N.J.A.C. 7:8

Rule Amendment Training

NJ DEP Division of Watershed Protection and Restoration

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

July 11, 2024

STORMWATER MANAGEMENT RULES N.J.A.C. 7:8

RULE AMENDMENT TRAINING

NJ DEP Division of Watershed Protection and Restoration
July 11, 2024

DWQ-BNPC-StormwaterManagement@dep.nj.gov

OVERVIEW

- Historical Background
- New Definitions
- Applicability to Major Development
- Calculation of Stormwater Runoff and Groundwater Recharge
- Modifications to Rainfall Data
- Modifications to Groundwater Recharge Standards
- Modifications to Stormwater Runoff Quantity Control Standards
- Examples
- BMP Manual and FAQ Updates
- Municipal Stormwater Control Ordinance

Executive and Administrative Orders

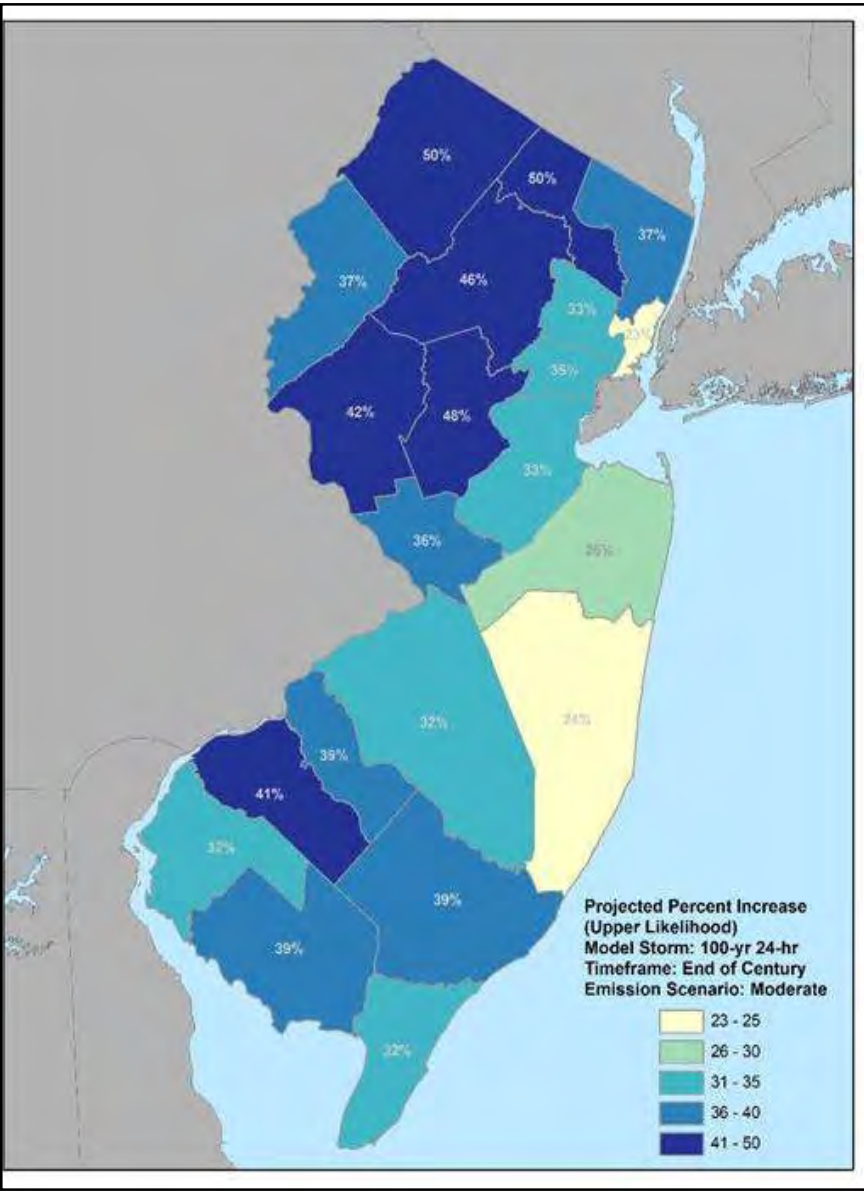
EO 100 signed by Governor Murphy

AO 2020-01 signed by Commissioner McCabe

- Directed NJDEP to integrate climate change considerations, including sea level rise and chronic flooding into its regulatory and permitting programs

INTENSIFYING RAINFALL & FLOODING IN NEW JERSEY

- The data presently used in the design of stormwater infrastructure is outdated and includes data only through 1999.
- The precipitation expectations that presently guide state policy, planning and development criteria do not accurately reflect current precipitation intensity conditions.



November 2021: NJDEP and the Northeast Regional Climate Center, a National Oceanic and Atmospheric Administration (NOAA) partner, released studies showing past and projected increases in precipitation

CURRENT PRECIPITATION

Since 1999:

- The 2-year storm has increased as much as 5%
- The 10-year storm has increased as much as 7%
- The 100-year storm has increased as much as 15%

FUTURE PRECIPITATION

Over the coming decades:

- The 2-year storm is likely to increase by as much as 24%
- The 10-year storm likely to increased as much as 27%
- The 100-year storm likely to increased as much as 50%

More Rain = More Stormwater Runoff

More Runoff = Increased Riverine Flow

More Flow = Higher Flood Elevations

NEW JERSEY'S INCREASING TEMPERATURES & PRECIPITATION

Higher temperatures increase the energy in the atmosphere, which increases the potential for more intense storm events

By the end of the 21st century, heavy storm events are projected to occur 200 to 500% more often and with more intensity than in the 20th century

Major flood events hit New Jersey in 2000, 2004, 2005, 2006, 2007, 2010, 2011, 2012, 2016, and 2021

EFFECTS OF INCREASING PRECIPITATION

- Adds stress on already overtaxed infrastructure and overwhelms stormwater management systems
- Increased fluvial flood depths
- Increased risk to life and property

We have to ensure that the BMPs will work for today's runoff, and also for future runoff

