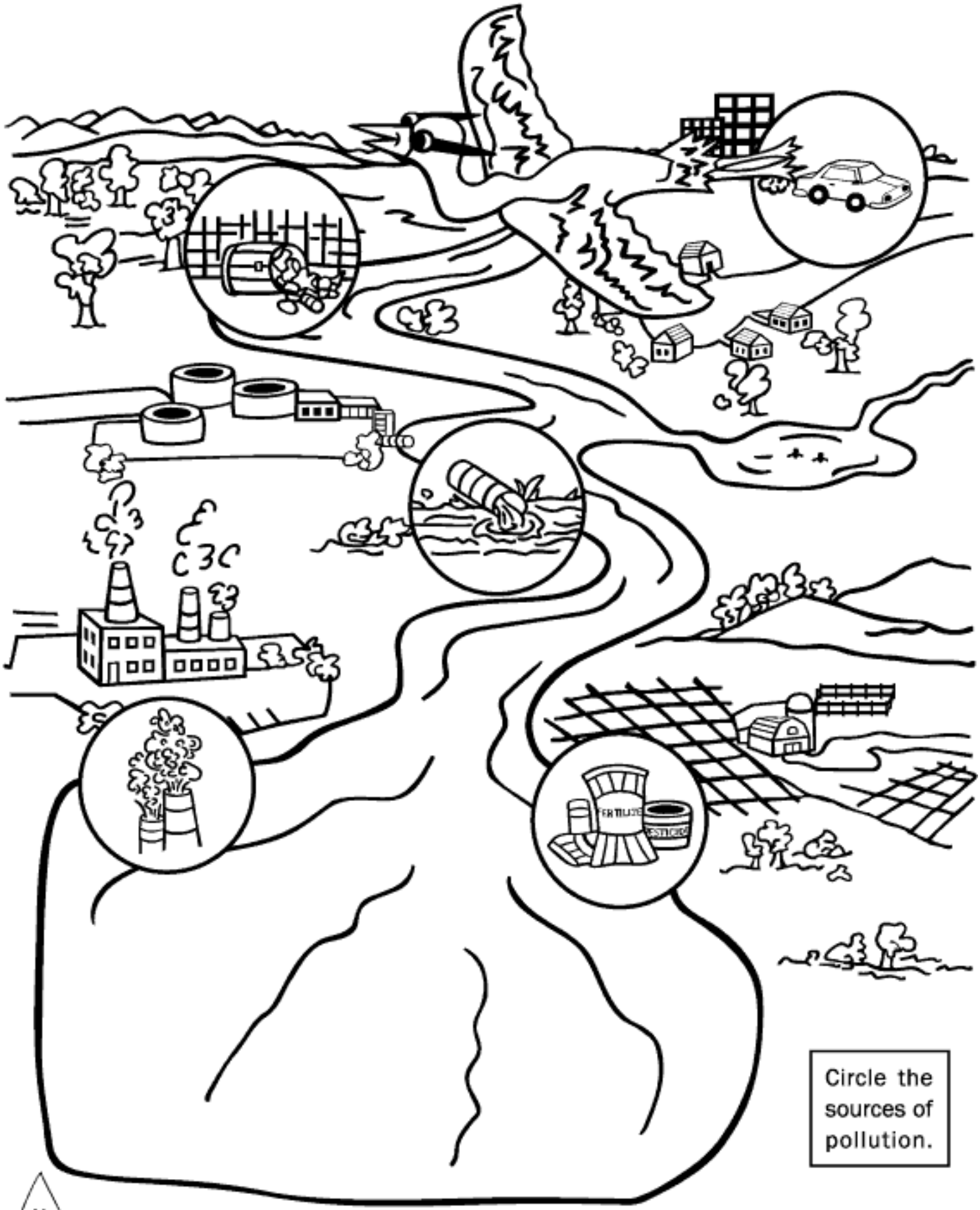
AS **H**OWIE FLIES ABOVE, **M**ARSHALL GOES THROUGH THE STORMPIPE IN SEARCH OF THE POLLUTION SOURCE.



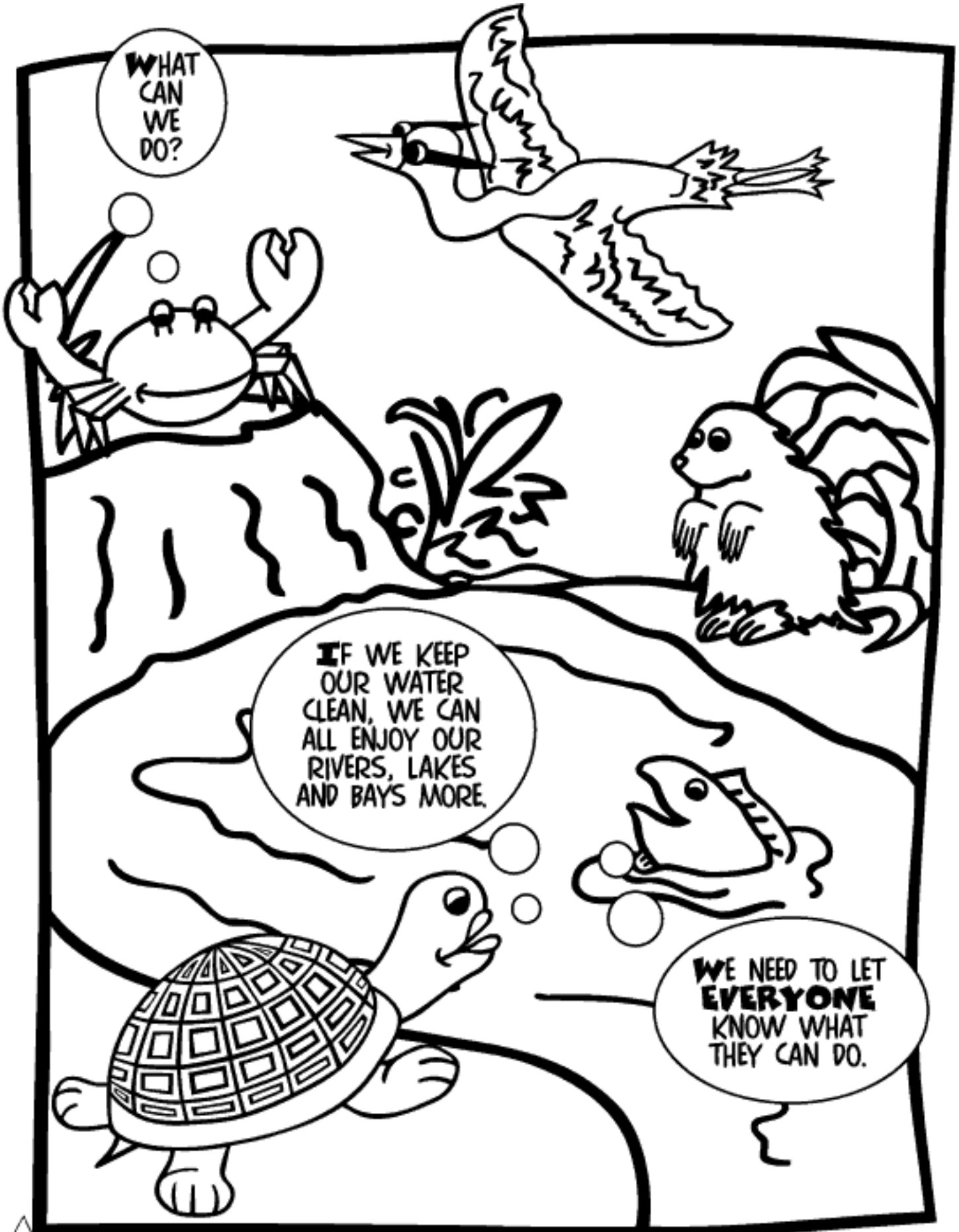
AS MARSHALL PEEKS OUT THE STORM DRAIN, HE SEES HIS FRIEND HOWIE. HE ALSO SEES WHERE THE LITTER IS COMING FROM.



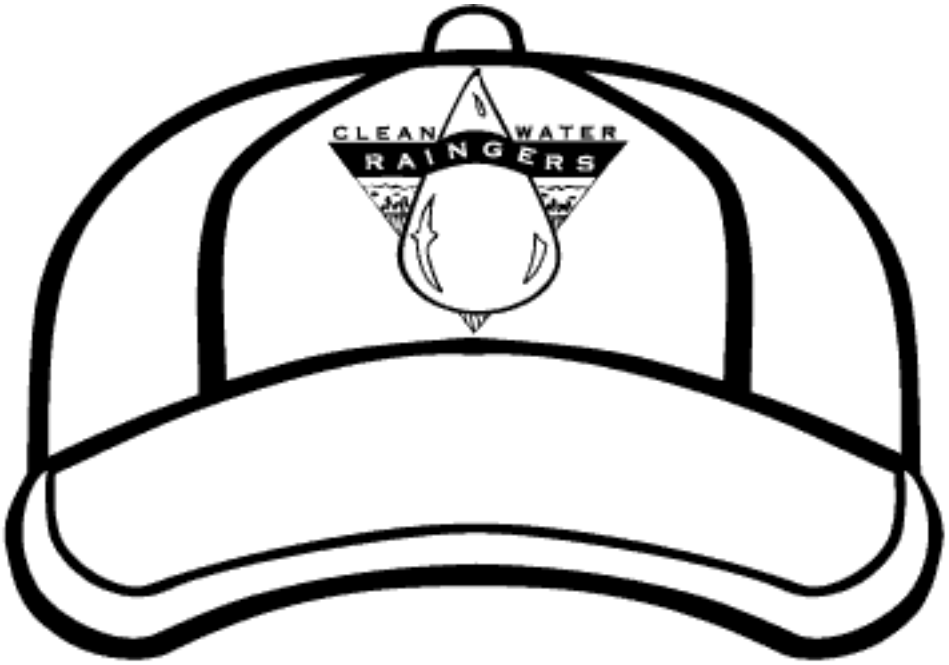
Circle the sources of pollution.

AS HOWIE FLYS BACK TO HIS FRIENDS, HE SEES OTHERS SOURCES OF POLLUTION.

HOWIE AND MARSHALL TELL THEIR FRIENDS WHAT THEY'VE FOUND.



THE FRIENDS FORM THE CLEAN WATER RAINGERS TEAM TO HELP KEEP THEIR WATER CLEAN. THAT'S RAINGERS AS IN RAIN!



Draw yourself here, so you can be a part of the Clean Water Raingers Team.

TOP TEN THINGS YOU CAN DO TO HELP KEEP WATER CLEAN AS PART OF THE CWR TEAM

1. NEVER THROW ANYTHING DOWN STORM DRAINS. THEY ARE FOR RAINWATER ONLY.

2. DON'T LITTER. ALWAYS PUT TRASH WHERE IT BELONGS.

3. ALWAYS CLEAN UP AFTER YOUR PETS. OBEY YOUR TOWN'S "POOPER SCOOPER" LAWS.

4. TELL OTHERS HOW IMPORTANT IT IS TO KEEP OUR LAND AND WATER CLEAN.

5. PLANT A TREE. THEY TAKE POLLUTANTS OUT OF GROUND WATER, PROVIDE SHADE, AND CLEAN THE AIR.

6. FIND OUT WHAT WATERWAY YOU LIVE NEAR. WHERE DOES YOUR WATER COME FROM?

7. PRECYCLE! BUY PRODUCTS THAT USE THE LEAST AMOUNT OF PACKAGING.

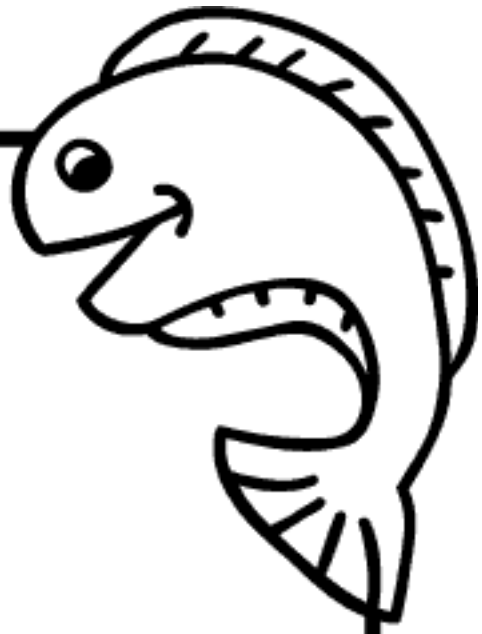
8. RECYCLE. FIND OUT WHAT IS RECYCLABLE IN YOUR COMMUNITY. BUY PRODUCTS IN RECYCLED OR RECYCLABLE CONTAINERS.

9. CONSERVE WATER WHENEVER POSSIBLE. FOR EXAMPLE, TURN OFF THE WATER WHILE BRUSHING YOUR TEETH AND DON'T LINGER IN THE SHOWER.

10. LEARN ABOUT ENVIRONMENTAL ISSUES. GET INVOLVED IN LOCAL ORGANIZATIONS.

JOIN THE TEAM!

THIS BOOK BELONGS TO...



CREDITS

THE CLEAN WATER RANGERS CONCEPT WAS DEVELOPED BY THE NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION.

FOR ADDITIONAL INFORMATION, PLEASE CONTACT:

CLEAN WATER RANGERS
NJDEP
DIVISION OF WATERSHED MANAGEMENT
PO BOX 418
TRENTON, NJ 08625-0418

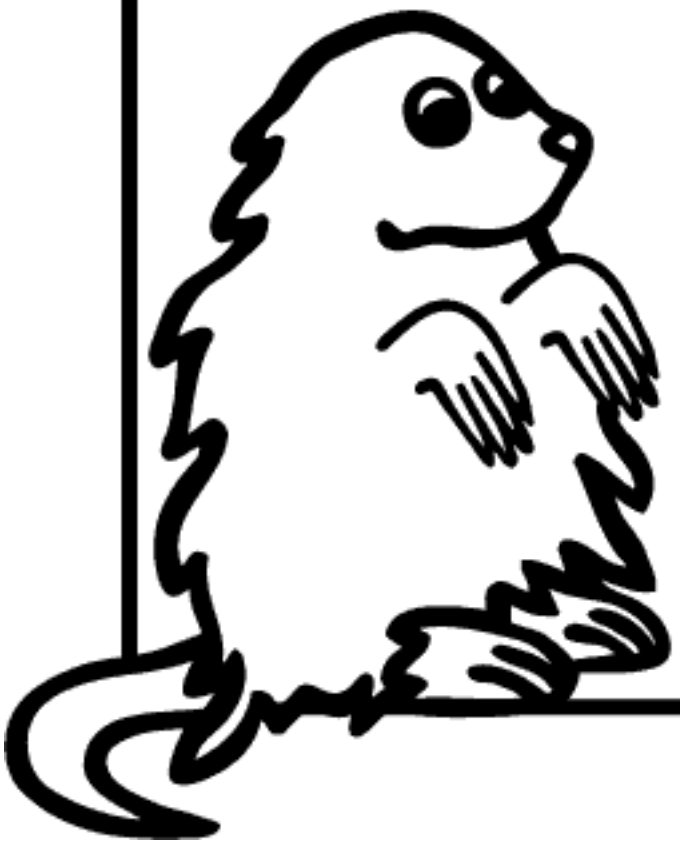
609-292-2113

DONALD T. DIFRANCESCO, ACTING GOVERNOR
STATE OF NEW JERSEY
ROBERT C. SHINN, JR., COMMISSIONER
DEPARTMENT OF ENVIRONMENTAL PROTECTION

KYRA HOFFMANN,
COORDINATOR

ERIN BRODEL,
GRAPHIC DESIGN & ILLUSTRATION

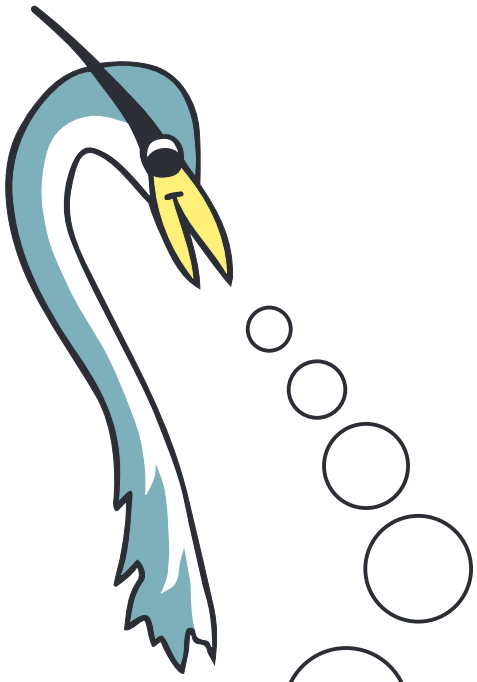
WATERSHEDS...
WHERE YOUR QUALITY OF LIFE BEGINS.
THE LINK BETWEEN OUR LAND, OUR WATER AND OUR COMMUNITY.



How To Be A Clean Water Rainger

Save this booklet! It contains valuable information you can use!

Who Are the Clean Water Raingers?



Hi! I'm Howie Heron. My friends and I have joined the Clean Water Rainger team and we're here to share what we've learned about the water quality of the great state of New Jersey. The Clean Water Raingers team is dedicated to protecting New Jersey's water. In this booklet, you'll learn how your everyday activities affect water.

CLEAN WATER RAINGERS

Dear Clean Water Rainger Candidate,

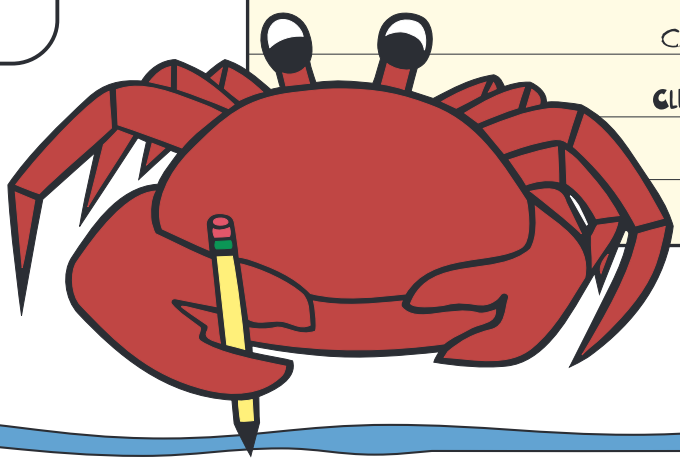
Are you interested in keeping New Jersey's water clean? Well, we need your help! Not long ago, my friends and I discovered that one of New Jersey's biggest water pollution problems comes from people -- from how we live our daily lives. That means things like littering, not cleaning up after pets, using too many pesticides, and dumping motor oil down storm drains. With eight million people living in the state, what everybody does can really add up.