AMENDMENTS TO N.J.A.C. 7:8

SUBCHAPTER 1: GENERAL PROVISIONS

7:8-1.1 Scope and purpose

7:8-1.2 Definitions

7:8-1.3 Program information

7:8-1.4 Severability

7:8-1.5 Relationship to other regulatory programs

7:8-1.6 Applicability to major development

AMENDMENTS TO N.J.A.C. 7:8

SUBCHAPTER 5: DESIGN AND PERFORMANCE STANDARDS FOR STORMWATER MANAGEMENT MEASURES

7:8-5.1 Scope

7:8-5.2 Stormwater management measures for major development

7:8-5.3 Green infrastructure

7:8-5.4 Groundwater recharge standards

7:8-5.5 Stormwater runoff quality standards

7:8-5.6 Stormwater runoff quantity standards

7:8-5.7 Calculation of stormwater runoff and groundwater recharge

7:8-5.8 Maintenance requirements

7:8-5.9 Sources for technical guidance

Stormwater Management Rules
Section 1.2: Definitions

- "Public roadway or railroad" means a pathway for use by motor vehicles or trains that is intended for public use and is constructed by, or on behalf of, a public transportation entity. A public roadway or railroad does not include a roadway or railroad constructed as part of a private development, regardless of whether the roadway or railroad is ultimately to be dedicated to and/or maintained by a governmental entity.

- "Public transportation entity" means a Federal, State, county, or municipal government, an independent State authority, or a statutorily authorized public-private partnership program pursuant to P.L. 2018, c. 90 (N.J.S.A. 40A:11-52 et seq.), that performs a public roadway or railroad project that includes new construction, expansion, reconstruction, or improvement of a public roadway or railroad.

Stormwater Management Rules

Section 1.6: Applicability to Major Development

a) Except as provided in (b) below, all major development shall comply with the requirements of this chapter.

b) Major development shall be subject to the stormwater management requirements in effect prior to July 17, 2023 as follows:

   1. Major development that does not require any of the Department permits listed at (c) below and for which a complete application has been submitted prior to July 17, 2023 shall be subject to the stormwater management requirements in effect pursuant to (b)2 or 3 below, provided that the application includes both the application form and all accompanying documents required by ordinance for one of the following approvals pursuant to the Municipal Land Use Law (N.J.S.A. 40:55D-1 et seq.):

      i. Preliminary or final site plan approval;

      ii. Final municipal building or construction permit;

      iii. Minor subdivision approval where no subsequent site plan approval is required;

      iv. Final subdivision approval where no subsequent site plan approval is required; or

      v. Preliminary subdivision approval where no subsequent site plan approval is required.

Stormwater Management Rules

Section 1.6: Applicability to Major Development *(cont'd.)*

2. An application required by ordinance for approval pursuant to (b)1 above that has been submitted prior to March 2, 2021, shall be subject to the stormwater management requirements in effect on March 1, 2021;
3. An application required by ordinance for approval pursuant to (b)1 above that has been submitted on or after March 2, 2021, but prior to July 17, 2023 shall be subject to the stormwater management requirements in effect on March 2, 2021; and
4. Major development for which a technically complete application was submitted to the Department for one of the approvals listed at (c) below prior to July 17, 2023, shall be subject to the stormwater management requirements as follows, provided that the application included a stormwater management review component:
    i. A technically complete application submitted to the Department for any of these approvals prior to March 2, 2021, shall be subject to the stormwater management requirements in effect on March 1, 2021; and
    ii. A technically complete application submitted to the Department for any of these approvals on or after March 2, 2021, and prior to July 17, 2023 shall be subject to the stormwater management requirements in effect on March 2, 2021.

Stormwater Management Rules

Section 1.6: Applicability to Major Development *(cont'd.)*

c) For the purposes of this section, the term "permit" shall include transition area waivers pursuant to the Freshwater Wetlands Protection Act. In order to qualify pursuant to (b)2 above, a technically complete permit application must have been submitted to the Department for the major development under the following statutes, provided that the permit included a stormwater management review component, prior to the applicable date listed in (b)4i and ii above:

1. Flood Hazard Area Control Act, N.J.S.A. 58:16A-50 et seq.;
2. Freshwater Wetlands Protection Act, N.J.S.A. 13:9B-1 et seq.;
3. Coastal Area Facility Review Act, N.J.S.A. 13:19-1 et seq.;
4. Waterfront and Harbor Facilities Act, N.J.S.A. 12:5-3; or
5. Highlands Water Protection and Planning Act, N.J.S.A. 13:20.

Stormwater Management Rules

Section 1.6: Applicability to Major Development *(cont'd.)*

d) An exemption provided by (b) above shall expire with the expiration, termination or other loss of duration or effect of either of the qualifying local approval or Department permit, whichever comes first. The expiration of local approvals under (b)1 above shall be governed by local ordinance. In the event there are multiple qualifying Department permits under (c) above, the expiration date is governed by that permit which expires last provided that the permit is still in effect. Once the exemption expires, the major development shall be subject to all requirements of this chapter upon reapplication for that permit and all subsequent permits or local approval(s) under the Municipal Land Use Law.

Stormwater Management Rules

Section 1.6: Applicability to Major Development *(cont'd.)*

e) An exemption under (b) above is limited to the land area and the scope of the project addressed by the qualifying applications or subsequent approval(s). Exemptions under this section shall be deemed void if revisions are made to the qualifying application in (b) above or its subsequent approval, including applications or approvals under the Municipal Land Use Law, unless, the review agency determines that each revision would have a de minimis impact on water resources. In making this determination, the Department shall consider the extent of any impacts on water resources resulting from the revision, including, but not limited to:

1. Increases in stormwater generated;
2. Increases in regulated impervious surface;
3. Increases in regulated motor vehicle surface;
4. Increases in stormwater pollutant loading;
5. Changes in land use;
6. New encroachments in 300-foot wide near-stream areas protected through ordinance or regulation including the 300-foot riparian zone as established at N.J.A.C. 7:13-4.1(c)1; and
7. Changes in vegetative cover.

Stormwater Management Rules

Section 1.6: Applicability to Major Development (*cont'd.*)

f) Notwithstanding any rule to the contrary, a major development for any public roadway or railroad project conducted by a public transportation entity that has determined a preferred alternative or reached an equivalent milestone before July 17, 2023 shall be subject to the stormwater management requirements in effect prior to the July 17, 2023.

Applicability Example 1

A non-residential major development submits an application for the Department's Flood Hazard Area Control Act permit with a stormwater review component on August 1, 2023, and is deemed technically complete. The non-residential major development also submits an application to the township for a preliminary site plan approval on August 1, 2023, but the township's Stormwater Control Ordinance (SCO) is still in alignment with the rules in effect prior to July 17, 2023 (the prior rules). What rules/SCO are applicable to this non-residential major development?

- The Department will review the stormwater component of the application under the Stormwater Management rules adopted on July 17, 2023 (adopted rules). Therefore, the non-residential major development shall design its stormwater management in accordance with the adopted rules. However, the township will review the stormwater management under its SCO pursuant to the prior rules. Since the design complying with the adopted rules is supposed to be more comprehensive and has higher capacity than the design under the prior rules, the design under the adopted rules should be able to pass the SCO pursuant to the prior rules.

Applicability Example 2

A non-residential major development submitted an application for the Department's Flood Hazard Area Control Act permit with a stormwater review component on June 1, 2023, and was deemed technically complete. The non-residential major development also submitted an application to the township for a preliminary site plan approval on December 1, 2023. The township's Stormwater Control Ordinance (SCO) had been amended to be consistent with the rules adopted on July 17, 2023 (adopted rules) when the application was submitted to the township. What rules/SCO are applicable to this non-residential major development?

- The Department will review the stormwater component of the application under the Stormwater Management rules effective on July 16, 2023 (the prior rules). However, the non-residential major development will need to redesign its stormwater management to comply with the township's SCO pursuant to the adopted rules. Receipt of the Department's approval on the stormwater management design does not necessarily secure the township's approval. The township's reviewer shall apply the township's SCO pursuant to the adopted rules when reviewing the stormwater management of the non-residential major development.

Applicability Example 3

A non-residential major development submits an application to the township for a preliminary site plan approval on December 1, 2023, but the township's Stormwater Control Ordinance (SCO) is still in alignment with the rules in effect prior to July 17, 2023 (the prior rules). The project will not require any of the Department permits described in the list published in N.J.A.C. 7:8-1.6(c). Is the project subject to the amended Stormwater Management rules?

- The township will review the stormwater management under its SCO pursuant to the prior rules, provided the submittal includes all of the required documents prior to the township amending its SCO pursuant to the July 17,2023, amendments to N.J.A.C. 7:8. Pursuant to the requirements of the MS4 permit, the township must revise its SCO to align with the amended rules **and** have it be in effect within one year of the rule adoption.

Applicability Example 4

A non-residential major development submitted an application to the township for a preliminary site plan approval on December 1, 2023. The township's Stormwater Control Ordinance (SCO) had been amended to be consistent with the rules adopted on July 17, 2023 (adopted rules) when the application was submitted to the township. No permit is required from the Department. Is the project subject to the amended Stormwater Management rules?

- The non-residential major development will need to design its stormwater management to comply with the township's SCO pursuant to the adopted rules. The township's reviewer shall apply the township's SCO pursuant to the adopted rules when reviewing the stormwater management of the non-residential major development.

Stormwater Management Rules

Subchapter 5. Design and Performance Standards for Stormwater Management Measures

N.J.A.C. 7:8-5.7 Calculation of stormwater runoff and groundwater recharge

- N.J.A.C. 7:8-5.7(a)1: The design engineer shall calculate runoff using the USDA Natural Resources Conservation Service (NRCS) methodology, including the NRCS Runoff Equation and Dimensionless Unit Hydrograph, as described in *Chapters 7, 9, 10, 15 and 16, Part 630 Hydrology, National Engineering Handbook (NEH*), incorporated herein by reference as amended and supplemented.
- The NEH is available from the United States Department of Agriculture website at:
  https://directives.sc.egov.usda.gov/viewerFS.aspx?hid=21422
- Can **no longer** use the "Rational Method" for peak flow or the "Modified Rational Method" for any computation under the Stormwater Management rules or the SCO adopted pursuant to the Stormwater Management rules

Stormwater Management Rules

Subchapter 5. Design and Performance Standards for Stormwater Management Measures:

N.J.A.C. 7:8-5.7 Calculation of stormwater runoff and groundwater recharge (*cont'd.*)

- N.J.A.C. 7:8-5.7(c): The precipitation depths of the **current** two-, 10-, and 100-year storm events shall be determined by multiplying the values determined in accordance with (c)1 and 2 below:
  1. The applicant shall utilize the National Oceanographic and Atmospheric Administration (NOAA), National Weather Service's Atlas 14 Point Precipitation Frequency Estimates: NJ, in accordance with the location(s) of the drainage area(s) of the site. This data is available at:

     https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=nj; and
  2. The applicant shall utilize Table 5-5, which sets forth the applicable multiplier for the drainage area(s) of the site, in accordance with the county or counties where the drainage area(s) of the site is located. Where the major development lies in more than one county, the precipitation values shall be adjusted according to the percentage of the drainage area in each county.

Table 5-5:
Current Precipitation Adjustment Factors

County	2-Year Design Storm	10-Year Design Storm	100-Year Design Storm
Atlantic	1.01	1.02	1.03
Bergen	1.01	1.03	1.06
Burlington	0.99	1.01	1.04
Camden	1.03	1.04	1.05
Cape May	1.03	1.03	1.04
Cumberland	1.03	1.03	1.01
Essex	1.01	1.03	1.06
Gloucester	1.05	1.06	1.06
Hudson	1.03	1.05	1.09
Hunterdon	1.02	1.05	1.13
Mercer	1.01	1.02	1.04
Middlesex	1.00	1.01	1.03
Monmouth	1.00	1.01	1.02
Morris	1.01	1.03	1.06
Ocean	1.00	1.01	1.03
Passaic	1.00	1.02	1.05
Salem	1.02	1.03	1.03
Somerset	1.00	1.03	1.09
Sussex	1.03	1.04	1.07
Union	1.01	1.03	1.06
Warren	1.02	1.07	1.15

Use this to adjust 1999 rainfall to 2019

Stormwater Management Rules

Subchapter 5. Design and Performance Standards for Stormwater Management Measures:

N.J.A.C. 7:8-5.7 Calculation of stormwater runoff and groundwater recharge (*cont'd.*)

- N.J.A.C. 7:8-5.7(d): Table 5-6 sets forth the change factors to be used in determining the **projected** two-, 10-, and 100-year storm events for use in this chapter, which are organized alphabetically by county. The precipitation depth of the projected two-, 10-, and 100-year storm events of a site shall be determined by multiplying the precipitation depth of the two-, 10-, and 100-year storm events determined from the National Weather Service's Atlas 14 Point Precipitation Frequency Estimates pursuant to (c)1 above, by the change factor in Table 5-6, in accordance with the county or counties where the drainage area(s) of the site is located. Where the major development and/or its drainage area lies in more than one county, the precipitation values shall be adjusted according to the percentage of the drainage area in each county.