We hope you will use the information in this booklet to improve water quality in your neighborhood. Join the Clean Water Rainger team and make New Jersey a better place to live, work, and play!

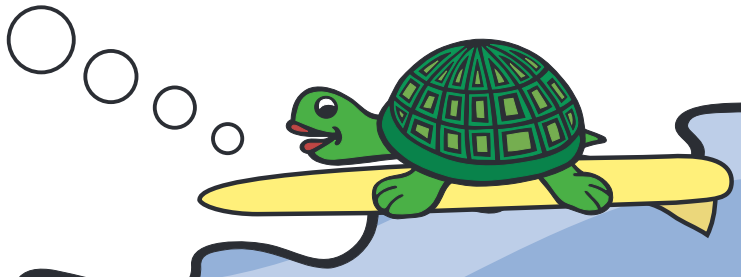
Your friend,

Claudius Crab

Clean Water Rainger



HI! I'M DIESHA DIAMONDBACK. DID YOU KNOW THAT ALL OF THE STREAMS, CREEKS, RIVERS, LAKES, AND BAYS IN NEW JERSEY EVENTUALLY FLOW TO THE ATLANTIC OCEAN? WHAT YOU DO IN YOUR HOME TOWN CAN AFFECT THE JERSEY SHORE, EVEN IF YOU LIVE FAR AWAY!



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Acknowledgments

The Clean Water Raingers concept was developed by the New Jersey Department of Environmental Protection.

Kyra Hoffmann, Coordinator
Erin Brodel, Graphic Design & Illustration

For additional information, please contact:

Clean Water Raingers
NJDEP
Division of Watershed Management
PO Box 418
401 E. State Street
Trenton, NJ 08625-0418

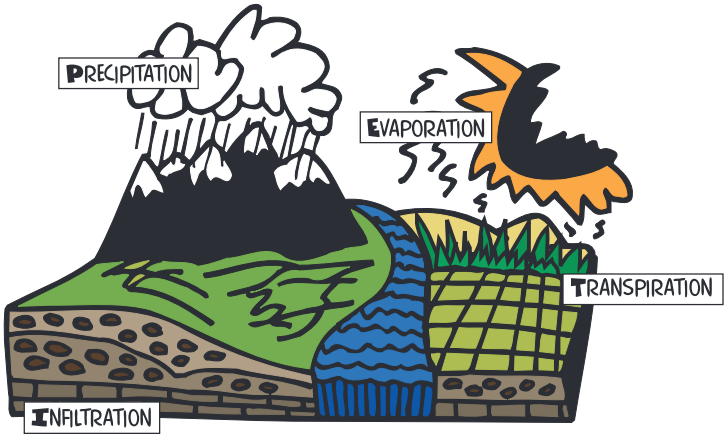
609-292-2113

www.state.nj.us/dep/watershedmgt

MARCH 2001

The Water Cycle

For millions of years, water has been recycled and reused. It is important to understand how water moves through the Earth's water cycle. When it rains, the rainwater flows on top of the land surface into waterways or is absorbed by the ground or plants. Water evaporates from land and water, becoming water vapor in the atmosphere. Water is also released from trees and other plants through "transpiration." The water vapor from evaporation and transpiration forms clouds in the atmosphere which in turn provide precipitation (rain, hail, snow, sleet) to start the cycle over again. This process of water recycling, known as the water cycle, repeats itself over and over.



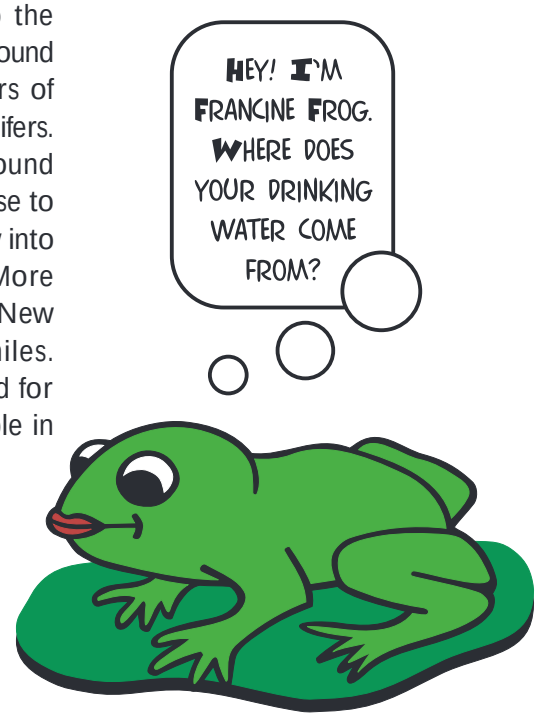
Water. It's an essential part of our lives. We use it to drink, to cook, to bathe, and to clean. It's used by industry and businesses to make their products. Farmers and gardeners use it to water their crops. Fish live in it and other animals need it to survive.

The earth has a lot of water - approximately 1.4 quintillion cubic meters of it. Yet, less than 1% of that is fresh, usable water. The oceans, glaciers, and ice caps account for greater than 99% of all water on Earth. That remaining small fraction accounts for every cloud, river, lake, pond, swamp, and aquifer. Of that, more than two thirds is below the Earth's surface.

In New Jersey, an average of 44 inches of precipitation per year replenishes the state's 6,500 miles of streams and rivers, 61,000 acres of lakes and an extensive network of underground aquifers.

What is Ground Water?

Some rainwater runoff seeps into the ground to become ground water. Ground water moves into water-filled layers of porous rock or soil that are called aquifers. Aquifers are not flowing underground streams or lakes. If the aquifer is close to the surface, its ground water can flow into nearby waterways and wetlands. More than 100 aquifers are below us in New Jersey, covering 7,500 square miles. Through wells, ground water is used for drinking water for half of the people in New Jersey.



What is a Watershed?

HOWIE HERON HERE. AS I FLY OVER NEW JERSEY, I CAN SEE THAT NEW JERSEY IS MADE OF MANY DIFFERENT WATERSHEDS. WE ALL LIVE IN A WATERSHED. WHICH ONE DO YOU LIVE IN?

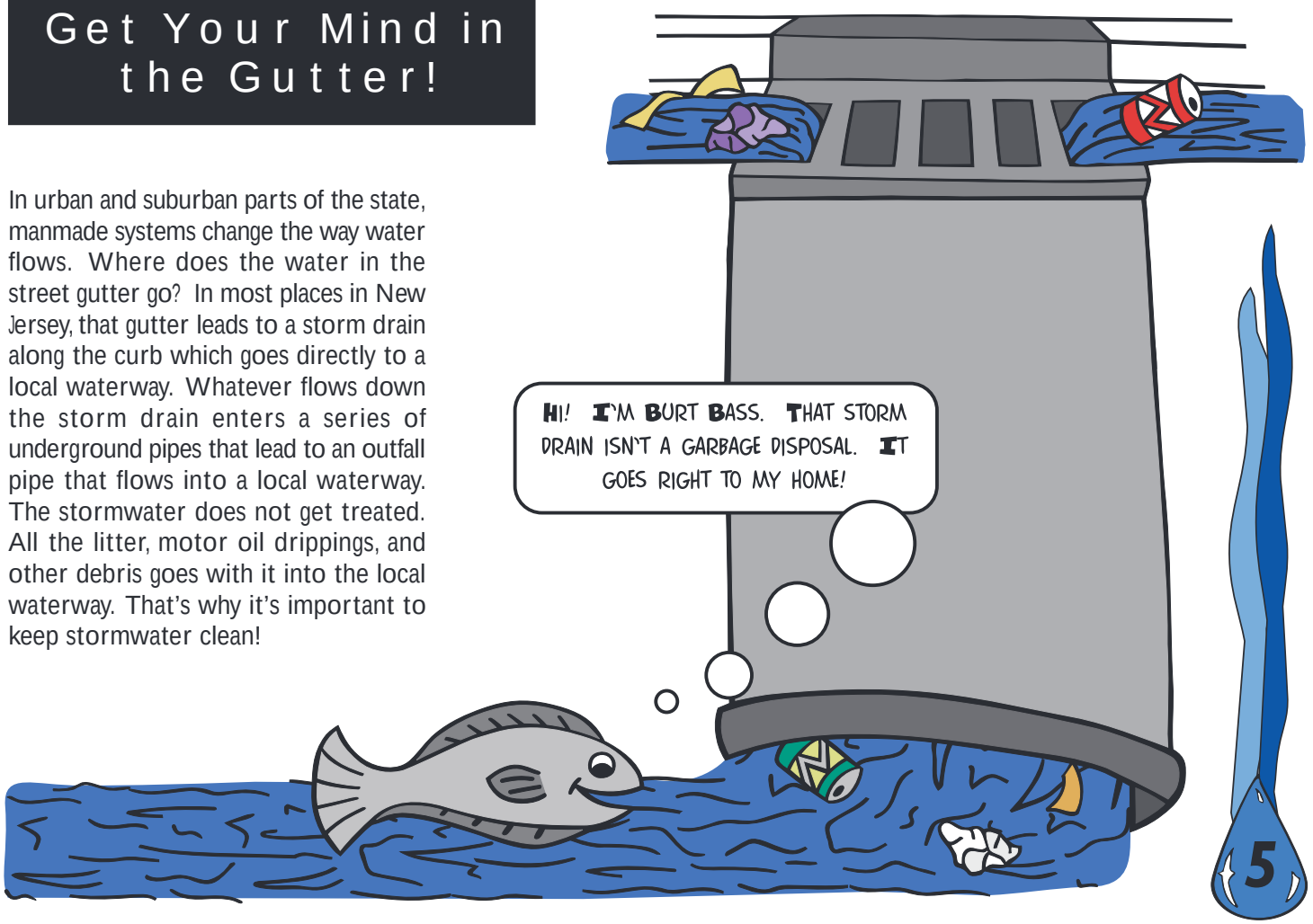
A watershed is the area of land surrounding a waterway that drains into it. A watershed includes not only the waterway itself but also the entire land area that drains to it. For example, the watershed of a lake would include not only the streams entering into that lake but also the land area that drains into those streams and eventually the lake.

A watershed can be as small as a backyard that drains to a puddle or as large as the sections of New York, Pennsylvania, New Jersey and Delaware that drain into the Delaware River.

So what happens on the land in a watershed affects the waterway. For example if too many fertilizers are used on lawns, the extra fertilizer can end up in the local waterway. The same thing goes for ground water. The extra fertilizer could end up in ground water and maybe someone's well.

Get Your Mind in the Gutter!

In urban and suburban parts of the state, manmade systems change the way water flows. Where does the water in the street gutter go? In most places in New Jersey, that gutter leads to a storm drain along the curb which goes directly to a local waterway. Whatever flows down the storm drain enters a series of underground pipes that lead to an outfall pipe that flows into a local waterway. The stormwater does not get treated. All the litter, motor oil drippings, and other debris goes with it into the local waterway. That's why it's important to keep stormwater clean!



What's Wrong With Our Water?

On his flights over New Jersey, Howie Heron sees that many water pollution problems begin upstream and concentrate as water flows toward the bays and the ocean. He has seen improvement as regulation of industries and improved sewage treatment have helped clean up the water. Now the number one problem in many areas is "polluted runoff."

Polluted runoff is stormwater runoff that picks up pollution as it washes over lawns, parking lots, roadways, farmland and other surfaces. There are four basic types of pollution in runoff: soil particles, nutrients, bacteria and toxic substances.

Soil Particles

Construction sites, farms, and eroded stream banks can be large sources of pollution. Because bare ground lacks plants to hold soil in place, rain and waves can easily lead to soil erosion.

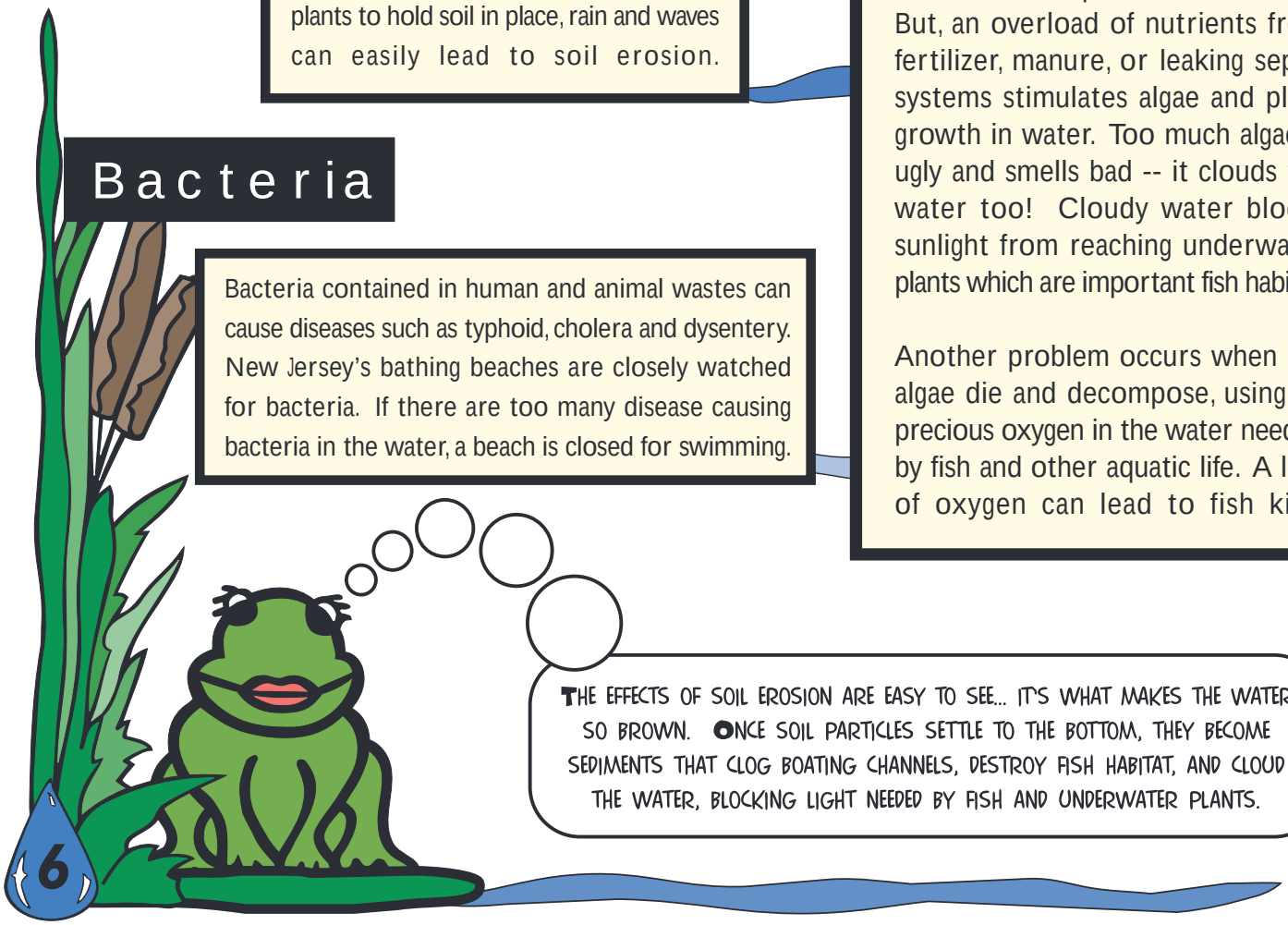
Nutrients

Nutrients, like potassium, phosphorous, and nitrogen, help plants grow. Just like we need food to survive, so do plants in the water. But, an overload of nutrients from fertilizer, manure, or leaking septic systems stimulates algae and plant growth in water. Too much algae is ugly and smells bad -- it clouds the water too! Cloudy water blocks sunlight from reaching underwater plants which are important fish habitat.

Another problem occurs when the algae die and decompose, using up precious oxygen in the water needed by fish and other aquatic life. A loss of oxygen can lead to fish kills.

Bacteria

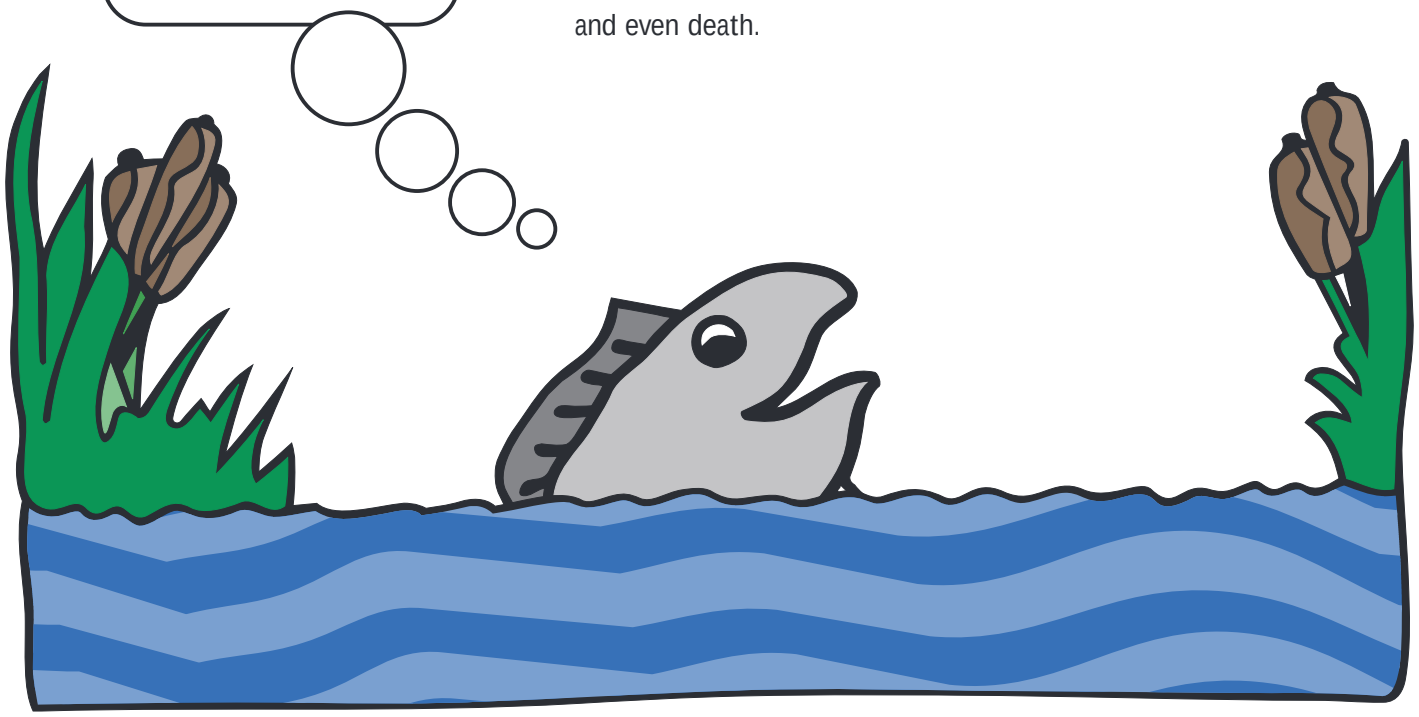
Bacteria contained in human and animal wastes can cause diseases such as typhoid, cholera and dysentery. New Jersey's bathing beaches are closely watched for bacteria. If there are too many disease causing bacteria in the water, a beach is closed for swimming.



THE EFFECTS OF SOIL EROSION ARE EASY TO SEE... IT'S WHAT MAKES THE WATER SO BROWN. ONCE SOIL PARTICLES SETTLE TO THE BOTTOM, THEY BECOME SEDIMENTS THAT CLOG BOATING CHANNELS, DESTROY FISH HABITAT, AND CLOUD THE WATER, BLOCKING LIGHT NEEDED BY FISH AND UNDERWATER PLANTS.

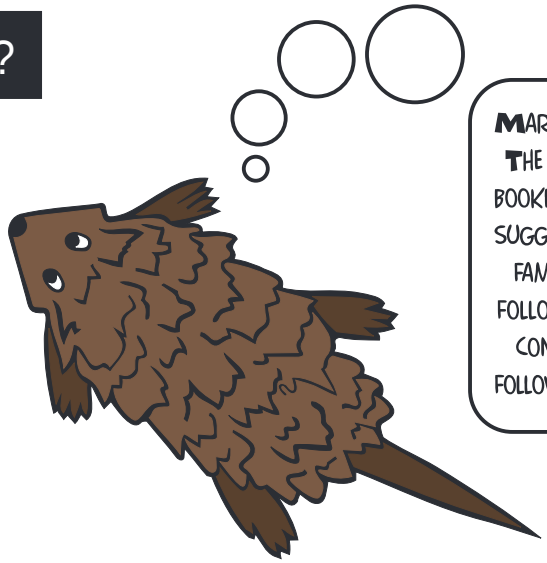
Toxic Substances

Toxic substances include oil and gas, heavy metals (zinc, mercury, cadmium, lead, etc.) and pesticides. When these substances are washed off sidewalks, parking lots, lawns, gardens, and cropland, they can end up in nearby streams and lakes and can even soak into the ground. Once in the water system, these pollutants can be carried downstream to settle into lakes, bays, and aquifers. Toxic substances can contaminate small organisms, which are eaten by fish and birds. The toxins build up in the fat of the larger animals, possibly leading to illness, birth defects, and even death.

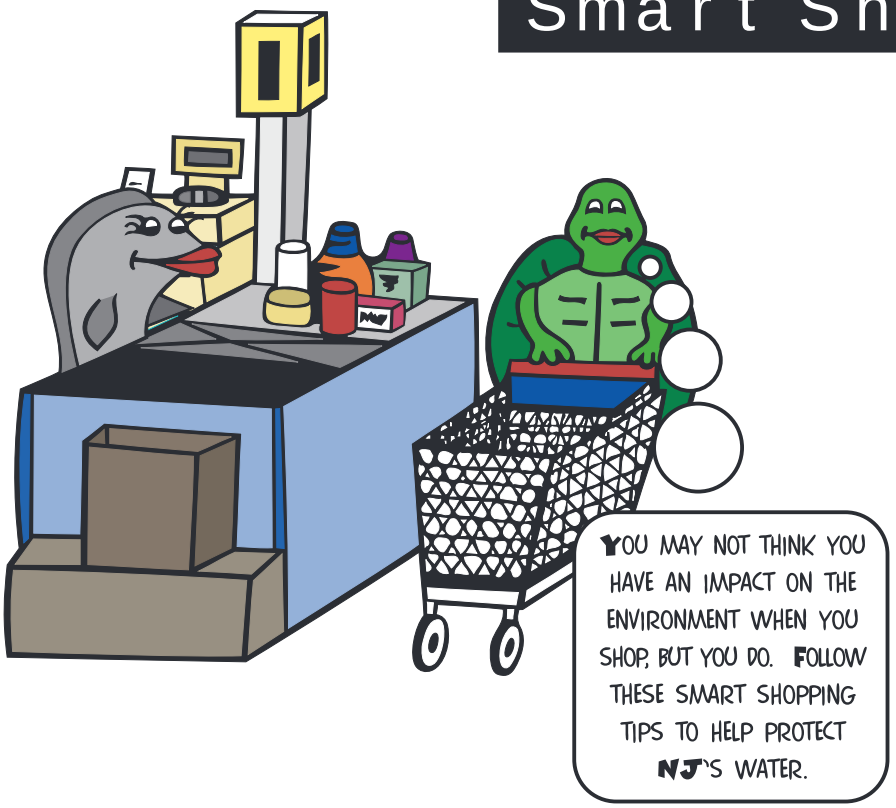


What Can You Do?

The most important thing you can do to improve New Jersey's water is to learn about the ways in which you and others affect the environment. Lots of little changes will make the biggest difference!



Smart Shopping Tips



Precycle! That means buying products that use the least amount of packaging. This helps by reducing water pollution from manufacturing and trash disposal problems.

Recycle! Find out what is recyclable in your community. Buy products in recyclable containers. Buy containers or products made from recycled materials.

Read labels and be aware of what they mean before you buy. Watch for signal words such as "caution," "warning," and "danger." These indicate that an item is a potentially hazardous product that consumers need to be concerned about.

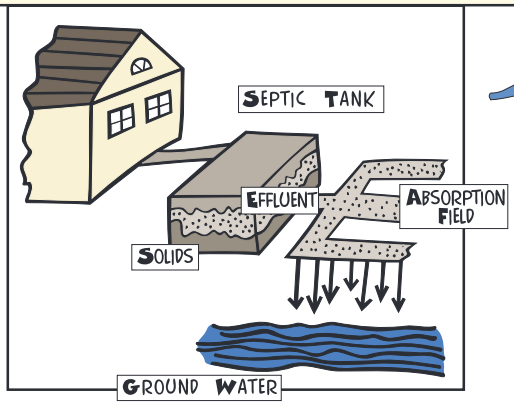
Thank You For Shopping Smart!

Don't Dump It Down the Drain

About 500,000 New Jersey homes use septic systems for the wastewater from their sinks, toilets, dishwashers, washing machines and showers. Rather than send their wastewater to a sewage treatment plant, homes with septic systems treat their wastewater in their own backyard.

How does a septic system work?

Septic systems work by using bacteria to decompose wastes sent into the system. A typical septic system has underground pipe leading from the home to an underground holding tank where most of the pollutants are treated. An underground system of small pipes leads from the tank into the backyard. These pipes allow treated water to soak into the ground.



Treat them with respect.

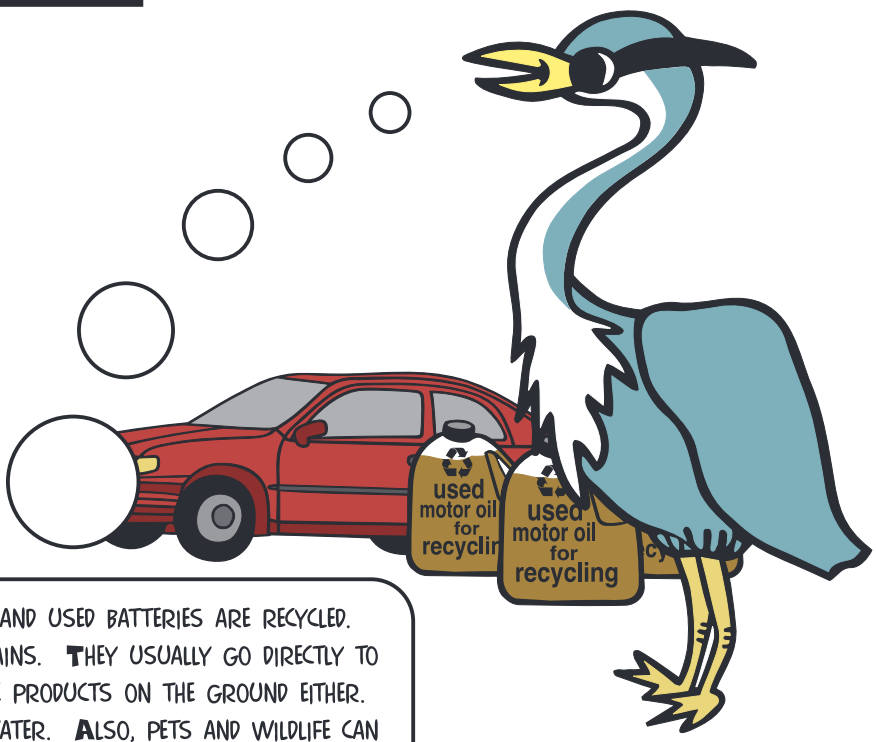
In order to keep these systems working, it's important to treat them right. To do this, you must be careful about what is put down the drain. The following things should not be put down household drains: hazardous household chemicals (for example, paints, varnishes, pesticides, drain cleaners), motor oil and other automotive fluids, cooking oils and grease, and large amounts of bulky materials such as kitter litter, diapers, or paper towels. These items may cause a septic system to stop working and can contaminate ground water.

Conserve.

It's also important to conserve water with a septic system. The less water the septic system treats, the longer the system will last.

Getting Around

You may not think of cars as a source of water pollution but they can be. Think of a parking lot or street. All that oil, grease, and other fluids that stain the pavement are washed into local waterways when it rains or as snow melts. Little bits of tires and brakes that wear off the car drop onto the pavement and are washed into waterways too. How do you avoid this pollution? Cars should be maintained properly and leaks fixed as soon as possible. That makes safety and environmental sense!



BE SURE USED MOTOR OIL, ANTIFREEZE, AND USED BATTERIES ARE RECYCLED. NEVER DUMP ANYTHING DOWN STORM DRAINS. THEY USUALLY GO DIRECTLY TO A LOCAL WATERWAY. NEVER DUMP THESE PRODUCTS ON THE GROUND EITHER. HERE THEY CAN SOAK INTO THE GROUND WATER. ALSO, PETS AND WILDLIFE CAN BE ATTRACTED TO SWEET TASTING ANTIFREEZE, BUT IT'S TOXIC TO THEM.

Scoop the Poop

Feces, guano, dung, poop, and road apples are all forms of animal waste which can be a serious water pollution problem. Too much animal waste from pets, wildlife, or livestock adds too many nutrients and disease-causing bacteria to the water.

If you walk your pet near a lake or stream, it's important to clean up after your dog. Don't leave animal waste on the sidewalk or roadway either. When it rains, the waste can be washed down the storm drain to the nearest waterway.

Trees, Turf, Bugs and Birds

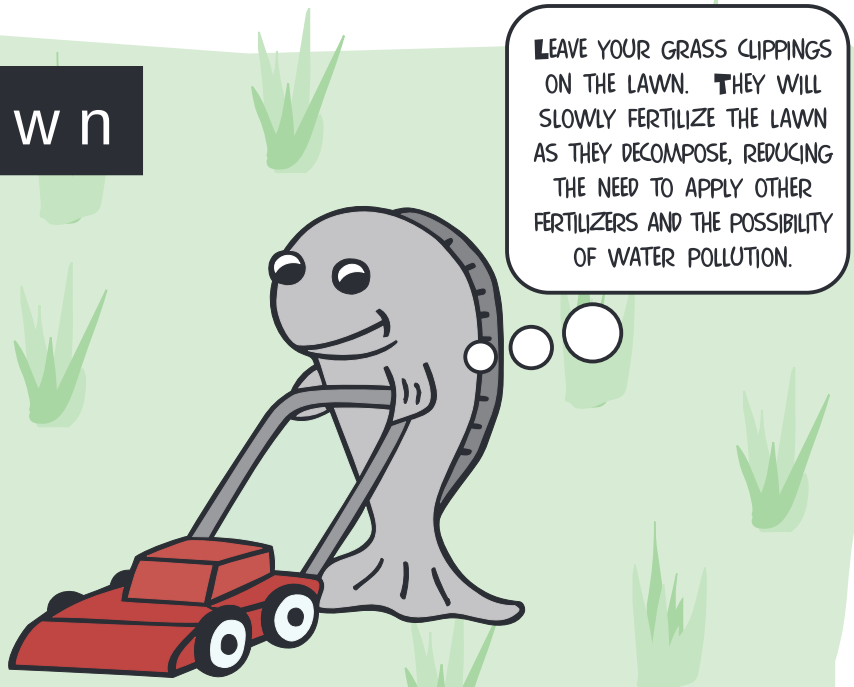
Most people like a healthy landscape surrounding their home. It can increase the value of your home and produce environmental benefits such as preventing soil erosion, keeping your home cooler in the summer, and filtering pollutants from runoff. The right combination of plants can even attract wildlife, butterflies, and birds.

Unfortunately using too many fertilizers and pesticides on lawns and gardens can also be a source of pollution. It's important to use these products wisely - at the right time and the right amount - if they're needed at all. Make sure the products are needed and, if so, use them according to the label.

Many people consider all insects to be harmful to the lawn or garden, but most insects are not harmful. In fact, many of them eat other harmful insects. Don't automatically turn to pesticides. These chemicals can also be dangerous to human health and the environment. All home and garden pesticides are poisonous to some degree. The most important thing to remember is to read and follow the label carefully if you are going to use a pesticide.

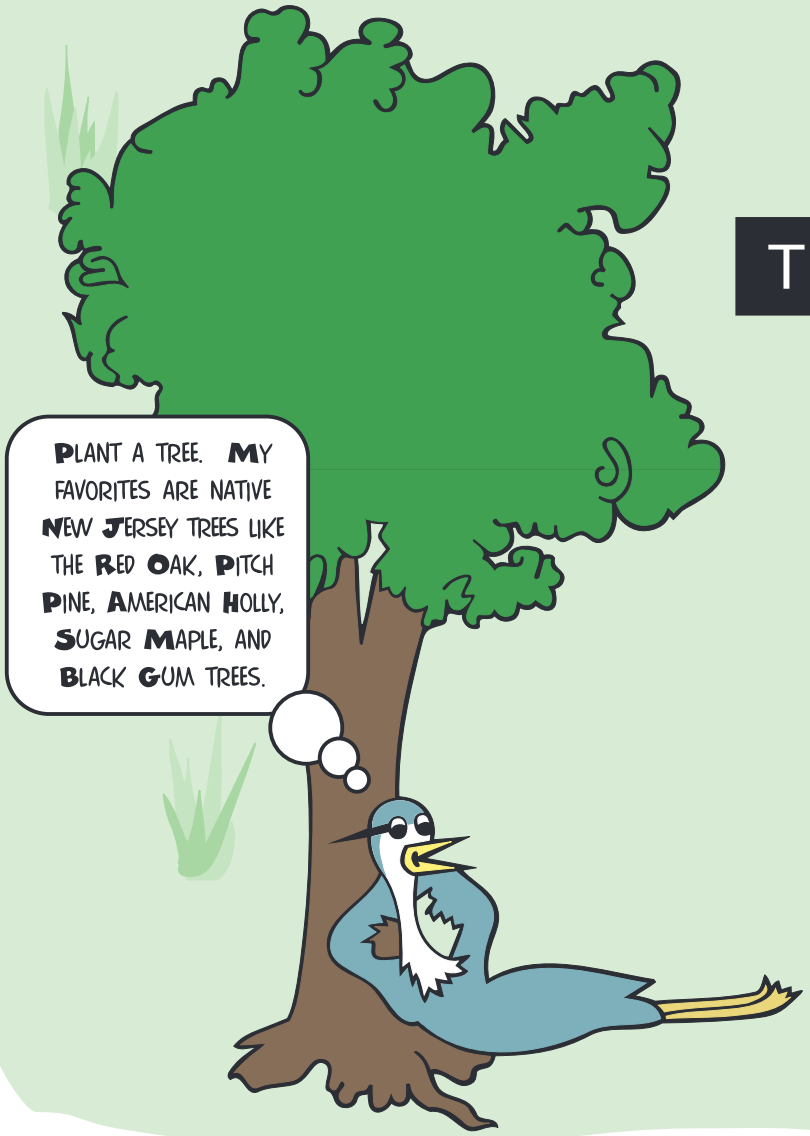
Mowing the Lawn

Always mow with a sharp blade set at the right height (about 2 to 3 inches). Never mow more than one third of the grass height. Cutting more will stress you lawn's health, opening the door to weeds and disease. A healthy lawn doesn't need pesticides.

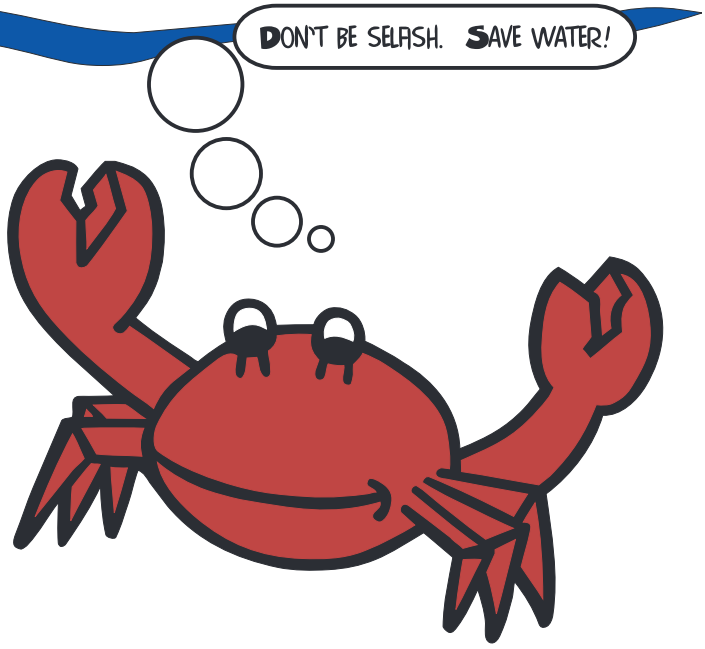


Trees Are Tops

Trees provide a whole range of environmental benefits. They provide shade - especially important during a hot summer day. This keeps your house cooler and shelters other plants from the drying sun. Trees use nutrients and can prevent those nutrients from entering waterways. Their roots hold the soil in place, thereby preventing soil erosion.