Table 5-6:
Future Precipitation Change Factors

County	2-Year Design Storm	10-Year Design Storm	100-Year Design Storm
Atlantic	1.22	1.24	1.39
Bergen	1.20	1.23	1.37
Burlington	1.17	1.18	1.32
Camden	1.18	1.22	1.39
Cape May	1.21	1.24	1.32
Cumberland	1.20	1.21	1.39
Essex	1.19	1.22	1.33
Gloucester	1.19	1.23	1.41
Hudson	1.19	1.19	1.23
Hunterdon	1.19	1.23	1.42
Mercer	1.16	1.17	1.36
Middlesex	1.19	1.21	1.33
Monmouth	1.19	1.19	1.26
Morris	1.23	1.28	1.46
Ocean	1.18	1.19	1.24
Passaic	1.21	1.27	1.50
Salem	1.20	1.23	1.32
Somerset	1.19	1.24	1.48
Sussex	1.24	1.29	1.50
Union	1.20	1.23	1.35
Warren	1.20	1.25	1.37

Use this to adjust 1999 rainfall for the period between 2050 to 2099

Stormwater Management Rules

Subchapter 5: Design and Performance Standards for Stormwater Management Measures

N.J.A.C. 7:8-5.7 Calculation of stormwater runoff and groundwater recharge (*cont'd.*)

- Time of Concentration Calculations:

$$T_t = \frac{0.007(nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$$

where:

T_t = travel time, hr

n = Manning's roughness coefficient for sheet flow

L = sheet flow length, ft

P_2 = 2-year, 24-hour rainfall, in, to which the current precipitation adjustment factor has been applied, or 2-year, 24-hour rainfall, in, to which the future precipitation change factor has been applied, depending on the calculation of the current or projected storm event

S = slope of land surface, ft/ft

The 2-year storm used in the time of concentration calculation is as follows:

a. use the current 2-year storm in the current storm events and

b. use the projected 2-year storm in the future storm events

Stormwater Management Rules

Subchapter 5: Design and Performance Standards for Stormwater Management Measures

N.J.A.C. 7:8-5.4 Groundwater recharge standards

- N.J.A.C. 7:8-5.4(b): The minimum design and performance standards for groundwater recharge are, as follows:
  1. The design engineer shall, using the assumptions and factors for stormwater runoff and groundwater recharge calculations at N.J.A.C. 7:8-5.7, either:
     i. 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
     ii. Demonstrate through hydrologic and hydraulic analysis that the increase of stormwater runoff volume from pre-construction to post-construction for the **projected** two-year storm, as defined and determined pursuant to N.J.A.C. 7:8-5.7(d), is infiltrated.

In other words, **if you are going to choose option 2 – infiltrate the difference**, the design uses:

Existing conditions for the **projected** 2-year storm vs **proposed** conditions for the **projected** 2-year storm

Stormwater Management Rules

Subchapter 5: Design and Performance Standards for Stormwater Management Measures

N.J.A.C. 7:8-5.6 Stormwater Runoff Quantity Standards

- **Demonstration of Option 1 at 7:8-5.6(b)1**

  Demonstrate through hydrologic and hydraulic analysis that for stormwater leaving the site, post-construction runoff hydrographs for the **current and projected** two-, 10-, and 100-year storm events, **as defined and determined pursuant to N.J.A.C. 7:8-5.7(c) and (d),** respectively, do not exceed, at any point in time, the pre-construction runoff hydrographs for the same storm events;

Stormwater Management Rules

Subchapter 5: Design and Performance Standards for Stormwater Management Measures

N.J.A.C. 7:8-5.6 Stormwater Runoff Quantity Standards

- **Demonstration of Option 2 at 7:8-5.6(b)2**

  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 current and projected two-, 10-, and 100-year storm events, as defined and determined pursuant to N.J.A.C. 7:8-5.7(c) and (d)**, respectively, 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;

Stormwater Management Rules

Subchapter 5: Design and Performance Standards for Stormwater Management Measures

N.J.A.C. 7:8-5.6 Stormwater Runoff Quantity Standards

- **Demonstration of Option 3 at 7:8-5.6(b)3**

  Design stormwater management measures so that the post-construction peak runoff rates for the **current and projected two-, 10-, and 100-year storm events, as defined and determined pursuant to N.J.A.C. 7:8-5.7(c) and (d)**, respectively, are 50, 75, and 80 percent, respectively, of the pre-construction 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;

Stormwater Management Rules

Subchapter 5: Design and Performance Standards for Stormwater Management Measures

N.J.A.C. 7:8-5.6 Stormwater runoff quantity standards

- Applicants now need to demonstrate compliance for six (6) different sets of precipitation:

Current Storms:

- Pre- and post-construction 2-year storm
- Pre- and post-construction 10-year storm
- Pre- and post-construction 100-year storm

Projected Storms:

- Pre- and post-construction 2-year storm
- Pre- and post-construction 10-year storm
- Pre- and post-construction 100-year storm

In other words, the design must demonstrate compliance with one of the 3 options (hydrograph comparison, drainage area wide at full buildout and peak reduction). **In all cases, the comparison is pre-development (existing) vs post-development (proposed) using the same storm.** That means:

1. Existing conditions for the current 2-year vs. proposed conditions for the current 2-year,
2. Existing conditions for the current 10-year vs. proposed conditions for the current 10-year, and
3. Existing conditions for the current 100-year vs. proposed conditions for the current 100-year;