Slow the Flow

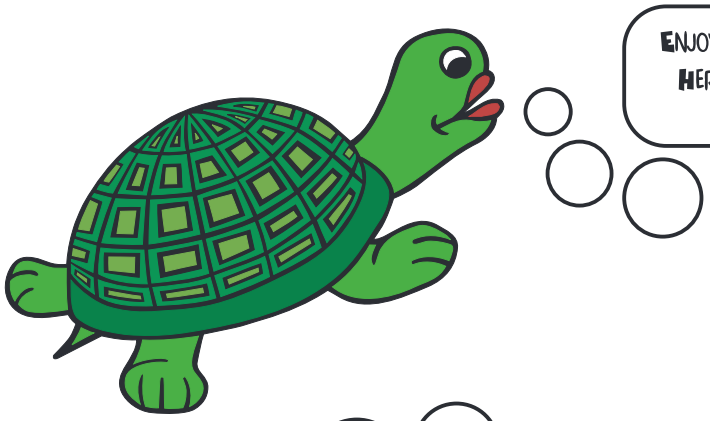


Like any valuable resource, water should be conserved both outdoors and indoors. We can't make new water so we need to conserve the clean water that's available to us.

Inside the home: Don't let the water run while you brush your teeth. Take short showers. Flush only when necessary. Don't use the toilet as a trash can.

Outside the home: Don't overwater the yard. Sweep sidewalks and driveways rather than hose them down. Use plants that don't need a lot of water.

Boating and Fishing Tips



Slow down and observe "No Wake" zones, which are designated to protect the shore. A wake is the wave caused by a boat moving too quickly through the water. Fast moving boats cause large waves that can cause the shoreline to erode.

Recycle old fishing line. Never throw it overboard.

Keep a trash bag handy and remember to recycle.

Never dispose of bait or fish waste overboard.

Glossary

AQUIFER - water filled underground layers of cracked rock, sand, gravel, or clay. Wells tap into aquifers to provide water for people to use.

EROSION - movement of soil commonly caused by running water or wind.

EVAPORATION - movement of water from land to the air when the sun heats up water and it becomes water vapor.

FERTILIZER - nutrient source for plants.

GROUND WATER - water that lies beneath the earth's surface.

PESTICIDE - chemical used to control a pest, such as an insect, weed or rodent.

POLLUTED RUNOFF - rain water or snow melt that carries pollutants.

PRECIPITATION - water that falls back to land from clouds as snow, sleet, hail or rain.

PRECYCLE - selection of products and packaging that produce the least amount of trash.

RECYCLE - reuse of materials such as plastic, glass or metal in either its original or different form rather than putting them in the garbage.

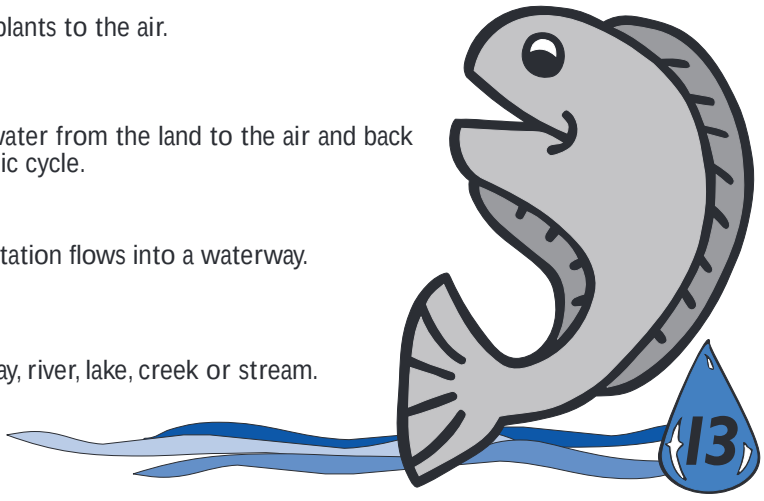
STORM SEWERS - underground pipe system that carries stormwater from streets and parking lots to local waterways.

TRANSPIRATION - movement of water from plants to the air.

WATER CYCLE - natural process of recycling water from the land to the air and back again, also called the hydrologic cycle.

WATERSHED - the land area from which precipitation flows into a waterway.

WATERWAY - a body of water, for example a bay, river, lake, creek or stream.



Top Ten Things You Can Do to Help Keep Water Clean

1. Never throw anything down storm drains. They are for rainwater only.

2. Don't litter. Always put trash where it belongs.

3. Always clean up after your pets. Obey your town's "pooper scooper" laws.

4. Tell others how important it is to keep our land and water clean.

5. Plant a tree. They take pollutants out of ground water, provide shade, and clean the air.

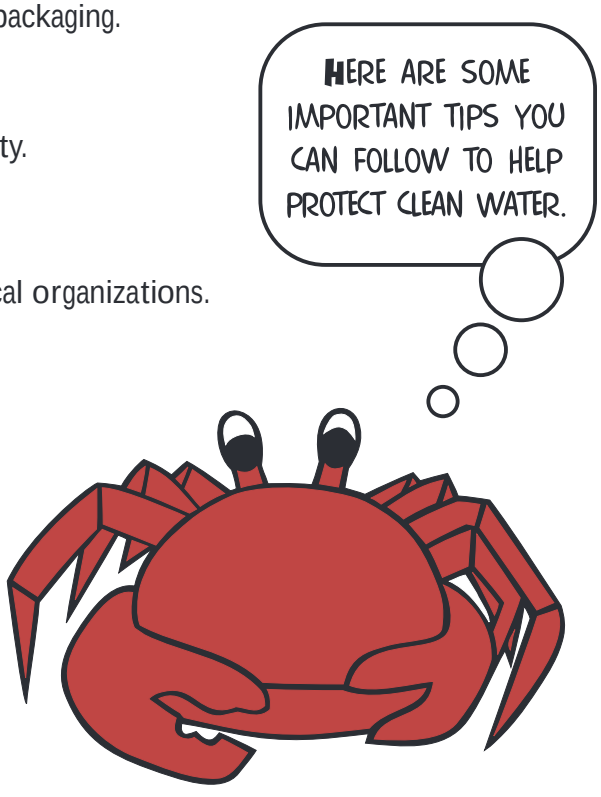
6. Find out what waterway you live near. Where does your water come from?

7. Precycle! Buy products that use the least amount of packaging.

8. Recycle. Find out what is recyclable in your community. Buy products in recycled or recyclable containers.

9. Learn about environmental issues. Get involved in local organizations.

10. Conserve water whenever possible. For example, turn off the water while brushing your teeth and don't linger in the shower.



You've Got the Know-How Now!

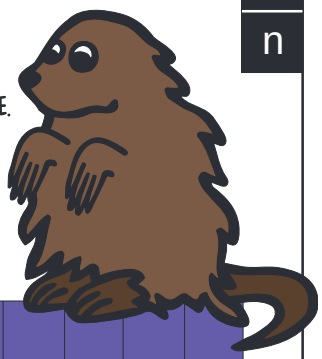
Now you know how to be a Clean Water Rainger! Join the team. Thanks for taking the time to read about how you can become a member of the team that's part of the solution to water pollution.

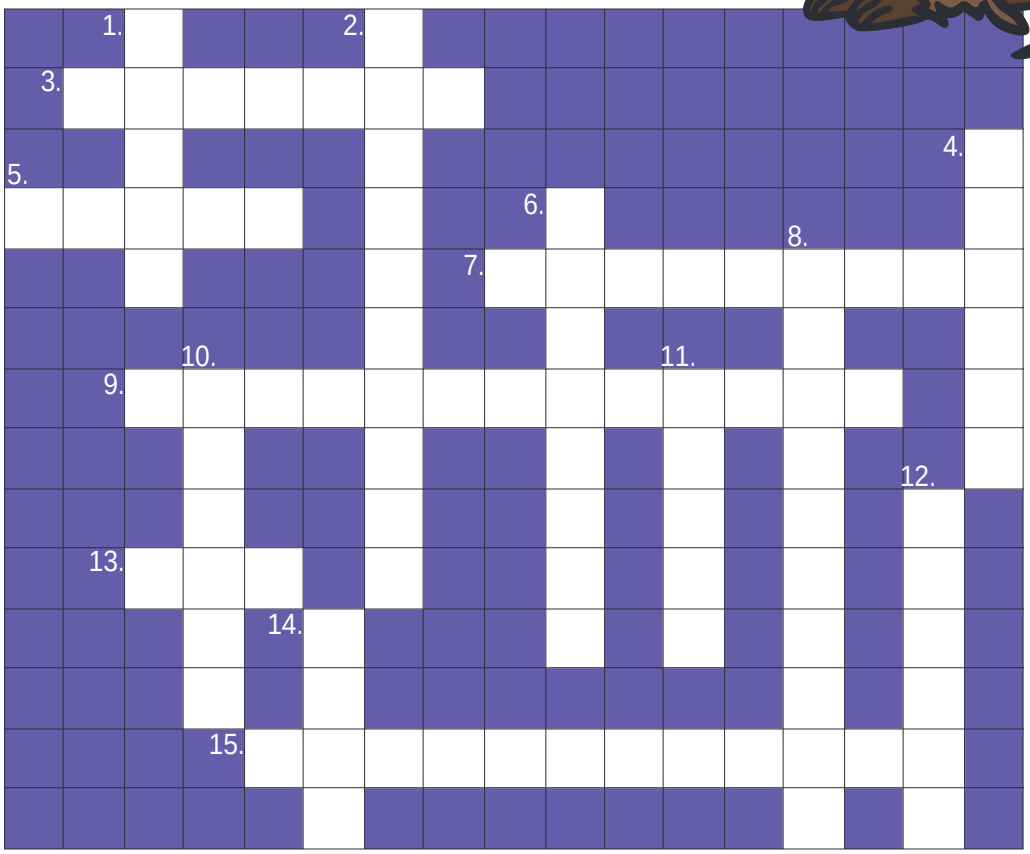
clean water raingers

crossword

down

1. FOR MILLIONS OF YEARS, _____ HAS BEEN REUSED AND RECYCLED.
2. USING TOO MUCH _____ ON YOUR LAWN CAN CAUSE WATER POLLUTION.
4. _____ YOUR USE OF PESTICIDES.
6. _____ , NUTRIENTS, SOIL PARTICLES AND TOXIC SUBSTANCES ARE FOUR TYPES OF POLLUTION IN RUNOFF.
8. A _____ _____ IS NOT A GARBAGE DISPOSAL.
10. RAINWATER _____ CAN BECOME POLLUTED AS IT FLOWS ACROSS THE LAND.
11. _____ CAN HELP PREVENT WATER POLLUTION BY USING NUTRIENTS AND HOLDING SOIL IN PLACE.
12. RAINWATER SEEPS INTO THE SOIL TO BECOME _____ WATER.
14. FRANCINE ____ EATS INSECTS AND IS AN ALTERNATIVE PEST CONTROL.





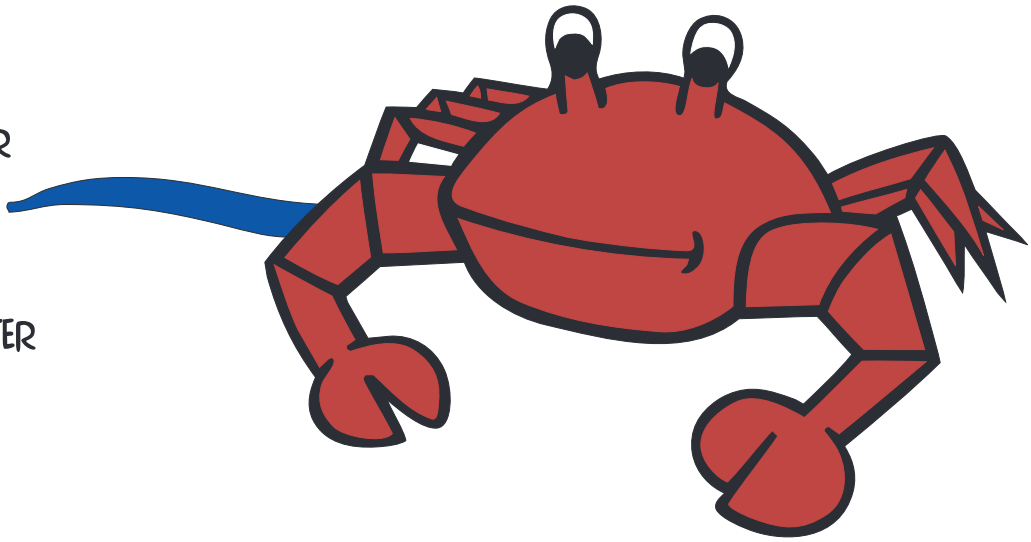
across

3. THE CLEAN WATER _____ TEAM IS WORKING TO KEEP NJ'S WATER CLEAN.
5. _____ UP AFTER PETS.
7. THE LAND SURROUNDING A WATERWAY IS ITS _____ .
9. RAIN AND SNOW ARE TWO TYPES OF _____ .
13. ____ CAN HELP KEEP WATER CLEAN.
15. USING PLANTS THAT DON'T USE A LOT OF WATER IS ONE WAY TO PRACTICE WATER _____ .

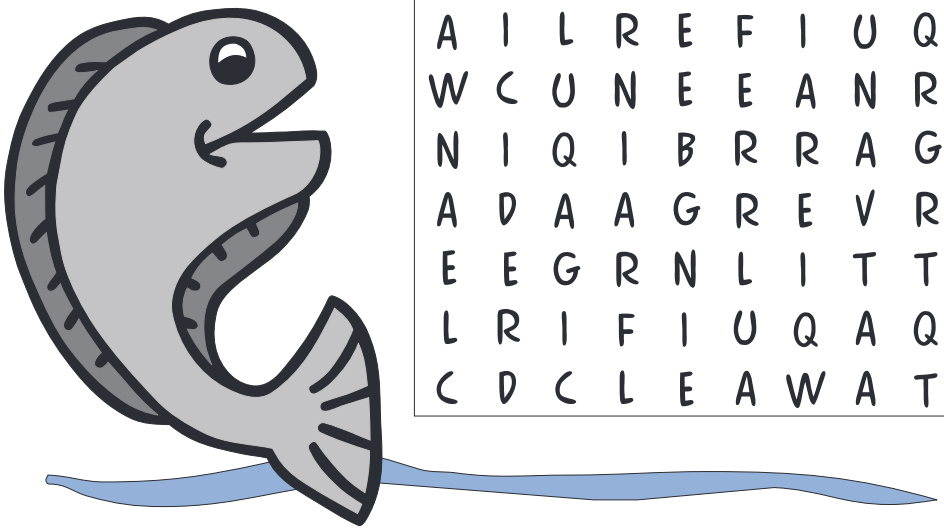
clean water raingers word search

FIND THESE WORDS ACROSS, DOWN, UP OR DIAGONALLY.

AQUIFER
BACTERIA
CLEAN WATER
CONSERVE
EROSION
FERTILIZER
GROUND WATER
LITTER
PESTICIDE
RAIN
RAINGERS
RECYCLE
RUNOFF
STORM DRAIN
STORM SEWER
WATER CYCLE
WATERSHED

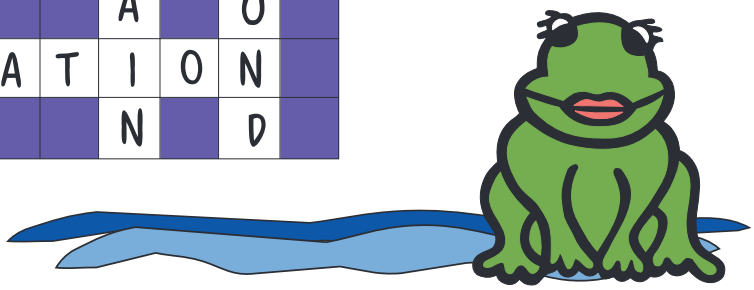


E	C	N	N	O	I	S	O	R	E	C	Y	Q	L	E
G	O	A	E	F	E	R	T	I	L	I	Z	E	R	S
N	N	R	A	I	N	D	B	Q	C	R	A	O	N	N
I	S	E	L	Q	C	T	R	E	Y	C	L	E	L	I
A	P	T	S	R	U	M	B	A	C	T	E	R	I	A
R	E	T	A	W	D	N	U	O	R	G	L	A	T	R
E	S	T	O	R	M	S	E	W	E	R	Q	Q	T	D
T	T	I	U	G	A	N	F	F	T	O	F	U	E	M
A	I	L	R	E	F	I	U	Q	A	U	E	H	L	R
W	C	U	N	E	E	A	N	R	W	N	S	F	C	O
N	I	Q	I	B	R	R	A	G	R	R	T	F	Y	T
A	D	A	A	G	R	E	V	R	E	S	N	O	C	S
E	E	G	R	N	L	I	T	T	E	R	W	N	E	N
L	R	I	F	I	U	Q	A	Q	C	L	S	U	R	A
C	D	C	L	E	A	W	A	T	R	E	I	R	O	H



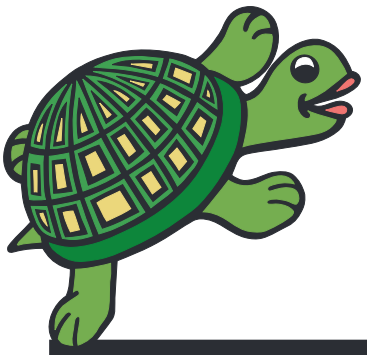
crossword answers

	1.	W			2.	F									
3.	R	A	I	N	G	E	R								
		T				R								4.	R
5.															
C	L	E	A	N		T		6.	B						E
		R				I	7.	W	A	T	E	R	8. S	H	E	D
						L			C				T			U
			10.								11.					
	9.	P	R	E	C	I	P	I	T	A	T	I	O	N		C
			U			Z			E		R		R			E
			N			E			R		E		M		12. G	
	13.	Y	O	U		R			I		E		D		R	
			F		14. F				A		S		R		O	
			F		R								A		U	
				15. C	O	N	S	E	R	V	A	T	I	O	N	
					G								N		D	



word search answers

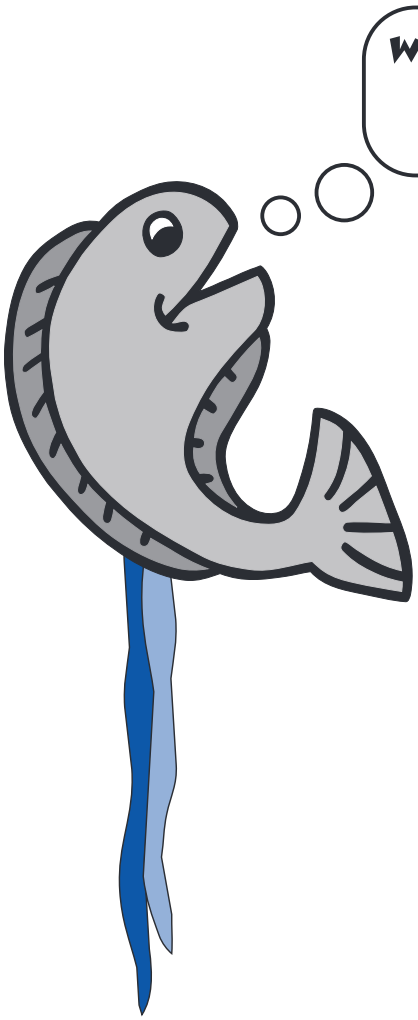
E	C	N	N	O	I	S	O	R	E	C	Y	Q	L	E
G	O	A	E	F	E	R	T	I	L	I	Z	E	R	S
N	N	R	A	I	N	D	B	Q	C	R	A	O	N	N
I	S	E	L	Q	C	T	R	E	Y	C	L	E	L	I
A	P	T	S	R	U	M	B	A	C	T	E	R	I	A
R	E	T	A	W	D	N	U	O	R	G	L	A	T	R
E	S	T	O	R	M	S	E	W	E	R	Q	Q	T	D
T	T	I	U	G	A	N	F	F	T	O	F	U	E	M
A	I	L	R	E	F	I	U	Q	A	U	E	H	L	R
W	C	U	N	E	E	A	N	R	W	N	S	F	C	O
N	I	Q	I	B	R	R	A	G	R	R	T	F	Y	T
A	D	A	A	G	R	E	V	R	E	S	N	O	C	S
E	E	G	R	N	L	I	T	T	E	R	W	N	E	N
L	R	I	F	I	U	Q	A	Q	C	L	S	U	R	A
C	D	C	L	E	A	W	A	T	R	E	I	R	O	H

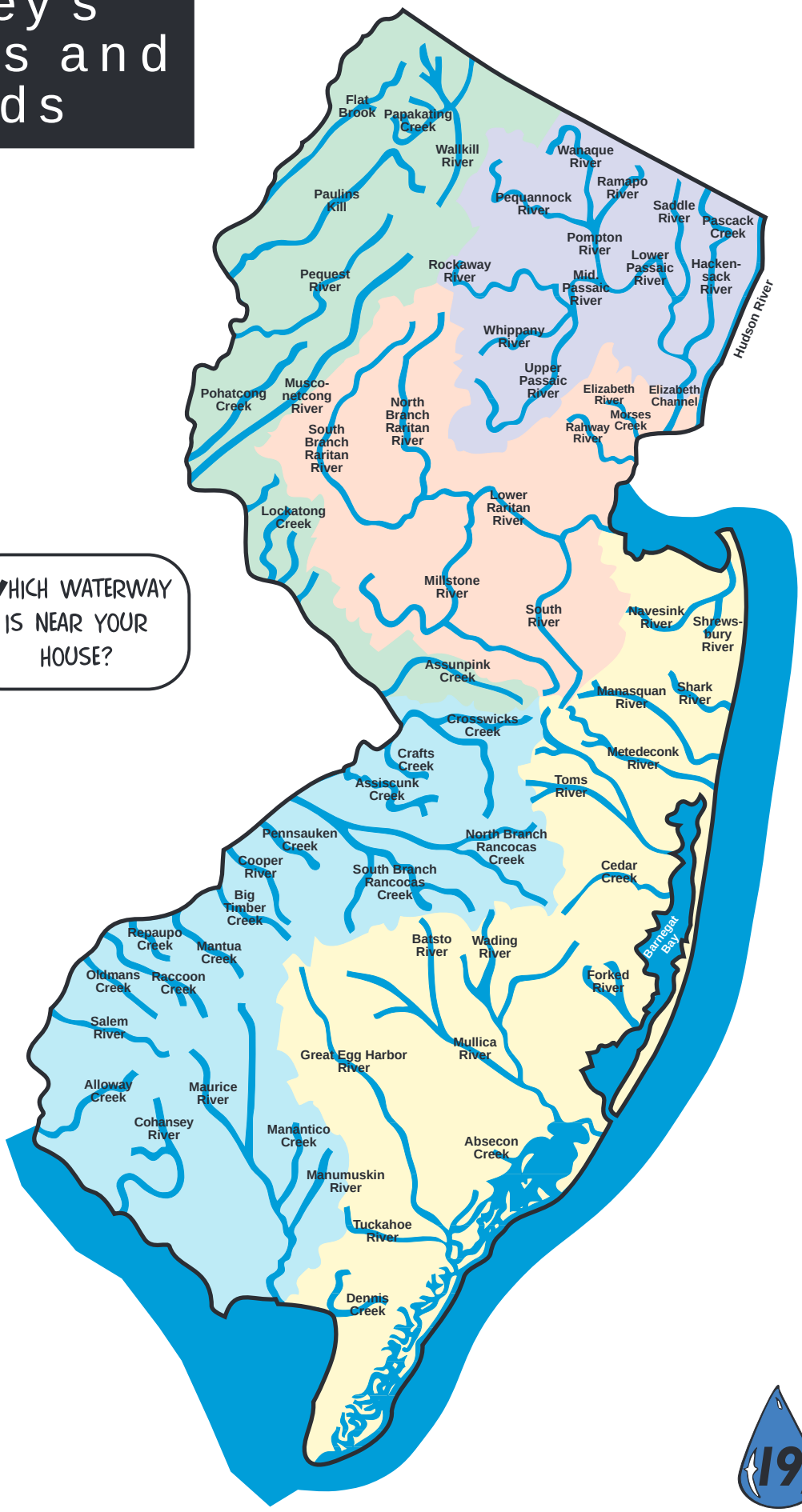


New Jersey's Waterways and Watersheds

Watersheds

- Atlantic Coastal
- Lower Delaware
- Northeast
- Northwest
- Raritan





New Jersey Department of Environmental Protection
Division of Watershed Management
PO Box 418
Trenton, NJ 08625-0418
609-292-2113
Donald T. DiFrancesco, Acting Governor
Robert C. Shinn, Jr., Commissioner

New Jersey Clean Communities Litter Activity Book

Clean Communities

The activity book has been produced to educate youth about the harmful effects of litter on wildlife and the environment. Please do your part to make your community cleaner. Our mission is to reduce litter through education. Clean Communities are safe, healthy, sustainable communities.

The NJ Clean Communities Council not only provides grants to towns and counties to help fight litter but also administers the Adopt-a-Beach and Adopt-a-Highway programs.

Courtesy of NJ Clean Communities Council, Inc.

www.njclean.org

Time Table for Litter Decomposition

How long do you think it takes for these items to decompose? Match the item to the time. Use your best guess.

-- Paper

450 Years

--Cotton Shirt

2-4 Weeks

--Wool Mittens

Undetermind

--Tin Can

200-500 Years

--Aluminum Can

1 Year

--Plastic Six Pack

100 Years

--Glass Bottle

1-5 Months

So, Make New Jersey Glitter and Can the Litter ! ! !

Answer Key -> paper = 2-4 weeks, cotton shirt = 1-5 months, wool mittens = 1 year, tin can = 100 years, aluminum can = 200-500 years, plastic six pack = 450 years, glass bottle = undetermined

Don't Be a Litter Bug Word Search

E A J T Z T Y H C S J X P U U
D S C E P S Q S Q U T J L B G
W A U A E L R A K M C L A Y L
P I N E N V I R O N M E N T Y
C U R G R S E T B U F T T Q K
L T N A E L X W Y P A X S V E
K I A A C R R G U O Y G G F G
R I T Y E A O J S L A M I N A
R J C T P L Q U Y L X W C D B
V E S P E A C G S U W A T E R
R I E C N R D U H T R A E E A
T R R U B B I S H I W H D S G
S G U B V F T F X O K U D M F
J A R C K U Y Z A N C G T F V
Z N G R P M M G L E N R Q M X

Find the hidden words from the list below.
They can be horizontal, vertical, or diagonal – forward or backward:

AIR
ANIMALS
BUG
CANS
CLEANUP
DANGEROUS
EARTH
ENVIRONMENT
GARBAGE
LITTER
PLANTS
POLLUTION
RECYCLE
REDUCE
REUSE
RUBBISH
TRASH
TREES
UGLY
WATER
WRAPPERS

Keep it Clean !

Use the words from the list below to complete the tips on how each of us can help prevent litter pollution.

1. **Always set an _____ by not littering.**
2. **If your parents own a car, make sure they have a _____.**
3. **When you visit the park, put your _____ in a trash can.**
4. **Help your family put _____ in a bin at curbside.**
5. **When you put out the trash at _____ make sure the garbage can lid is on tight.**
6. **If your school _____ doesn't have a trash can, ask your principal to put one out along with a recycling container.**
7. **Ask your parents to take you to a recycling _____.**
8. **Participate in a _____ trash cleanup day.**

COMMUNITY	EXAMPLE
HOME	LITTER
LITTERBAG	CENTER
PLAYGROUND	RECYCLABLES

Trash Math

Soda cans here, water bottles there - it all adds up !

Did you know that the average person throws away 5 pounds (lbs) of trash a day?

Figure out how many pounds of trash you throw away:

in one week ... **5 lbs** **x** _____ **=** _____ **lbs per week**
Number of days in a week

in one month... _____ **lbs per week x** _____ **=** _____ **lbs per month**
Number of weeks in a month

in one year... _____ **lbs per month x** _____ **=** _____ **lbs per year**
Number of months in a year

Want to convert these numbers to tons? Divide each one by 2,000 !

Recycling Fun Facts

Recycling helps reduce the amount of trash we throw away so make sure you recycle.

- **The average American uses 650 pounds of paper a year !**
- **Recycling one ton of paper saves 17 trees, 6,953 gallons of water, 463 gallons of oil, and 4,077 kilowatts of energy !**
- **About 50 % of the paper used in the United States is recycled**

Match the Message Coloring Page

Keep NJ Litter Free !

A ___ Don't Pollute My Stream !
B ___ Keep The Trash Off My Back !
C ___ I Can't Bear Trash !
D ___ Litter in My Woods, Owl That Hurts !
E ___ Buck The Trend, Litter Sure Does Offend !
F ___ Keep Trash Out Of Our Hare !

(Write the correct letter in the sign each animal is holding)

To Trash or Not to Trash?

Trash: Broken, discarded, or worthless things, rubbish

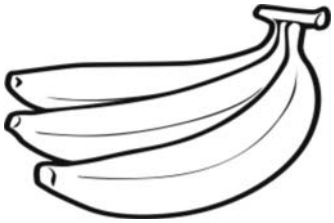
Recyclables: Materials which can be reused

Circle/Color the items below which can be saved from becoming trash

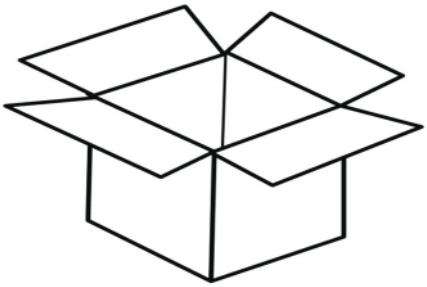
Milk Carton

Newspapers

Soda Can

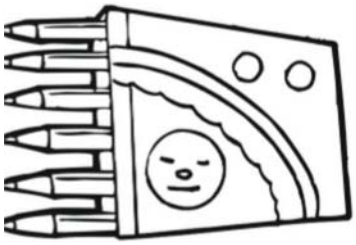


Banana Peels



Cardboard Box

Grass Clippings



Used Crayons

Plastic Bag

Old Books

Word Scramble

See how many litter related words you can unscramble using the clues provided:

ebragga: discarded food waste or any other unwanted or useless material.

_____

rppae: many different kinds can be recycled from your parent's offices and your home.

_____

sgars: if you leave it on the ground instead of bagging it, it can actually make your lawn greener and healthier.

_____

rtetli: pieces of trash that have been carelessly left on the ground, especially in a public place or outdoors.

_____

gbsa: whether plastic or paper, you can use them again until they fall apart. Then they can often be recycled.

_____

elrcyce: to save or collect waste material so that it can be used again.

_____

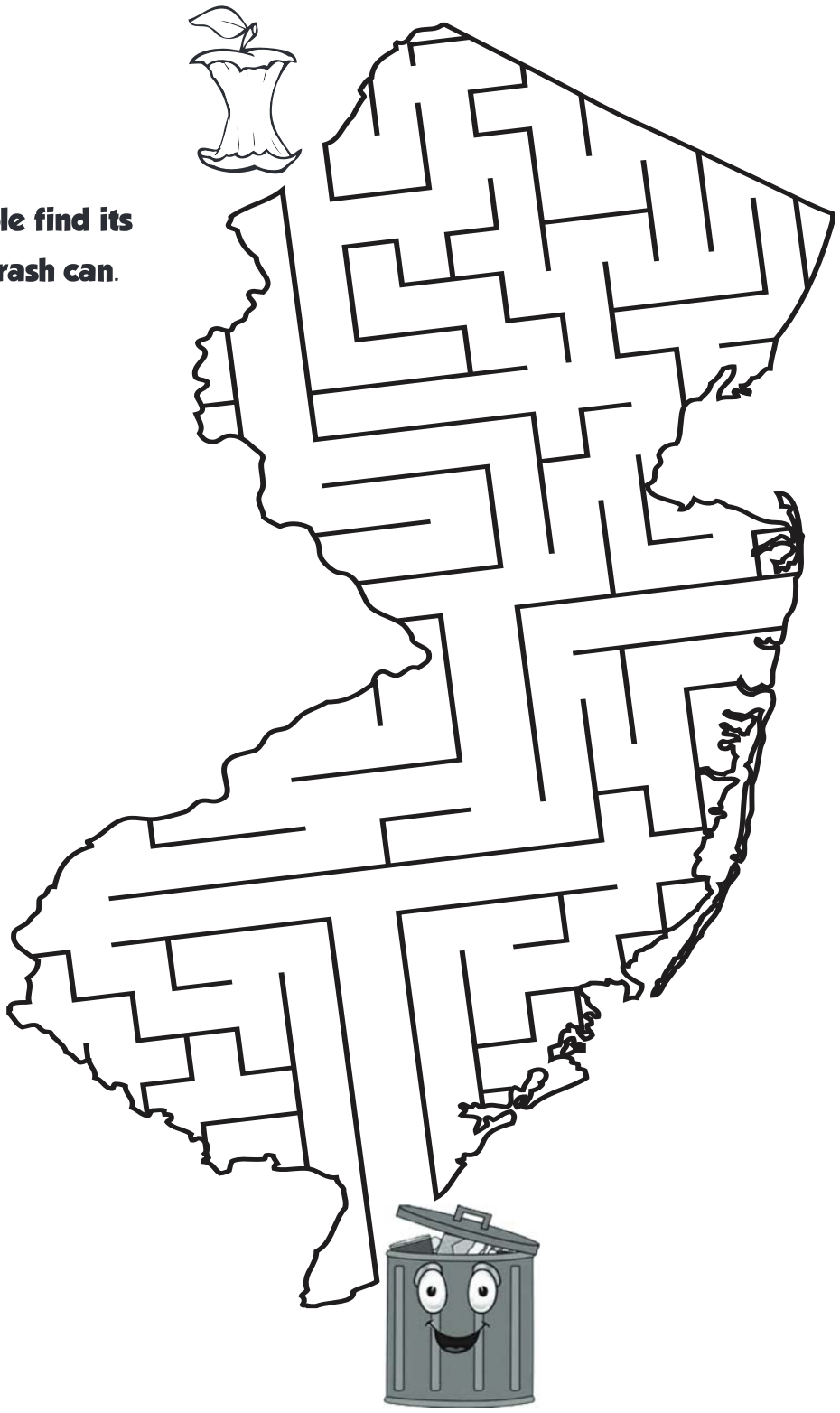
nelca: free from dirt or litter.

_____

(We made a list in case you need some help:
recycle, paper, litter, bags, garbage, clean, grass)

Help NJ Put Litter in its Place !

Help the apple find its way to the trash can.



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Somerset County

The NJ Clean Communities Council is a 501c3 nonprofit corporation whose mission is to reduce litter through education. The NJ Clean Communities Council works with the state departments of environmental protection and treasury to administer the Clean Communities program, disbursing grants to 558 municipalities and 21 counties for the implementation of grassroots, community-driven litter abatement programs. The NJ Clean Communities Council also administers New Jersey's Adopt-a-Beach and Adopt-a-Highway programs.