PLUS

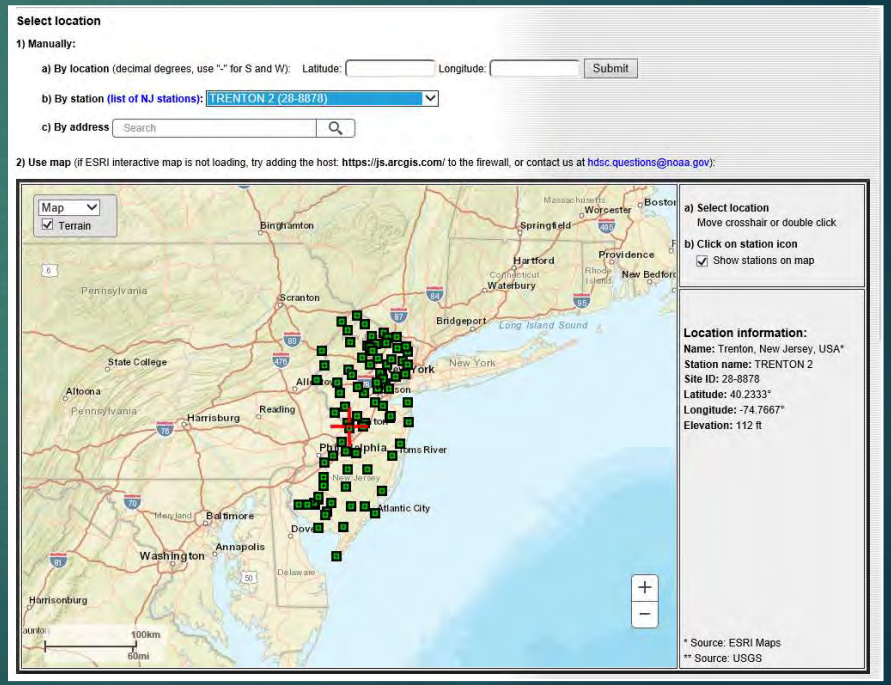
1. Existing conditions for the projected 2-year vs. proposed conditions for the projected 2-year,
2. Existing conditions for the projected 10-year vs. proposed conditions for the projected 10-year, and
3. Existing conditions for the projected 100-year vs. proposed conditions for the projected 100-year.

Example 1

Apply the current precipitation adjustment factors to the rainfall data for a site located at Trenton Station 2 on the NOAA NWS PFDS Website

a. NOAA Atlas 14 rainfall data is provided by NOAA's NWS Precipitation Frequency Data Server (PFDS), which is available online at https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=nj

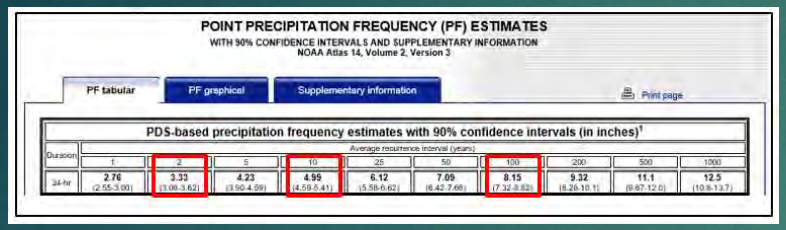
b. Trenton Station 2 was selected from the dropdown menu under 1.b)



Example 1 (*cont'd.*)

Apply the current precipitation adjustment factors to the rainfall data for a site located at Trenton 2 on the NOAA NWS PFDS Website

c. The data needed is found in the row labeled "24-hr."



d. Locate the Mercer County current precipitation adjustment factors from Table 5-5. To obtain the current precipitation depth for the 2-year design storm, multiply the precipitation depth for the 2-year design storm by the 2-year current precipitation adjustment factor. Repeat the process for the 10- and 100-year design storms using the respective adjustment factor. The results are depicted in the column farthest to the right in the table below.

Frequency of Storms	NOAA NWS PFDS Rainfall Depth (inches)	Current Precipitation Adjustment Factor	Current Rainfall Depth (inches)
2-year	3.33	1.01	3.36
10-year	4.99	1.02	5.09
100-year	8.15	1.04	8.48

Example 2

Determine the current precipitation adjustment factors for a site with one-third of the area located in Middlesex County and the remainder in Mercer County.

In the event a project spans the boundary line(s) between counties, N.J.A.C. 7:8-5.7(c)2 instructs the user as follows: "Where the major development lies in more than one county, the precipitation values shall be adjusted according to the percentage of the drainage area in each county."

a. Step 1: Obtain the current precipitation for each of the counties

County	Current Precipitation		
	2-year Design Storm	10-year Design Storm	100-year Design Storm
Middlesex	3.35 * 1.00 = 3.35	5.12 * 1.01 = 5.17	8.63 * 1.03 = 8.89
Mercer	3.31 * 1.01 = 3.34	5.01 * 1.02 = 5.11	8.33 * 1.04 = 8.66

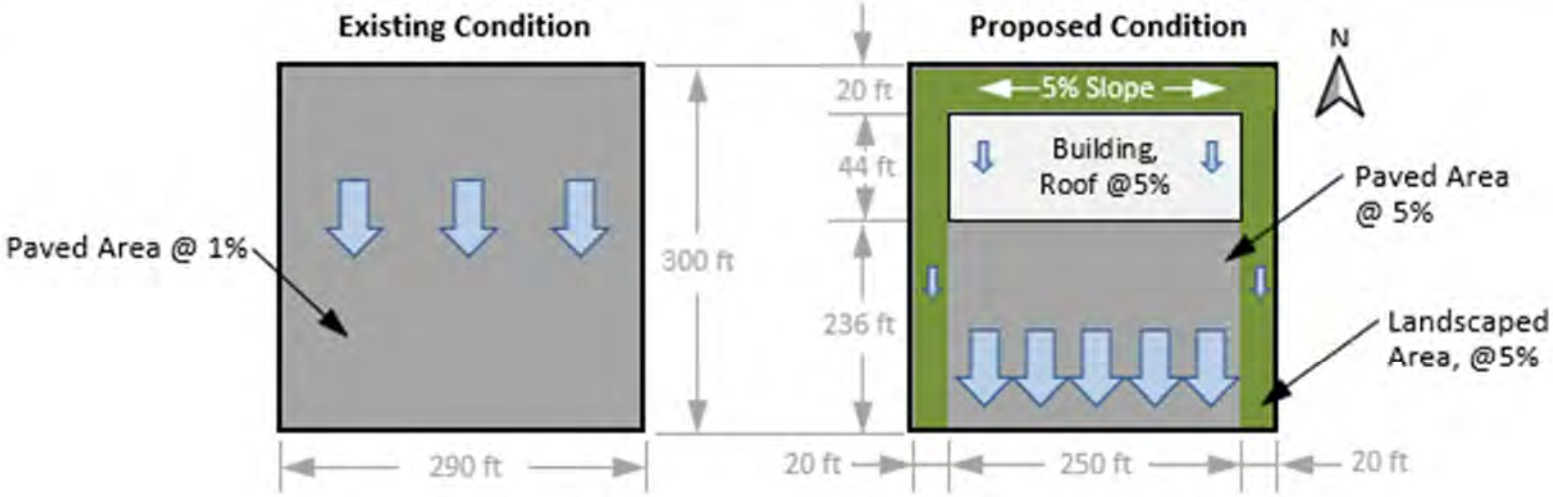
b. Step 2: Multiply the percentage of the project area within each county with the current precipitation for the respective county, and sum the results for each of the design storms, pursuant to N.J.A.C. 7:8-5.7(c)2.