New Jersey Clean Communities Council

222 West State Street, Trenton, NJ 08608
Voice: 609-989-5900 • Fax: 609-989-9066
www.njclean.org

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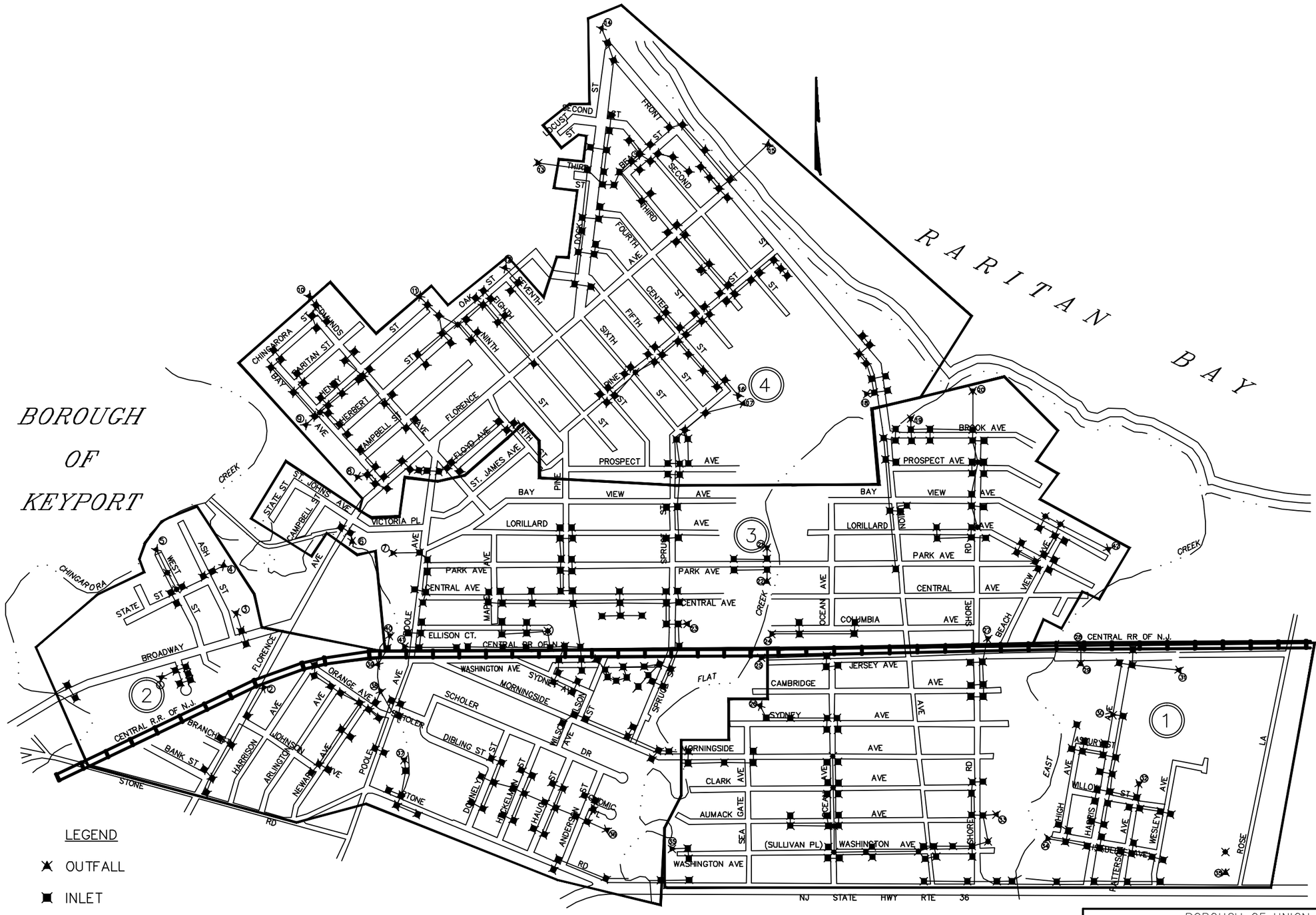
APPENDIX 4

Stormwater Collection System Map



BOROUGH OF UNION BEACH

STORMWATER COLLECTION SYSTEM

UNION BEACH, MONMOUTH COUNTY, NEW JERSEY

11 TINDALL ROAD
MIDDLETOWN, NJ 07748
TEL 732-671-6400
FAX 732-671-7365

EDWARD G. BROBERG, P.E.
UNION BEACH BOROUGH ENGINEER

LICENSED PROFESSIONAL ENGINEER
STATE OF NEW JERSEY LICENSE No. 18001

DATE

DRAWING

SHEET 1 OF 1

NEW JERSEY BOARD OF PROFESSIONAL ENGINEERS AND LAND SURVEYORS CERTIFICATE OF AUTHORIZATION: 24GA27867300

DESIGNED BY | DRAWN BY | CHECKED BY

PROJECT NO. UBCH-02756 | CADD FILE | FIELD BK. #

APPENDIX 5

2018 Trash and Recycling Schedule

2018 RECYCLING AND TRASH COLLECTION CALENDAR

Please check the street listing below to see if your address is located in Section A or Section B. Then follow the calendar to locate your trash, recycling, and bulk pick-up days. If you have any questions, please call 732-264-1133. **ALWAYS PLACE TRASH, RECYCLING, AND BULK AT THE CURB THE NIGHT BEFORE A SCHEDULED PICK-UP.**

Section A

2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 9th, 10th, Ash, Aspen, Bay, Bayview (#100-499), Beach, Broadway, Campbell, Center, Central (#100-499), Chingarora, Dock, Edmunds, Ellison, Florence (#100-#1400), Floyd, Front, Gateway, Herbert, Henry, Johnson (#1-99), Kathleen, Locust, Lorillard (#100-499), Maple, Oak, Pine, Park (#100-499), Poole (#100-599), Prospect (#100-499), Raritan, State, St. James, St. Johns, Spruce (#400-799), Victoria, Vista Shores, West

Regular trash pick-up is scheduled for **Tuesdays** and **Fridays.** You may place up to 3 cans/bags at the curb the night before a pick-up. Each can/bag may not exceed 50 pounds. There will be no pick-up on Tuesday, December 25.

Section A — Recycling

Pick-up is scheduled on the following Wednesdays:

January 10 & 24
February 7 & 21
March 7 & 21
April 4 & 18
May 2, 16 & 30
June 13 & 27
July 11 & 25
August 8 & 22
September 5 & 19
October 3, 17 & 31
November 14 & 28
December 12 & 26

Includes cans & bottles, bundled cardboard, bundled newspaper

Section A — Bulk

Pick-up is scheduled on the following Wednesdays:

January 3, 17 & 31
February 14 & 28
March 14 & 28
April 11 & 25
May 9 & 23
June 6 & 20
July 4 & 18
August 1, 15 & 29
September 12 & 26
October 10 & 24
November 7 & 21
December 5 & 19

Includes wooden furniture, mattresses, couches, other plastics (3 items per pick-up)

Section B

Anderson, Arlington, Asbury, Aumack, Bank, Bayview (#600-999), Beachview, Branch, Brook, Cambridge, Central (#500-999), Chomic, Clark, Columbia (#500-799), Dibling, Donnelly, Fr. Fitzpatrick, Florence (#1500-1799), Harris, Harrison, Haug, Heckelmann, High, Isabelle, Jersey, Johnson (#300-499), Lorillard (#500-999), Morningside, Newark, Ocean, Orange, Park (#500-999), Patterson, Poole (#600-699), Private, Prospect (#500-899), Rose, Route 36, Seagate, Seaview, Scholer, Shore, Spruce (#900-1000), Stone, Sullivan, Sydney, Union, Washington, Wesley, Willow, Wilson.

Regular trash pick-up is scheduled for **Mondays** and **Thursdays.** You may place up to 3 cans/bags at the curb the night before a pick-up. Each can/bag may not exceed 50 pounds. There will be no pick-up on Monday, January 1, or Thursday, November 22.

Section B — Recycling

Pick-up is scheduled on the following Wednesdays:

January 3, 17 & 31
February 14 & 28
March 14 & 28
April 11 & 25
May 9 & 23
June 6 & 20
July 4 & 18
August 1, 15 & 29
September 12 & 26
October 10 & 24
November 7 & 21
December 5 & 19

Includes cans & bottles, bundled cardboard, bundled newspaper

Section B — Bulk

Pick-up is scheduled on the following Wednesdays:

January 10 & 24
February 7 & 21
March 7 & 21
April 4 & 18
May 2, 16 & 30
June 13 & 27
July 11 & 25
August 8 & 22
September 5 & 19
October 3, 17 & 31
November 14 & 28
December 12 & 26

Includes wooden furniture, mattresses, couches, other plastics (3 items per pick-up)

Leaves will be picked up curbside in the Fall — Section B on Tuesdays/Section A on Wednesdays. Please use paper bags only. Do **NOT** mix in other types of debris, including branches. Branches/brush will be taken with regular garbage but **ONLY** when properly bundled. Appliances, electronics and metals will be picked up curbside by appointment only. Please call 732-264-1133 for information regarding any of this. If you are putting out a refrigerator, all doors must be removed.

BOROUGH OF UNION BEACH

APPENDIX 6 – MAINTENANCE OPERATIONS

1. STREET SWEEPING

Statewide Basic Requirement:

Street Sweeping: Tier A Municipalities shall sweep, at a minimum of once per month (weather and street surface conditions permitting), all streets (including roads or highways) that meet all of the following criteria: (1) the street is owned or operated by the municipality; (2) the street is curbed and has storm drains; (3) the street has a posted speed limit of 35 miles per hour or less; (4) the street is not an entrance or exit ramp; an d (5) the street is in a predominantly commercial area.

Existing Street Sweeping Program:

A review of the Borough streets was conducted, and it was determined that there are no Borough owned streets that meet the NJDEP minimum requirements for monthly sweeping under the Tier A Stormwater General Permit. Therefore, the Borough will continue with their existing street sweeping program, which consists of the following:

- Weekly sweepings of all Main and Secondary roadways year round, weather and surface condition permitting.
- Records of sweepings collected and the date the work is completed is maintained by the Public Works Department.
- All sweepings collected are stored into an existing container kept at the Public Works Department and disposed off periodically as neeeded.

2. CATCH BASINS AND STORM DRAIN INLETS

Statewide Basic Requirement:

Catch Basin and Storm Drain Inlet Inspection and Cleaning: The Tier A Municipality shall inspect storm drain inlets and any associated catch basins that it owns or operates and remove sediment, trash, or debris when present. Each catch basin and inlet shall be inspected at least once every five years. The Tier A Municipality shall clean any municipally owned or operated storm drain inlet or catch basin as frequently as necessary to eliminate recurring problems and restore proper function.

Existing Catch Basin and Storm Drain Inlet Program:

- The Borough conducts a annual inspection of all its inlets and catch basins.
- Cleaning of inlets and catch basins are done as needed based on the results of the field inspection.
- Spoils collected from the inlets/catch basins are dumped into the Borough's street sweeping container maintained at Public Works.
- Inspection records for each inlet/catch basin is maintained by the Borough's Public Works.
- Repairs needed are noted and work orders are generated where necessary.

3. STORMWATER FACILITIES

Statewide Basic Requirement:

Stormwater Facility Maintenance - The Tier A Municipality shall develop, update and implement a program to ensure adequate long-term cleaning, operation and maintenance of all municipally owned or operated stormwater facilities

Existing Stormwater Facilities:

The Borough of Union Beach does not have any existing stormwater detention basins and only has one (1) existing manufactured treatment devices. The Borough currently operates outfalls and storm drain inlets/manholes and storm sewer pipe

Inspection Program:

As part of the Borough's regular maintenance program the Department of Public Works shall inspect the Borough's stormwater facilities as follows:

- Pump stations shall be inspected on an annual basis and after a major storm event to ensure the screens are clear of major debris and all mechanical elements are functioning as they were designed.
- Inlets shall be inspected and cleaned on an annual basis. DPW personnel will also conduct a visual inspection of the inlets to ensure they are functioning properly. Inlets found to be in disrepair shall be reported to the Director of Public Works for scheduling of maintenance. Records of maintenance conducted on inlets will be recorded.

- Storm sewer pipes identified as problem areas shall be inspected after major storm events and on an as needed basis. Broken or collapsed storm sewer pipes shall be reported to the Director of Public Works and the Borough Engineer for further evaluation and/or maintenance.

- Outfalls shall be inspected once every 5 years for evidence of dry weather flow, scouring or erosion. Observations will be reported to the Director of Public Works and the Borough Engineer and necessary action will be taken if applicable.

Maintenance Program:

Based on field observations, the following routine maintenance will be performed as required:

- Removal of trash or litter on the two pump station screens.

- Inlets with evidence of debris will be cleaned as needed by the Public Works Department or utilizing on-call contractors, where necessary.

- Inlet markers will be replaced as needed.

- Blocked storm sewer pipes shall either be hand snaked or jetted to remove the blockage.

The DPW will note all inspections and maintenance/repair calls for the stormwater facilities in their internal maintenance log.

2018 STREET SWEEPING SCHEDULE

April 1 - November 1
(weather permitting)

First Monday	First Tuesday	First Thursday	First Friday
Florence (#100-1400) Front Dock Locust Second Third Fourth Beach Vista Shores Gateway	Union Brook Shore (#100-899) Prospect (#700-899) Bayview (#600-999) Lorillard (#500-999)	Spruce (#400-800) Center Kathleen Fifth Sixth Seventh Eighth Ninth Oak Prospect (#300-499)	Park (#500-899) Beachview Central (#500-999) Seaview /Private Columbia (#500-799) Ocean (from Columbia To Bayview)
Second Monday	**Second Tuesday**	**Second Thursday**	**Second Friday**
Park (#100-499) Maple Central (#100-499) Ellison Pine Lorillard (#100-499) Bayview (#200-499)	Jersey Rose Harris Asbury High Willow Isabelle Wesley Patterson	Tenth St. James Floyd Edmunds Bay Raritan Campbell (#100-299) Herbert Henry Chingarora	Ocean (Rt 36 to Jersey) Cambridge Sydney (#500-899) Clark Aumack Washington Sullivan Fr. Fitzpatrick Seagate Shore (#900-1499)
Third Monday	**Third Tuesday**	**Third Thursday**	**Third Friday**
Poole (#100-599) Victoria St. Johns State (#90-199) Campbell (#400-499)	Sydney (#100-199) Morningside Spruce (#900-1000) Wilson Scholer Chomic Anderson Haug Heckelmann Donnelly Dibling Stone (#600-1000)	Broadway Johnson (#1-25) Ash State (#200-399) West Aspen	Poole (#600-699) Stone (#100-599) Newark Orange Harrison Arlington Johnson (#300-499) Branch Bank Florence (#1400-1799)

Please remove all vehicles, trash cans, and basketball hoops from the street on your scheduled day. Thank you for your cooperation.

BOROUGH OF UNION BEACH

APPENDIX 7 – MAINTENANCE YARD OPERATIONS

Statewide Basic Requirement:

The Tier A Municipality shall implement best management practices for municipal maintenance yards and other ancillary operations owned or operated by the Tier A Municipality. Ancillary operations include but are not limited to impound yards, permanent and mobile fueling locations, and yard trimmings and wood waste management sites. The Inventory of Material and Machinery, and Inspections and Good Housekeeping practices shall be conducted at all municipal maintenance yards and other ancillary operations. Best Management Practices shall be implemented for the following activities, whenever such activities occur:

- Fueling Operations;
- Discharge of Stormwater from Secondary Containment;
- Vehicle Maintenance;
- On-Site Equipment and Vehicle Washing and Wash Wastewater Containment; and
- Salt and De-icing Material Storage and Handling.

Implementation of best management practices for the following activities, if applicable, shall commence on January 1, 2019:

- Aggregate Material and Construction Debris Storage;
- Street Sweepings, Catch Basin Clean Out, and Other Material Storage;
- Yard Trimmings and Wood Waste Management Sites that are owned and operated by the Tier A Municipality; and
- Roadside Vegetation Management

Existing Maintenance Yard Conditions and Activities:

As noted in SPPP Form 16 of this report, the Borough does not conduct any vehicle fueling, vehicle or onsite washing activities within their municipal DPW facilities.

To comply with the permit renewal requirements, a copy of the Borough's "Good Housekeeping Practices" standard operating procedures is attached to this report, as well as, an inventory of the Borough's DPW yard and Recycling Center. Please note these facilities do not have existing floor drains or storm drains inlets/catch basins that may potentially result in a stormwater discharge.

Aggregate Material and Construction Debris Storage:

Any sand, gravel, stone, top soil, road millings, waste concrete, asphalt, brick, block and asphalt-based roofing scrap or processed aggregate shall be stored in such a manner as to minimize stormwater run-on and aggregate run-off. Outdoor storage of aggregate material shall be considered only if a 50-foot setback from surface water bodies, storm drain inlets and/or stormwater ditches can be maintained.

Currently, the Borough stores gravel and other miscellaneous aggregate material outdoor in their yard behind their salt storage facility. This material is used by the Borough as needed and is within an area that has no immediate access to an existing storm drain inlet or catch basin. This area will be evaluated by the Borough and their representatives to determine application of best management practice that may be necessary for compliance. These may include but not be limited to use of sand bags, hay bales or curbing to regrade the surface and/or create dikes or berms. If feasible, storage bays may be considered as well.

Adjustments, if necessary, will be made for compliance with the new requirement to be initiated on January 1, 2019.

Street Sweepings, Catch Basin Clean Out, and Other Material Storage:

Road cleanup material, which includes but is not limited to street sweepings, storm sewer clean out materials, stormwater basins clean out materials and other similar materials collected during road cleanup operations, that is placed into storage must:

- Stored in leak-proof containers or on an impervious surface that is contained (e.g. bermed) to control leachate and litter; and
- Be removed for disposal within six (6) months of placement into storage.

Spoils are currently stored in a container disposed of periodically. This will be evaluated further with Borough representatives and adjustments, if necessary, will be made for compliance with the new requirement to be initiated on January 1, 2019.

Borough Owned/Operated Yard Trimmings and Wood Waste Management Sites:

In accordance with permit renewal requirements, yard trimming storage areas will be located and/or constructed to limit discharge to State waterways, prevent stormwater run-on and leachate run-off, and not be located in areas susceptible to seasonal flooding.

The Borough currently maintains brush, branches and leaves at their DPW Yard. This material is stored outdoors with no nearby storm drain inlet and/or catch basins. Jersey barrier blocks are placed in back of the disposal area to contain the material from escaping the DPW yard. This

will be evaluated further by the Borough and their representative and additional best management practices may be implement if necessary to comply with the new requirement starting January 1, 2019.

Roadside Vegetation Management:

The Borough does not conduct any roadside vegetation program. However, in the event application of herbicides is necessary after January 1, 2019, application of herbicides will be prohibited on or adjacent to storm drain inlets, on steeply sloping grounds, along curb lines and unobstructed shoulders.

Application of herbicides will only be permitted within a 2-foot radius around structures where overgrowth presents a safety hazard and where it is unsafe to mow.

BOROUGH OF UNION BEACH

STANDARD OPERATING PROCEDURES

TITLE	REVISION NO.
Good Housekeeping Practices	000

DESCRIPTION:

This Standard Operating Procedure (SOP) contains the basic good housekeeping practices to be implemented at the Borough maintenance yards including maintenance areas at ancillary operations.

PURPOSE:

This SOP provides a set of guidelines for the Borough of Union Beach employees to implement Good Housekeeping Practices for its maintenance yards and ancillary operations' maintenance areas.

STANDARDS AND SPECIFICATIONS:

General

1. All containers should be properly marked and labeled. Labels should be clean and legible.
2. Keep all containers in good condition and sealed tightly when they are not in use.
3. Keep all chemicals, fluids, and supplies indoors, where practical.
4. Containers stored outdoors must be covered and placed on spill containment platforms.
5. Keep storage areas clean and organized.
6. Keep spill kits and drip pans near any liquid transfer areas. Keep them protected from rain.
7. Absorbent spill clean-up materials must be available in maintenance areas and must be properly disposed of after spills.
8. All trash, dirt, and other debris must be placed in the dumpster.
9. Waste fluids must be collected in properly labeled containers and dispose of properly.
10. Maintain the recycling program by disposing of bottles, cans, paper, and trash in their designated containers.
11. Sweep and clean garages and yard once per week.

Salt and De-icing Material Handling

1. Prevent or minimize spills during material loading and unloading. If de-icing materials are spilled, remove the material using dry cleaning methods, and reuse or dispose of the material properly.
2. Inspect, sweep and clean area once per week to remove dirt and debris. Sweep area immediately following loading and unloading operations, when practical.
3. Minimize tracking material from the storage and loading/unloading areas.
4. Minimize the distance materials are transported during loading and unloading activities
5. Tarp any materials stored outside when they are not in use.
6. If interim seasonal tarping is used, de-icing materials may only be store outside between October 15th and April 30th.

BOROUGH OF UNION BEACH

STANDARD OPERATING PROCEDURES

Recycling Center

1. Sweep and clean area once per week to remove dirt and debris. Sweep area immediately following loading and unloading operations, when practical.
2. All trash, dirt, and other debris must be placed in the dumpster.
3. Waste fluids must be collected in properly labeled containers and dispose of properly.

Spill Response and Reporting

1. Conduct clean-up of and spill(s) immediately after discovery.
2. Spills are to be cleaned-up using dry cleaning methods only.
3. For Environmental Emergencies Hazardous Materials spills:
   Level 1: Contact the local police (731) 229-1313.
   Level 2: Contact NJDEP at (877) WARN DEP or (877) 927-6337.

Maintenance and Inspection

1. Check for leaks and damaged equipment, periodically. Make repairs as necessary.
2. Perform monthly inspections of all storage areas and containers, both in and outdoors.
3. Perform overall facility inspection and maintenance annually.

BOROUGH OF UNION BEACH

STANDARD OPERATING PROCEDURES

TITLE	REVISION NO.
Vehicle Maintenance	000

DESCRIPTION:

This Standard Operating Procedure (SOP) contains the basic vehicle maintenance practices to be implemented at the Borough maintenance yards including maintenance areas at ancillary operations.

PURPOSE:

This SOP provides a set of guidelines for the Borough of Union Beach vehicle maintenance for its maintenance yards and ancillary operations' maintenance areas.

STANDARDS AND SPECIFICATIONS:

Vehicle Maintenance

1. Conduct all vehicle maintenance only in designated areas.
2. When possible perform vehicle and equipment maintenance indoors and on a paved floor.
3. Always use drip pans.
4. Absorbent spill clean-up materials shall be available in all maintenance areas. Material shall be properly disposed of after use.
5. Protect maintenance areas from both stormwater runoff and stormwater run-on. Areas should be located 50 feet downstream of any drainage facility or watercourse.
6. Do not dump or dispose of oils, grease, fluids, and lubricants on the ground. Waste oil and waste antifreeze shall be collected in properly labeled containers and disposed of properly.
7. Do not dump or dispose batteries, used oils, antifreeze or other toxic fluids into a storm drain or watercourse.
8. Do not bury or burn tires.

Spill Response and Reporting

1. Conduct clean-up of and spill(s) immediately after discovery.
2. Spills are to be cleaned-up using dry cleaning methods only.
3. For Environmental Emergencies Hazardous Materials spills:
   Level 1: Contact the local police (732) 229-1313.
   Level 2: Contact NJDEP at (877) WARN DEP or (877) 927-6337.

Maintenance and Inspection

1. Periodically check for leaks and damaged equipment and make necessary repairs.

STORMWATER POLLUTION PREVENTION PLAN

MAINTENANCE YARD INVENTORY

BOROUGH OF UNION BEACH, MONMOUTH COUNTY, NEW JERSEY

Facility Name: Borough of Union Beach Department of Public Works Yard
Date: April 2018
Facility Location: 1400 Florence Avenue, Union Beach, NJ

Location: Yard (near office)

- Exposed Material Stockpile: Bricks, pavers

- Exposed Material Stockpile: (3-sided bin)
  Cold Patch
  Gravel
  Fill sand
  Mulch

Location: Recycling Yard

- Exposed Material Stockpile:
  White good/appliances
  Waste paper recycling (30-yd dumpster)
  Plastic, glass & aluminum (30-yd dumpster)
  Cardboard recycling (30-yd dumpster)
  Metal (30-yd dumpster)
  Leaves (20-yd dumpster)
  Branches (30-yd dumpster)
  Concrete (20-yd dumpster)
  Street sweepings (30-yd dumpster)
  Electronics (30-yd dumpster)

Note: There are no floor drains in the vehicle garages, or office building. De-icing material is stored indoors. There is no storm drainage system on the property. Runoff may be conveyed via overland sheet flow to the stream located at the border of the property or the stormwater system on Florence Avenue. There is a dry swale/culvert system running between the recycling center and the disabled vehicles in the yard.

APPENDIX 8

2011 SPPP Forms

BOROUGH OF UNION BEACH
MONMOUTH COUNTY, NEW JERSEY

New Jersey Department of Environmental Protection

TIER A MUNICIPAL STORMWATER
GENERAL PERMIT

STORMWATER MANAGEMENT PROGRAM

MARCH 2005

Revised October 2011

PREPARED BY:

T&M ASSOCIATES

11 TINDALL ROAD
MIDDLETOWN, NJ 07748

BOROUGH OF UNION BEACH
MONMOUTH COUNTY, NEW JERSEY

New Jersey Department of Environmental Protection

TIER A MUNICIPAL STORMWATER
GENERAL PERMIT

STORMWATER MANAGEMENT PROGRAM
MARCH 2005
Revised October 2011

_____ _____

EDWARD G. BROBERG, P.E., P.P. DATE
UNION BEACH BOROUGH ENGINEER
STORMWATER PROGRAM COORDINATOR

PREPARED BY:

T&M ASSOCIATES

11 TINDALL ROAD
MIDDLETOWN, NJ 07748

TABLE OF CONTENTS

Tier A Municipal Stormwater Regulation Program

Stormwater Pollution Prevention Team Members

Number of team members may vary.

Completed by: *Edward G. Broberg, P.E., P.P.*
Title: *Borough Engineer*
Date: *March 1, 2005 Revised Oct 2011*
Municipality: *Borough of Union Beach*
County: *Monmouth*
NJPDES #: NJG*0148466*
PI ID #: *168615*

Stormwater Program Coordinator: *John K. Haines, CPWM , CRP*
Title: *Director of Public Works*
Office Phone #: *(732) 264-1133*
Emergency Phone #: *Same as above*

Public Notice Coordinator: *Anne Marie Friscia*
Title: *Borough Clerk*
Office Phone #: *(732) 264-2277*
Emergency Phone #: *Same as above*

Post-Construction Stormwater Management Coordinator: *Edward G. Broberg, P.E., P.P.*
Title: *Borough Engineer*
Office Phone #: *(732) 671-6400*
Emergency Phone #: *Same as above*

Local Public Education Coordinator: *John K. Haines, CPWM , CRP*
Title: *Director of Public Works*
Office Phone #: *(732) 264-1133*
Emergency Phone #: *Same as above*

Ordinance Coordinator: *Anne Marie Friscia*
Title: *Borough Clerk*
Office Phone #: *(732) 264-2277*
Emergency Phone #: *Same as above*

Public Works Coordinator: *John K. Haines, CPWM , CRP*
Title: *Director of Public Works*
Office Phone #: *(732) 264-1133*
Emergency Phone #: *Same as above*

Employee Training Coordinator: *John K. Haines, CPWM , CRP*
Title: *Director of Public Works*
Office Phone #: *(732) 264-1133*
Emergency Phone #: *Same as above*

Other: *Jennifer W. Maier*
Title: *Borough Administrator*
Office Phone #: *732-734-7189*
Emergency Phone #: *Same as above*

SPPP Form 2 - Public Notice

Municipality Information

Municipality: *Borough of Union Beach* County: *Monmouth*

NJPDES # : NJG*0148466* PI ID #:*168615*

Team Member/Title:*Anne Marie Friscia, Borough Clerk*

Effective Date of Permit Authorization (EDPA):*04/01/04*

Date of Completion: *March 1, 20005* Date of most recent update: *October 2011*

Briefly outline the principal ways in which you comply with applicable State and local public notice requirements when providing for public participation in the development and implementation of your stormwater program.

The Borough of Union Beach provides public notice of meetings as required by the Open Public Meetings Act ("Sunshine Law," N.J.S.A. 10:4-6 et seq.) and as required by N.J.S.A. 40:49-1 et. seq. for the passage of ordinances. The Borough will also continue to provide public notice for municipal actions, such as the adoption of any future stormwater management plans or masterplan amendments, as outlined by the Municipal Land Use Law (N.J.S.A. 40:55D-1 et. seq.).

SPPP Form 3 – New Development and Redevelopment Program

Municipality Information

Municipality: *Borough of Union Beach* County: *Monmouth*

NJPDES # : NJG*0148466* PI ID #: *168615*

Team Member/Title: *Edward G Broberg, Borough Engineer*

Effective Date of Permit Authorization (EDPA): *04/01/04*

Date of Completion: *March 1, 2005* Date of most recent update: *October 2011*

Describe in general terms your post-construction stormwater management in new development and redevelopment program (post-construction program), and how it complies with the Tier A Permit minimum standard. This description must address compliance with the Residential Site Improvement Standards for stormwater management; ensuring adequate long-term operation and maintenance of BMPs (including BMPs on property that you own or operate); design of storm drain inlets (including inlets that you install); and preparation, adoption, approval, and implementation of a municipal stormwater management plan and municipal stormwater control ordinance(s). Attach additional pages as necessary. Some additional specific information (mainly about that plan and ordinance(s)) will be provided in your annual reports.

The Borough post-construction stormwater management in new development and redevelopment program is as follows:

1. The Borough Planning Board will continue to ensure that plans for all new residential development and redevelopment projects, subject to the Residential Site Improvements Standards, are in compliance with the Stormwater Management Regulations prior to issuance of final subdivision or site plan approvals under the Municipal Land Use Law.

2. The Code Enforcement Officer will continue to ensure compliance of all private developments with the approved subdivision plans and applicable ordinances, as well as, long term operation and maintenance of BMPs on private property. The Director of Public Works will be responsible for appropriate long term operation and maintenance of BMP's on Borough property.

3. The Planning Board will continue to ensure all plans for new development and redevelopment projects incorporate the new design of storm drain inlets. The Borough Engineer will ensure proper installation of said inlet and the Director of Public Works will be responsible for proper maintenance/retrofit of existing and new inlets. The Borough Engineer and Construction Official will ensure that any existing storm drain on private property in direct contact with a repaving, resurfacing, reconstrction or alteration project will be retrofit to prevent discharge of solids and flotable to the Borough's Storm System. The Borough Code Enforcement officer will ensure that all dumpsters are covered.

4. The Borough's Municipal Stormwater Management Plan was adopted on March 30, 2005 and the Ordinance was adopted on March 16, 2006. After approval by the County it became effective onMarch 16, 2006.

5. Since approval of the stormwater control ordinance and plan, the Planning Board will ensure that all plans for new development and redevelopment projects are in compliance with the design and maintenance measures adopted.

SPPP Form 4- Local Public Education Program

Municipality Information

Municipality: *Borough of Union Beach* County *Monmouth*

NJPDES # : *NJG0148466* PI ID #: *168615*

Team Member/Title: *John Haines,Director of Public Works*

Effective Date of Permit Authorization (EDPA): *04-01-04*

Date of Completion: *March 1, 2005* Date of most recent update: *October 2011*

Local Public Education Program

Describe your Local Public Education Program. Be specific on how you will distribute your educational information, and how you will conduct your annual event. Attach additional pages with the date(s) of your annual mailing and the date and location of your annual event.

The Borough will select a total of 10 points annually from the educational activities listed below:

- Website - The Borough will maintain a stormwater-related page on its municipal website. (1 point)

- Stormwater Display - The Borough will present a stormwater-related display at Borough Hall. (2 points)

- Stormwater Giveaway - The Borough will distribute an item with a stormwater-related message such as magnets, temporary tattoos, bookmarks, coloring books, and pens or pencils. The Borough will purchase a supply of the item equal to a minimum of 10% of the population. (2 points)

- Citizen Stormwater Advisory Committee - The Borough will consider the formation and operation of such a committee. (2 points)

- Utilize Department Materials - The Borough will use N.J.D.E.P. authored stormwater education materials available from www.cleanwaternj.org to publish an ad in the newspaper that serves the Borough; produce a sign or billboard which can be displayed on a bus, bus step shelter or recreational field. (2 points each/max 4 points per year)

- Poster Contest - The Borough will hold a poster or photo contest requiring a clean water or stormwater theme and caption. (2 points)

- Stormwater Training for Elected Municipal Officials - The Borough will conduct an educational program for all elected municipal officials to educate them on the Stormwater Management Rules (N.J.A.C. 7:8), Tier A Permit and the steps already taken to minimize stormwater pollution. (3 points)

- Mailing - the Borough will distribute any of the N.J.D.E.P.'s educational brochures, tip cards, or a municipality produced equivalent (e.g. calendar, recycling schedule), to every residence and business in the municipality. (3 points)

- Partnership Agreement/Local Event- The Borough shall identify and enter into a partnership agreement with a local event. The Borough shall identify a group or water

SPPP Form 5 – Storm Drain Inlet Labeling

Municipality Information

Municipality: *Borough of Union Beach* County *Monmouth*

NJPDES # : *NJG0148466* PI ID #: *168615*

Team Member/Title: *John Haines, Director of Public Works*

Effective Date of Permit Authorization (EDPA): *04-01-04*

Date of Completion: *March 1, 2005* Date of most recent update: *October 2011*

Storm Drain Inlet Labeling

Describe your storm drain inlet labeling program, including your labeling schedule, the details of your long-term maintenance plan, and plans on coordinating with watershed groups or other volunteer organizations.

In the past the Borough had conducted a storm drain inlet labeling program and stenciled approximately 475 inlets (98% of the Borough) utilizing local boy scout groups. In 2005, the Borough initiated a re-labeling program utilizing the aluminum plates manufactured by Almetek Industries Inc., Hackettstown, NJ. The plates will show a crab in the center and read "No Dumping-Drains to Bay". The re-labeling program was completed prior to 2009.

Periodic inspection and maintenance will continue to be conducted by the Borough forces. Labels will be checked to ensure that they are visible and firmly adhered to the storm drain inlet. Replacement will be done as needed.

SPPP Form 6 – MS4 Outfall Pipe Mapping

Municipality Information

Municipality: *Borough of Union Beach* County *Monmouth*

NJPDES # : *NJG0148466* PI ID #: *168615*

Team Member/Title: *Edward G. Broberg, Borough Engineer*

Effective Date of Permit Authorization (EDPA): *04-01-04*

Date of Completion: *March 1, 2005* Date of most recent update: *October 2011*

Explain how you will prepare your map (include its type and scale, and the schedule for the mapping process). Who will prepare your map (e.g., municipal employees, a consultant, etc.)?

The Borough's outfalls were previously mapped by the U.S. Army Corps of Engineers on two, 24"x36", (1:100 scale) maps. The Borough Engineer continues to update these drawings and include locations of any new outfalls. All outfalls have been given an alpha-numeric identification as required by the DEP.

SPPP Form 7 – Illicit Connection Elimination Program

Municipality Information

Municipality: *Borough of Union Beach* County *Monmouth*

NJPDES # : *NJG0148466* PI ID #: *168615*

Team Member/Title: *John Haines, Director of Public Works*

Effective Date of Permit Authorization (EDPA): *04-01-04*

Date of Completion: *March 1, 2005* Date of most recent update: *October 2011*

Describe your Illicit Connection Elimination Program, and explain how you plan on responding to complaints and/or reports of illicit connections (e.g., hotlines, etc.). Attach additional pages as necessary.

The Borough continues to inspect its MS4 outfalls on a monthly basis for instablility and blockages. The Borough will complete a DEP Illicit Connection Inspection Form for each outfall during these inspections and keep a copy of the records with the SPPP plan. Outfall pipes that are found to have a dry-weather flow or evidence of an intermittent non-stormwater flow will be reinspected to locate the illicit connection. If the illicit connection is identified and located, the responsible party will be cited for being in violation of the Borough Illicit Connection Ordinance and the connection will be eliminated. If the illicit connection is not found after a reasonable effort, the Borough will submit the Closeout Investigation Form with the Annual Inspection and Recertification. If the illicit connection is found within another public entity, the Borough will notify that entity and report the connection to the DEP.

Residents may contact either the Borough Police, or the Department of Public Works to report of any suspected illicit connections, spills or leaks of hazardous materials. The Borough formalizes its complaint response/reporting procedures by October 1, 2005 and adopted an ordinance prohibiting illicit connections on 3/16/06.

SPPP Form 8 – Illicit Connection Records

Municipality Information

Municipality: *Borough of Union Beach* County *Monmouth*

NJPDES # : *NJG0148466* PI ID #: *168615*

Team Member/Title: *John Haines, Director of Public Works*

Effective Date of Permit Authorization (EDPA): *04-01-04*

Date of Completion: *March 1, 2005* Date of most recent update: *October 2011*

Prior to May 2, 2006

Note: *Attach a copy of each illicit connection report form for outfalls found to have a dry weather flow.*

Total number of inspections performed this year? *0*

Number of outfalls found to have a dry weather flow? *N/A*

Number of outfalls found to have an illicit connection? *N/A*

How many illicit connections were eliminated? *N/A*

Of the illicit connections found, how many remain? *N/A*

May 2, 2006 – May 1, 2007

Note: *Attach a copy of each illicit connection report form for outfalls found to have a dry weather flow.*

Total number of inspections performed this year? *45*

Number of outfalls found to have a dry weather flow? *0*

Number of outfalls found to have an illicit connection? *0*

How many illicit connections were eliminated? *N/a*

Of the illicit connections found, how many remain? *N/A*

May 2, 2007 – May 1, 2008

Note: *Attach a copy of each illicit connection report form for outfalls found to have a dry weather flow.*

Total number of inspections performed this year? *46*

Number of outfalls found to have a dry weather flow? *20 (all are tidal)*

Number of outfalls found to have an illicit connection? *0*

How many illicit connections were eliminated? *N/A*

Of the illicit connections found, how many remain? *N/A*

May 2, 2008 – May 1, 2009

Note: *Attach a copy of each illicit connection report form for outfalls found to have a dry weather flow.*

Total number of inspections performed this year? _____

Number of outfalls found to have a dry weather flow? _____

Number of outfalls found to have an illicit connection? _____

How many illicit connections were eliminated? _____

Of the illicit connections found, how many remain? _____

SPPP Form 9 – Yard Waste Ordinance/Collection Program

Municipality Information

Municipality: *Borough of Union Beach* County *Monmouth*

NJPDES # : *NJG0148466* PI ID #: *168615*

Team Member/Title: *John Haines,Director of Public Works*

Effective Date of Permit Authorization (EDPA): *04-01-04*

Date of Completion: *March 1, 2005* Date of most recent update: *October 2011*

Please describe your yard waste collection program. Be sure to include the collection schedule and how you will notify the residents and businesses of this schedule. Attach additional pages as necessary.

The Borough continues to maintain its existing collection program which consists of bi-weekly curbside leaf collections from October to December and in April. Residents are notified that all leaves must be bagged in clear plastic bags and tied prior to pickup. Branches/brush are also collected weekly by the Borough garbage contractor. Both bagged leaves and branches may also be brought to the Borough DPW yard throughout the year. See Appendix 3 for additional information and collection schedules.

Grass clippings are not collected, the Borough encourages residents to mulch their grass.

Notification of the collection schedule is conducted through the annual distribution of the Borough Recycling Newsletter.

SPPP Form 10 - Ordinances

Municipality Information

Municipality: *Borough of Union Beach* County *Monmouth*

NJPDES # : *NJG0148466* PI ID #: *168615*

Team Member/Title: *Anne Marie Friscia, Borough Clerk*

Effective Date of Permit Authorization (EDPA): *04-01-04*

Date of Completion: *March 1, 2005* Date of most recent update: *October 2011*

For each ordinance, give the date of adoption. If not adopted, explain the development status:

Pet Waste *3/16/06 and information disributed with pet licenses*

Are information sheets regarding pet waste distributed with pet licenses? Y ( ) N ( )

Litter *3/16/06*

Improper Waste Disposal *3/16/06*

Wildlife Feeding *3/16/06*

Yard Waste *3/16/06*

Illicit Connections *3/16/06*

How will these ordinances be enforced?

The local code enforcement officer willcontinue to enforce these ordinances. If someone violates one of these ordinances they will be given warnings prior to issuance of a summons for the violation.

SPPP Form 11 – Storm Drain Inlet Retrofitting

Municipality Information

Municipality: Borough of Union Beach County Monmouth

NJPDES # : NJG0148466 PI ID #: 168615

Team Member/Title: John Haines, Director of Public Works

Effective Date of Permit Authorization (EDPA): *04-01-04*

Date of Completion: *March 1, 2005* Date of most recent update: *October 2011*

What type of storm drain inlet design will generally be used for retrofitting?

The Borough will utilize NJDOT bicycle safe grates and Campbell Foundry Model #N-2-ECO inlet heads or equal.

Repaving, repairing,reconstruction or alteration project name	Projected start date	Start date	Date of completion	# of storm drain inlets	# of storm drains w/ hydraulic exemptions
Jersey Avenue, Broadway, Campbell,	*Summer 2005*			*4*	
Broadway	*Summer 2005*			*4*	
Campbell Street	*Summer 2005*			*2*	
Central Avenue	*Summer 2005*			*2*	
Continued on Attached					

Are you claiming any alternative device exemptions or historic place exemptions for any of the above projects? Please explain:

No. The Borough does not plan on claiming any historic place or alternate device exemptions for any of the above projects.

SUMMARY OF INLETS REHABILITATED AS PART OF THE BOROUGH OF UNION BEACH'S ANNUAL CAPITAL IMPROVEMENT PROGRAM

Year	Project Name(s)	Total Number of Inlets Within Project Area	Total Number of Inlets Replaced /Retrofit	Number of Inlets Not Retrofit as Part of this Project
2006	Reconstruction of Lorillard Ave., Central Ave Phase II, State Street and Curb and Sidewalk	14	14	0
2007	Pine Street, Central Ave Phase III, Harris Phase II and Curb and Sidewalk	18	18	0
2008	Wesley Avenue, Morningside, Edmunds Phase I and Floyd Ave.	23	23	0
2009	Jersey Avenue Phase I & Edmunds Phase II	4	4	0
2010	Jersey Avenue Phase II, Dibling Street & Morningside Traffic Calming	14	14	0
2011	Scholer Drive, Phase I and Bayview Ave Phase II	13	13	0
2012	Scholer Drive Phase II and Haug Street	*To be determined, project is currently in design phase.*		
2013				
2014				
2015				
2015				
2017				
2018				
2019				
2020				

SPPP Form 12 – Street Sweeping and Road Erosion Control Maintenance

Municipality Information

Municipality: Borough of Union Beach County: Monmouth

NJPDES # : NJG0148466 PI ID #: 168615

Team Member/Title: John Haines, Director of Public Works

Effective Date of Permit Authorization (EDPA): *04-01-04*

Date of Completion: *March 1, 2005* Date of most recent update: *October 2011*

Street Sweeping

Please describe the street sweeping schedule that you will maintain.
(NOTE: Attach a street sweeping log containing the following information: date and area swept, # of miles swept and the total amount of materials collected.)

There are no municipal roadways that meet all of DEP street sweeping requirements However, the Borough will continue its existing street sweeping program. This includes monthly street sweeping from March 1st thru November 30th.

See Appendix 4 for additional details, schedule and sample record log.

Road Erosion Control Maintenance

Describe your Road Erosion Control Maintenance Program, including inspection schedules. A list of all sites of roadside erosion and the repair technique(s) you will be using for each site should be attached to this form.
(NOTE: Attach a road erosion control maintenance log containing the following information: location, repairs, date)

The Borough will continue to inspect all curbless municipal roadways during their street sweeping activities for signs of possible road erosion. Any road erosion problems will be reported to the Director of Public Works. Identified areas will be prioritized and repaired in accordance with the Standards for Soil Erosion and Sediment Control in New Jersey. The Borough will log the inspections and include a copy of the repairs and dates completed with the SPPP.

SPPP Form 13 – Stormwater Facility Maintenance

Municipality Information

Municipality: Borough of Union Beach County: Monmouth

NJPDES # : NJG0148466 PI ID #: 168615

Team Member/Title: John Haines, Director of Public Works

Effective Date of Permit Authorization (EDPA): *04-01-04*

Date of Completion: *March 1, 2005* Date of most recent update: *October 2011*

Please describe your annual catch basin cleaning program and schedule. Attach a map/diagram or additional pages as necessary.

Presently the Borough conducts bi-annual inspection and cleaning of their storm drain inlets. Flood prone areas are also inspected and cleaned after major storm events and as needed throughout the year. The Borough continues to maintain their record logs outlining the number of inlets inspected and/or cleaned. At the time of inspection, the Borough will also check to determine if the inlet is functioning properly. A maintenance record (or work orders) will be generated for those inlets that are in disrepair.

See Appendix 5 for additional details, and sample maintenance and inspection record logs.

Please describe your stormwater facility maintenance program for cleaning and maintenance of all stormwater facilities operated by the municipality. Attach additional pages as necessary.

(NOTE: Attach a maintenance log containing information on any repairs/maintenance performed on stormwater facilities to ensure their proper function and operation.)

The Borough will continue to maintain its ongoing maintenance program for their stormwater facilities (storm drain inlets, pipes, outfalls and swales). This program includes inspection of inlets, storm pipes and outfalls and general maintenance of swales during the growing season.

See Appendix 5 for additional details and sample maintenance and inspection record logs.

SPPP Form 14 - Outfall Pipe Stream Scouring Remediation

Municipality Information

Municipality: Borough of Union Beach County: Monmouth

NJPDES # : NJG0148466 PI ID #: 168615

Team Member/Title: John Haines, Director of Public Works

Effective Date of Permit Authorization (EDPA): *04-01-04*

Date of Completion: *March 1, 2005* Date of most recent update: *October 2011*

Describe your stormwater outfall pipe scouring detection, remediation and maintenance program to detect and control active, localized stream and stream bank scouring. Attach additional pages as necessary.

(NOTE: Attach a prioritized list of sites observed to have outfall pipe stream and stream bank scouring, date of anticipated repair, method of repair and date of completion.)

The Borough presently conducts monthly inspections of their outfalls for instability and flow restriction (blockages). During these inspections, the Borough will inspect for signs of outfall pipe scouring. Outfalls showing signs of scouring will be reported to the Director of Public Works, evaluated and prioritized for repairs in accordance with the Standards for Soil Erosion and Sediment Control in New Jersey. Repairs that do not require DEP permits will be prioritized first.

All repairs conducted will be followed with an annual inspection to ensure that the scouring has not resumed.

SPPP Form 15 – De-icing Material Storage

Municipality Information

Municipality: *Borough of Union Beach* County *Monmouth*

NJPDES # : *NJG0148466* PI ID #: *168615*

Team Member/Title: *John Haines, Director of Public Works*

Effective Date of Permit Authorization (EDPA): *04-01-04*

Date of Completion: *March 1, 2005* Date of most recent update: *October 2011*

De-icing Material Storage

Describe how you currently store your municipality's de-icing materials, and describe your inspection schedule for the storage area. If your current storage practices do not meet the de-icing material storage SBR describe your construction schedule and your seasonal tarping interim measures. If you plan on sharing a storage structure, please include its location, as well as a complete list of all concerned public entities. If you store sand outdoors, describe how it meets the minimum standard.

The Borough currently stores their de-icing materials inside a building located within their DPW yard. The structure has four walls, an impermeable floor, roof, and door. De-icing materials stored include a mixture of rock salt and sand.

The Borough will continue to store its de-icing materials at this facility and conduct the appropriate inspection/maintenance procedures.

SPPP Form 67 – Standard Operating Procedures

Municipality Information

Municipality: *Borough of Union Beach* County *Monmouth*

NJPDES # : *NJG0148466* PI ID #: *168615*

Team Member/Title: *John Haines, Director of Public Works*

Effective Date of Permit Authorization (EDPA): *04/01/04*

Date of Completion: *March 1, 2005* Date of most recent update: *October 2011*

BMP	Date SOP went into effect	Describe your inspection schedule
Fueling Operations (including the required practices listed in Attachment D of the permit)	*N/A*	*The Borough does not have an on-site fueling station*
Vehicle Maintenance (including the required practices listed in Attachment D of the permit)	*3/31/2005*	*Inpsections will be held on a monthly basis to ensure that the standard operationg procedure is being met.* *See Appendix 6 for copy of SOP.*
Good Housekeeping Practices (including the required practices listed in Attachment D of the permit) **Attach inventory list required by Attachment D of the permit**.	*3/31/05*	*Indoor/outdoor storage area, containers and surrounding areas around the DPW will be inspected on a monthly basis.* *See Appendix 6 for copy of SOP.*

SPPP Form 17 – Employee Training

Municipality Information

Municipality: *Borough of Union Beach* County *Monmouth*

NJPDES # : *NJG0148466* PI ID #: *168615*

Team Member/Title: *John Haines, Director of Public Works*

Effective Date of Permit Authorization (EDPA): *04-01-04*

Date of Completion: *March 1, 2005* Date of most recent update: *October 2011*

Describe your employee training program. For each required topic, list the employees that will receive training on that topic, and the date the training will be held. Attach additional pages as necessary.

The following topics will be covered in the Borough annual employee training program:

Waste Disposal Education	*Code Enforcement Officer & Public Works Employees*
Municipal Ordinances	*Code Enforcement Officer, Public Works Employees, Police Dept.*
Yard Waste Collection Program	*Public Works employees*
Street Sweeping Program	*Public Works employees*
Stormwater Facility Maintenance Program	*Public Works employees*
Road Erosion Control Program	*Public Works employees*
Outfall Pipe Stream Scouring Remediation	*Public Works employees*
Illicit Connection Elimination and Outfall Pipe Mapping	*Public Works employees*
Maintenance Yard Operations	*Public Works employees*
Construction Activity/Post Construction Stormwater Management in New Development and Redevelopment	*Public Works employees & Code Enforcement Officer*

The illicit connection elimination training will include field training on procedures to properly conduct outfall inspections for illicit connections, follow-up investigation and procedures for elimination of the illicit connection. The maintenance yard operations training will include field training on the standard operating procedures for vehicle maintenance and good housekeeping practices.

Method of conducting the training and the dates for the above training programs are yet to be determined.

See Appendix 8 for additional information.

BOROUGH OF UNION BEACH

STORMWATER MANAGEMENT PROGRAM

SOLID AND FLOATABLE CONTROLS
STREET SWEEPING PROGRAM

Statewide Basic Requirement:

Street Sweeping - Tier A Municipalities shall sweep all municipally owned or operated curbed streets (including roads or highways) with storm drains that have a posted speed limit of 35 mph or less (excluding all entrance and exit ramps) in predominantly commercial areas at a minimum of once per month, weather and street surface conditions permitting.

After review of the NJDEP requirements it was determined that all of the Borough municipal roadways do not meet the NJDEP street sweeping requirements. Therefore, the Borough is not required to conduct monthly sweepings. However, the Borough will continue to maintain their existing program.

Existing Street Sweeping Program:

DPW employees conduct an ongoing street sweeping program between the months of March through November. All municipal roads (curbed and uncurbed), commercial areas, County roads and State Highways are swept monthly. The Borough is subdivided into 4 sections. Each section is divided into three subsections that are swept weekly each month, weather and surface condition permitting. See the attached Borough Street Sweeping Schedule for additional detail.

DPW personnel shall record the date the streets are swept and keep an account of the material collected and disposed off. See enclosed sample record log.

BOROUGH OF UNION BEACH

STORMWATER MANAGEMENT PROGRAM

SOLIDS AND FLOATABLE CONTROLS
STORMWATER FACILITY MAINTENANCE

Statewide Basic Requirement:

Stormwater Facility Maintenance - Tier A Municipalities shall develop and implement a stormwater facility maintenance program for cleaning and maintenance of all stormwater facilities operated by the Tier A Municipality. Stormwater facilities include, but are not limited to: catch basins, detention basins, filter strips, riparian buffers, infiltration trenches, sand filters, constructed wetlands, wet basins, bioretention systems, low flow bypasses, and stormwater conveyances. The stormwater facility maintenance must be performed as required to ensure the proper function and operation of the stormwater facility. Tier A Municipalities shall also clean all catch basins annually to remove accumulated sediment, trash and debris.

Existing Stormwater Facilities:

The Borough currently maintains approximately 400 storm drain inlets, 38 outfalls and approximately 6.5 miles of storm sewer pipe ranging in size from 12 inches to 48 inches. See the enclosed Stormwater Facilities Location Map.

Inspection Program:

As part of the Borough's regular maintenance program the Department of Public Works (DPW) shall inspect the Borough stormwater facilities as follows:

- Swales, if any, shall be inspected on a monthly basis during the Spring and Summer and on a bi-monthly basis during the Fall and Winter.
- Inlets shall be inspected on a bi-annual basis during their storm drain inlet inspection/cleaning activities. Additionally, flood prone areas will be inspected after major storm events and as needed.

- Storm sewer pipes identified as problem areas shall be inspected after major storm events and on an as needed basis. Broken or collapsed storm sewer pipes shall be reported to the Borough Engineer.
- Outfalls shall be inspected on a monthly basis for instability, obstruction of flow or evidence of scouring or bank erosion. Problems will be reported to the Superintendent of Public Works for further investigation by Borough personnel or the Engineer's office.

Maintenance Program:

Based on field observations, the following routine maintenance will be performed as required:

- Mowing of areas around the stormwater facilities (where appropriate) to minimize excessive plant growth during the growing season.
- Removal of trash or litter.
- Inlets with evidence of debris will be cleaned by the DPW utilizing the Borough's jet-vacuum truck.
- Inlet labels will be replaced as needed once the labeling program is complete.
- Blocked storm sewer pipes shall be jetted to remove the blockage.

The DPW will note all inspections and maintenance/repair calls for the stormwater facilities in their internal maintenance log (See the enclosed sample copy).

BOROUGH OF UNION BEACH

STORMWATER MANAGEMENT PROGRAM

MAINTENANCE YARD OPERATIONS STANDARD OPERATING PROCEDURES

Statewide Basic Requirement:

Standard Operating Procedures - Municipalities must develop and implement standard operating procedures for vehicle maintenance and repair activities that occur at municipal maintenance yard operations (if applicable), and for good housekeeping practices of the municipal maintenance yard and materials and machinery listed in the municipality's inventory list.

Standard Operating Procedures:

Attached are the Borough standard operating procedures for vehicle maintenance and good housekeeping practices for its DPW facility and recycling center.

BOROUGH OF UNION BEACH

STORMWATER MANAGEMENT PROGRAM

EMPLOYEE TRAINING PROGRAM

Statewide Basic Requirement:

Employee Training Program - Tier A Municipalities shall develop and conduct an annual employee training program for appropriate employees on appropriate topics. At a minimum, annual employee training will include the following topics:

- *Waste Disposal Education*
- *Yard Waste Collection Program*
- *Municipal Ordinances*
- *Illicit Connection Elimination and Outfall Pipe Mapping*
- *Street Sweeping*
- *Stormwater Facility Maintenance*
- *Road Erosion Control and Outfall Pipe Stream Scouring Remediation*
- *Maintenance Yard Operations (including Ancillary Operations)*
- *Construction Activity / Post-Construction Stormwater Management in New Development and Redevelopment*

Employee Training:

For each of the required training topics the Borough will conduct a tutorial outlining the benefits gained from each new program and any additional work activities that will be required with the implementation of this Stormwater Management Program. Field training will be given to those employees attending the training for illicit connection elimination and maintenance yard operations.

Training will be as follows:

Required Attendees	Course Covered
Public Works Employees	Waste Disposal Education; Municipal Ordinances; Yard Waste Collection Program; llicit Connection Elimination;

	Outfall Pipe Mapping; Street Sweeping; Stormwater Facility Maintenance; Road Erosion Control; Outfall Pipe Stream Scouring Remediation; Maintenance Yard Operations; and Construction Activity/ Post-Construction Stormwater Management in New Development and Redevelopment
Code Enforcement Officer	Municipal Ordinances; Waste Disposal Education; and Construction Activity/ Post-Construction Stormwater Management in New Development and Redevelopment
Police Department Officers	Municipal Ordinances

Upon completion of the training sessions, the SPPP plan will be updated to include the date of the training program and a list of attendees.

Optional Measures:

Based on the effectiveness of the first training program, the Borough will evaluate if alternative training tools can be utilized to optimize the training program. Alternative training tools can include the use of informational CD's as provided by the Conservation Technology Information Center or formal training seminars as provided by the Watershed Ambassadors Program, the Watershed Institute, or the Center for Watershed Protection. Modifications to the Borough's annual training program will be included in the SPPP plan.