County, Weight Averaged	Current Precipitation		
	2-year Design Storm	10-year Design Storm	100-year Design Storm
Middlesex	0.333 * 3.35 = 1.12	0.333 * 5.17 = 1.72	0.333 * 8.89 = 2.96
Mercer	+ 0.667 * 3.34 = 2.23	+ 0.667 * 5.11 = 3.41	+ 0.667 * 8.66 = 5.78
Total Site Precipitation	3.35	5.13	8.74

Example 3

A Comparison of Pre- and Post-condition Hydrographs for Compliance Under N.J.A.C. 7:8-5.4(a)3.i When Impervious Cover is Reduced

For a site located in Trenton, Mercer County, an approximately 2 acre paved parking lot is to be redeveloped as an office complex consisting of a new building, a parking lot, and landscaping. The existing lot has a slope of 1%. The redeveloped site will be re-graded to a 5% slope for better drainage. The landscaped area will not receive runoff from the impervious surfaces. HSG 'C' soils are present.

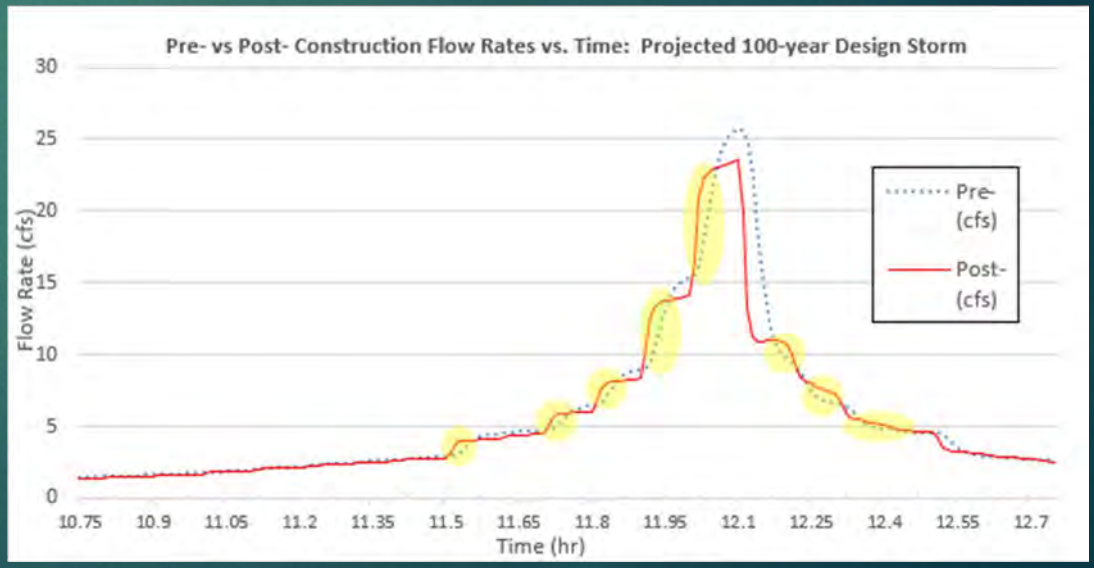


Example 3 (*cont'd.*)

A Comparison of Pre- and Post-condition Hydrographs for Compliance Under N.J.A.C. 7:8-5.4(a)3.i When Impervious Cover is Reduced

a. Calculate the peak flow rates for the projected 100-year storms for the pre- and post-construction conditions using the future precipitation change factor and compare the hydrographs

Projected 100-year Design Storm		
Parameter	Pre-Construction Condition	Post-Construction Condition
Peak Flow Rate & Time of Peak =	25.71 cfs @ 12.10 hr	23.60 cfs @ 12.10 hr
Runoff Volume=	78,690 cf	75,250 cf



An analysis of the output data shows several instances where the post-construction peak flow rate exceeds the pre-construction peak flow rate. Shown, shaded in yellow, are several time periods in which an exceedance occurs.

This example dispels the common misconception that the reduction of impervious surface will automatically meet the quantity control requirements. Municipal review engineers must require that the design report include hydrologic modelling and hydrographs even when the design engineer claims there is reduction of impervious surface by the proposed development. To reiterate, the rules do not allow a "de minimus" exception.

Example 4

A 2-Acre Development Project with a GI BMP Illustrating the Use of Current and Projected Rainfall Data in the Design Calculations

A 2.5-acre wooded lot is located in Somerset County. The latitude and longitude of the site are 40.4573° and -74.5309°, respectively. The proposed development consists of a one-acre office building, a 0.5-acre parking lot, and a 0.5-acre lawn area, plus 0.5 acres of existing woods to remain undisturbed. Design a stormwater management system to meet the Stormwater Management rules. The soil present onsite is HSG 'B.'

Assume that a small-scale infiltration basin is to be designed to meet the design and performance standards for the demonstration of the groundwater recharge requirement by infiltrating the increase in stormwater runoff volume from pre-construction to post-construction for the projected two-year storm. Calculate the volume of runoff to be recharged.

Example 4 (*cont'd.*)

A 2-Acre Development Project with GI BMPs Illustrating the Use of Current and Projected Rainfall Data in the Design Calculations

Calculate the rainfall depth for the projected 2-year storm event

Design Storms	NOAA NWS PFDS Precipitation Depth (inches)	Future Precipitation Change Factor for Somerset County	Projected Precipitation Depths (inches)
2-year	3.30	1.19	3.93

Demonstrate Compliance with the Groundwater Recharge Standards

Pre-construction Condition	Post-construction Condition	Increase
4,557 cf	22,443 cf	17,886 cf

The small-scale infiltration basin needs to infiltrate 17,886 cf of runoff and needs to be designed in accordance with the BMP Manual.

Example 5

Calculate the Peak Flow Rate for Sizing a Manufactured Treatment Device Treating the WQDS from a 0.25-acre Impervious Motor Vehicle Surface

The following parameters apply:

Area =	0.25 ac
Slope =	5%
CN Value =	98 (100% Impervious)
Projected 2-year storm rainfall depth	3.84 inches
Hydraulically most distant point to the inlet of MTD	110 ft

a. Calculate Time of Concentration

The calculation of the time of concentration follows the steps in Example 5-1 of Chapter 5. The maximum sheet flow length calculated by McCuen-Speiss limitation is 909 ft, which is greater than 100 ft. Therefore, 100 ft is used for the sheet flow length. The shallow concentrated flow length is 10 ft. The total time of concentration is 0.8 minutes.

b. Calculate the WQDS Peak Flow Rate

When calculating the peak flow rate using NRCS methodology for an MTD, the SCS Standard DUH, which is with a peak rate factor of 484, must be used. Using the NRCS methodology with the time of concentration calculated in Step a, the WQDS peak flow rate is 0.77 cfs.

BMP Manual and FAQ Updates

BMP Manual Updates:

https://dep.nj.gov/stormwater/bmp-manual/

- Chapter 5
- Chapter 6
- Chapter 9.5: GI Manufactured Treatment Devices
- Chapter 11.3: Non-GI Manufactured Treatment Devices

FAQs:

https://dep.nj.gov/stormwater/sw_rule_faqs/

- See "FAQ for the Inland Flood Protection Rule (effective July 17, 2023)"

BMP MANUAL UPDATES

Chapter 5: Computing Stormwater Runoff Rates and Volumes presents the mathematical methods for the stormwater runoff rates, volumes, and the stormwater quality and quantity design storms.

*** Updated July 2023***

- NOAA C & D distributions
- 1 minute WQDS rainfall distribution Curve Data

Chapter 5

*** Updated July 2023***

Chapter Six: Groundwater Recharge discusses the groundwater recharge methodology, the groundwater recharge design storm, and the details of the New Jersey Groundwater Recharge Spreadsheet (NJGRS).

- Download the NJGRS in Excel 2002 format
- Download the NJGRS in Excel 97 format

Chapter 6

Chapter 9

Chapter Nine: Provides general information on Green Infrastructure BMPs that may be used for Groundwater Recharge, Stormwater Runoff Quality, and/or Stormwater Runoff Quantity
*** Updated March 2021***

- Chapter 9.1: Cisterns
  - Cistern Analysis Spreadsheet
- Chapter 9.2: Dry Wells
- Chapter 9.3: Grass Swales
- Chapter 9.4: Green roofs
- Chapter 9.5: Manufactured Treatment Devices (GI)-*** Updated July 2023***
- Chapter 9.6: Pervious Paving Systems
- Chapter 9.7: Small-scale Bioretention Systems
- Chapter 9.8: Small-scale Infiltration Basins
- Chapter 9.9: Small-scale Sand Filters (GI)
- Chapter 9.10: Vegetative Filter Strips

Chapter 11

Chapter 11: Provides general information on Non-GI BMPs that may be used for Groundwater Recharge, Stormwater Runoff Quality, and/or Stormwater Runoff Quantity only with a Waiver or Variance from N.J.A.C. 7:8-5.3

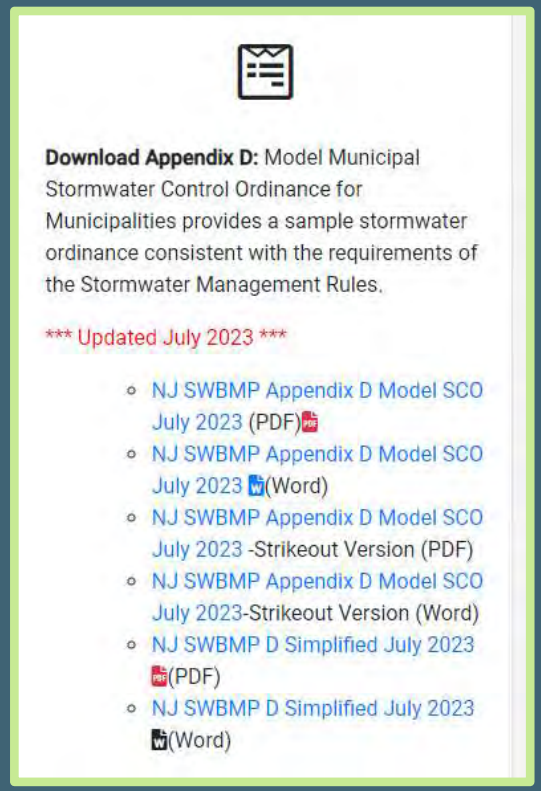
- Chapter 11.1: Blue Roofs
- Chapter 11.2: Extended Detention Basins
- Chapter 11.3: Manufactured Treatment Devices (Non-GI)-*** Updated July 2023***
- Chapter 11.4: Sand Filters (Non-GI)
- Chapter 11.5: Subsurface Gravel Wetlands
- Chapter 11.6: Wet Ponds (Non-GI)

FAQ UPDATES

FAQ for the Inland Flood Protection Rule (effective July 17, 2023)

- Q: When shall a municipality update its stormwater control ordinance(s) to conform with the rules?
- Q: When will a major development project that requires a municipal review of stormwater management be affected by the rule amendments?
- Q: What is the definition of a technically complete application relative to the exemptions listed at N.J.A.C. 7:8-1.6?
- Q: The rules include an exemption of a major development for any public roadway or railroad project conducted by a public transportation entity that has determined a preferred alternative or reached an equivalent milestone before the adoption of the rules. What entity is considered a public transportation entity?
- Q: The rules eliminate use of the Rational Method and the Modified Rational Method for calculating stormwater runoff under the Stormwater Management rules at N.J.A.C. 7:8. Could the Rational Method still be used in the design of storm sewers?
- Q: Will the New Jersey Groundwater Recharge Spreadsheet be updated for the rules?
- Q: Will the increased rainfall projections through 2100 be applied to the water quality design storm?
- Q: Will the Department update the Best Management Practice Manual (BMP Manual) to provide guidance in terms of the updated design and performance standards of the stormwater management rules?

Municipal Stormwater Control Ordinance



Download Appendix D: Model Municipal Stormwater Control Ordinance for Municipalities provides a sample stormwater ordinance consistent with the requirements of the Stormwater Management Rules.

*** Updated July 2023 ***

- NJ SWBMP Appendix D Model SCO July 2023 (PDF)
- NJ SWBMP Appendix D Model SCO July 2023 (Word)
- NJ SWBMP Appendix D Model SCO July 2023 -Strikeout Version (PDF)
- NJ SWBMP Appendix D Model SCO July 2023-Strikeout Version (Word)
- NJ SWBMP D Simplified July 2023 (PDF)
- NJ SWBMP D Simplified July 2023 (Word)

Note: Municipalities must amend their municipal stormwater ordinance within one year of the rulemaking (notification was sent July 17, 2023)

A template document has been created for modification by a municipality and is available online at: https://dep.nj.gov/stormwater/bmp-manual/

Summary of Updates to the Municipal SCO Template to Match the Rule Adoption

- Applicability
- Additional Definitions
- Updated Groundwater Recharge Standards
- Updated Stormwater Runoff Quantity Standards
- Updated Calculation of Stormwater Runoff and Groundwater Recharge
- Updated website hyperlinks, DEP mailing address and document layout

RECAP

- New Definitions
- Applicability to Major Development
- Calculation of Stormwater Runoff and Groundwater Recharge
- Modifications to Rainfall Data
- Modifications to Groundwater Recharge Standards
- Modifications to Stormwater Runoff Quantity Control Standards
- Examples
- BMP Manual and FAQ Updates
- Municipal Stormwater Control Ordinance

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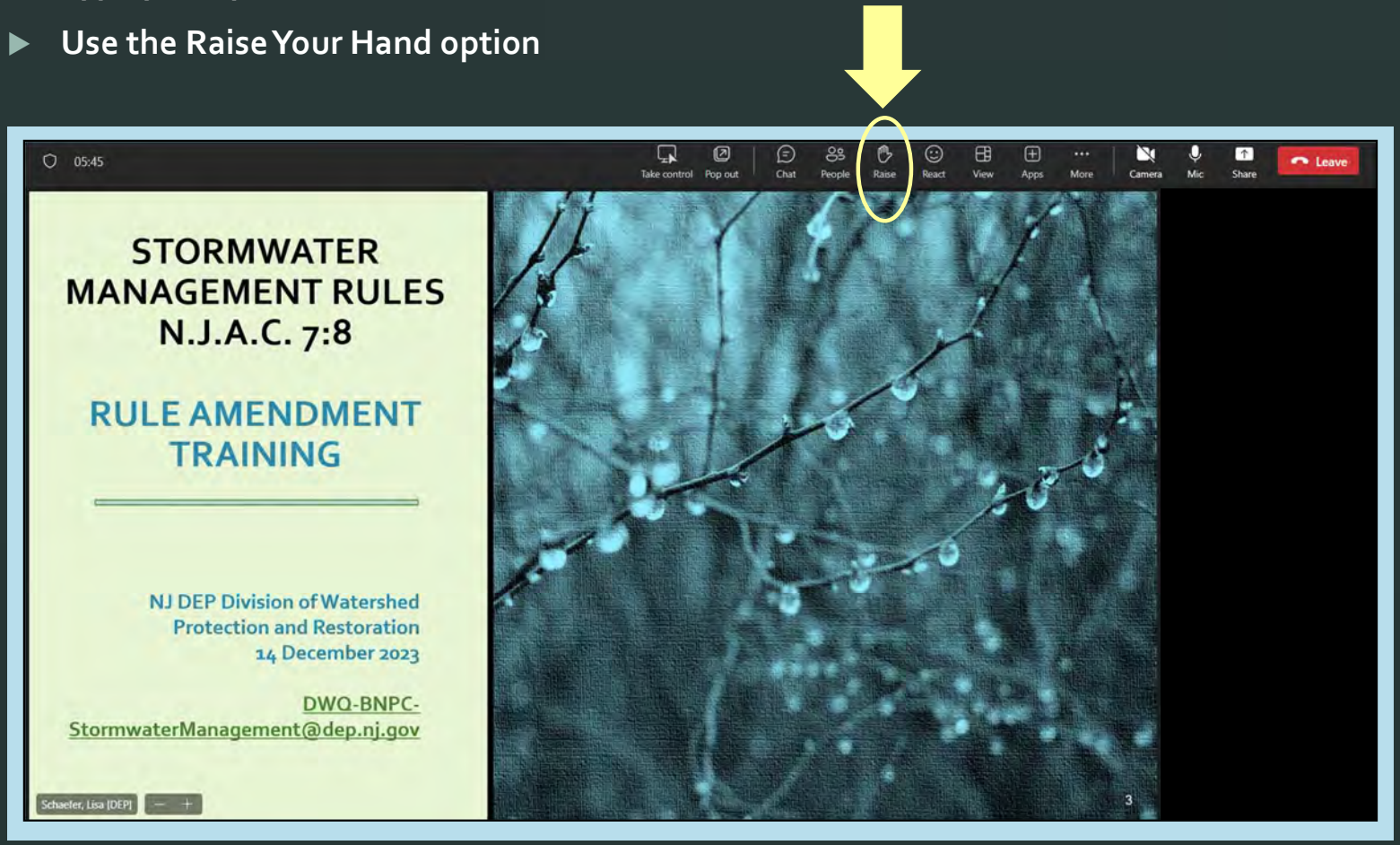
NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

Q & A SESSION

- Type your questions into the chat or
- Use the Raise Your Hand option



STORMWATER MANAGEMENT RULES
N.J.A.C. 7:8

RULE AMENDMENT TRAINING
JULY 11, 2024

NJ DEP Division of Watershed Protection and Restoration
Bureau of NJPDES Stormwater Permitting and Water Quality Management
Municipal Stormwater Engineering Unit

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NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION