

THE 4 STORM EVENTS OF THE 2022 CGP

**QPEs,
FPEs, APEs,
and MSEs—
So What?**

If you took the Construction General Permit Training Team’s reissuance review for the new permit, during the Group 3, Module 7 presentation, you were most likely surprised, like we were, that there are four types of storm events we need to track in order to comply with the new 2022 Construction General Permit. In this edition of *The Monthly Dirt*, we will take a closer look at the four specified types of rain events, and, like the reissuance training, we will provide information on what they are and how to determine them, but, unlike the training, we will answer the “So What?” questions.

Unanswered Questions:

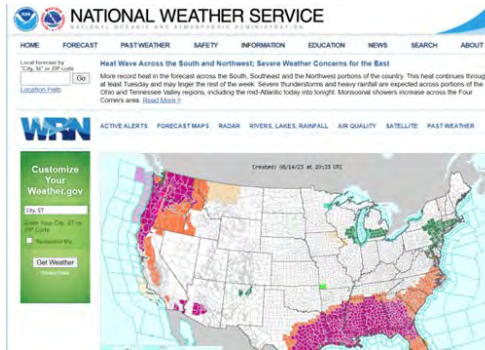
The Construction General Permit Training Team (CPGTT) actually did a good job of identifying and defining the four storm events referenced in the 2022 CCP. In fact, the demonstrations included in the reissuance review on how to determine these storm events were very helpful and clearly presented. However, after viewing the presentation (and taking the exam), I was left with the questions, Why do I need to know this information? And, How do each of these types of storm events play into the permit? By diving further into the new permit, we will attempt to answer some of these “So What” questions.

Qualifying Precipitation Event (QPE):

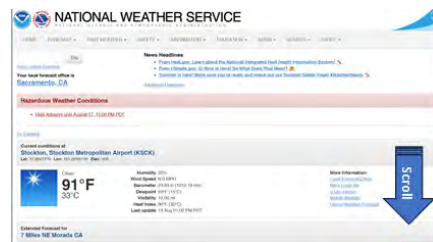
According to [Attachment B of the 2022 CGP](#), a “Qualifying Precipitation Event is any weather pattern that is forecast to have a 50 percent or greater Probability of Precipitation (PoP) and a Quantitative Precipitation Forecast (QPF) of 0.5 inches or more within a 24-hour period. The event begins with the 24-hour period when 0.5 inches has been forecast and continues on subsequent 24-hour periods when 0.25 inches of precipitation or more is forecast.”

How to determine a QPE:

1. Go to <https://www.weather.gov/> and enter the location using “City, State” or “Zip Code”.



2. Scroll down the weather forecast page for your location and click on “Hourly Weather Forecast” ...



3. Select the “Precipitation Potential” and the “Rain” forecasts and press “Submit”. (You can turn off the other layers to make it less busy.)



4. Check the weather forecast for a 24-hour period that has both a probability of precipitation (PoP) 50% or greater and has a quantitative precipitation forecast (QPF) of 0.5 inches or more of rain. In the example shown above, both criterion are met for August 15 with 90% probability and more than 1” of rain predicted. The rain event continues the subsequent day, and each day thereafter, that has a QPF of 0.25 inches or more. The event ends when 0.25 inches is not forecast for a subsequent day. In our example above, there is less than 0.25 inches predicted for August 16, therefore, the QPE was only on August 15.

The following is a summary of where and how

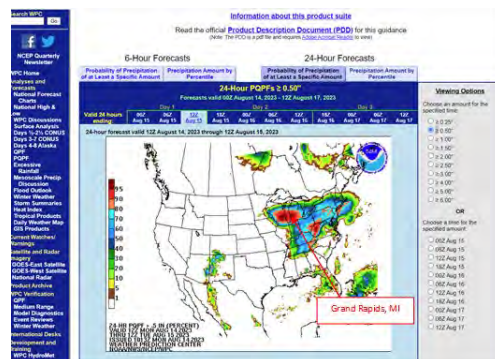
QPEs are referenced in the 2022 CGP:

- ⇒ Discharge sampling and numeric action levels;
- ⇒ Pre-storm inspections;
- ⇒ During-storm inspections;
- ⇒ Post-storm inspections;
- ⇒ Receiving water sampling; and
- ⇒ Inspections (post-storm) of areas of passive treatment.

Forecasted Precipitation Event (FPE):

According to [Attachment B of the CGP](#), a “Forecasted Precipitation Event is any weather pattern that is forecasted to have a 50 percent or greater chance of producing 0.5 inches of precipitation in a 24-hour period in the project area. The discharger shall obtain precipitation forecast information from the National Weather Service Forecast Office (e.g., by entering the zip code of the project’s location at <https://forecast.weather.gov>). Precipitation events end when there are two sequential 24-hour periods with less than 0.25 inches of precipitation forecast for each period.” It is unfortunate that this definition is sometimes erroneously referenced in the 2022 CGP for tasks that are associated with QPEs (such as for pre-QPE inspections in [Attachment D III.C.3](#).) The CGPTT made it clear in the reissuance review that where this is the case, the definition for QPEs in the Attachment B glossary should prevail. They also made it clear that FPEs and QPEs are not the same thing and apply to different scenarios. (Unfortunately, they didn’t identify what those scenarios are.) Determining a FPE can be a bit challenging and should follow this process:

1. Go to https://www.wpc.ncep.noaa.gov/pqpf/conus_hpc_pqpf.php?fpd=24 and identify the project’s location on the U.S. map. (Warning: It is not possible to achieve high resolution on this map and you will have to do your best at estimating the actual site location.) Above the map, select the tab “Probability of Precipitation of at Least a Specific Amount” under “24-Hour Forecasts” and, to the right of the map, select “≥ 0.50”.



2. Now at the time of this demonstration

there was no predicted rainfall in California, but if we consider another location such as Grand Rapids, Michigan, using the color coded index, we can see that there is a 90 – 95% chance of receiving 0.5 inches of rain. For your project to meet the FPE definition, it would need to be located at least within the [light blue section](#).

3. Another consideration is that the times on this forecasting tool are reported in Zulu Time (or Greenwich Mean Time). In California, we are 7 hours behind Zulu Time (during daylight savings). You can access a time conversion tool here: <https://savvytime.com/converter/z-to-pst>

It is important to note where FPEs are referenced in the 2022 CGP:

- ⇒ Inactive projects must be inspected by a QSP or delegated inspector once a calendar month and prior to any weather pattern that is forecasted to have a 50 percent or greater chance of 0.5 inches or more in a 24-hour period, **which is the definition of a FPE**. Because of the confusion of terms elsewhere in the permit, it is possible that the Water Board meant for this to be a QPE, but since there is nothing else to suggest it’s a QPE, we are taking it at face values as a FPE.
- ⇒ Discontinue the application of any erodible landscape material at least 2 days before a FPE.
- ⇒ Complete corrective action as soon as possible, prior to the next FPE.
- ⇒ And, an inspection of a passive treatment zone surface condition must be performed within 72 hours before a FPE.

Any Precipitation Event (APE):

As defined in [Attachment B](#) of the 2022 CGP, a “precipitation event is any weather pattern that results in precipitation (rain, snow, sleet, or hail).” The Construction General Permit Training Team’s reissuance training refers to the National Weather Service definition of “the process of water vapor condenses in the atmosphere to form water droplets that fall to Earth as rain, sleet, snow, hail, etc.” and “the discharge of water, in a liquid or solid state, out of the atmosphere, generally onto a land or water surface.” (Refer to the CGPTT / CASQA CGP Reissuance Training Group 3, Module 7.) Therefore, the definition of an APE is quite straight forward—it means **any** precipitation event.

In the 2022 CGP, there is only one reference to an APE and it involves street sweeping. Both traditional and LUP projects must “remove any excess sediment or other construction activity-related materials that are

deposited on the impervious roads by vacuuming or sweeping prior to APE.”

Measurable Storm Event (MSE):

The last of the four storm events identified in the 2022 CGP is actually not defined in the permit’s glossary. Therefore, we have to turn to the National Weather Service’s definition. According to the NWS, “measurable precipitation is equal to or greater than 0.01 inches.”¹ A MSE applies to only one very specific situation in the 2022 CGP. It is used in [Attachment I](#) for dischargers in Areas of Special Biological Significance (ASBS). They are to perform runoff sampling during a storm event that is greater than 0.1 inch and generates runoff, and at least 72 hours **from the previously measurable storm event (MSE)**.

So What?

So how does this affect my project and what do I do with these definitions? Above all, become very familiar with the process of defining a QPE. It will apply to most (if not all) monitoring scenarios in this new permit. Associate FPEs with things that need to be done before it rains such as inspecting inactive sites, discontinuing landscaping, completing corrective action items, and inspecting passive treatment areas. Although time will tell, because of how they are defined, it is our speculation that FPEs will be triggered less frequently than QPEs. An FPE is a 50% chance or greater of actually receiving a half inch of precipitation; where a QPE is a 50% chance of receiving any rain **and** a half inch or more is predicted. The permit does not mention why the Water Board made this distinction or why it is even necessary; but the reissuance training would make it appear that it is an intentional distinction. Unfortunately, we feel the result will be losing “in the weeds” those who are trying to comply with and understand the permit. To help bring further clarity, we have included with this newsletter a more detailed summary of the four storm events of the 2022 CGP.

¹ National Weather Service Weather Forecast Terms https://www.weather.gov/bgm/forecast_terms And CGPTT/CASQA CGP Reissuance Training Group 3, Module 7

Please contact us if you have any questions ...

The Monthly Dirt

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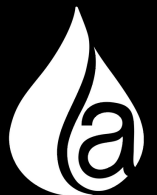
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SAVE THE DATES

AUGUST 25:
deadline for
workshop host
registrations

SEPTEMBER 1:
attendee
registration
opens

SEPTEMBER 25-29:
storm water
awareness week





Voices OF STORM WATER

2023 KEYNOTES SCHEDULE

WHAT TO EXPECT WHEN YOU GET INSPECTED:
ADVICE FOR INDUSTRIAL FACILITIES
MONDAY, SEPTEMBER 25TH AT 10 AM PDT

WHICH PERMIT DOES MY PROJECT NEED? - NEW
DE-WATERING REQUIREMENTS IN THE 2022 CGP
WEDNESDAY, SEPTEMBER 27TH AT 10 AM PDT

visit stormwaterawareness.org to register for the keynotes



SNEAK PREVIEW

of 2023 Storm Water Awareness Week Workshops

Summary of the New CGP - Part 1

Presenting a brand new BMP (Kai Pono Solutions)

Ion Exchange and Iron Oxide Media for Heavy Metals and Emerging Contaminants Removal

Passive Treatment Technologies: The Power of Polyacrylamide

QSD Field Bootcamp 101

Erosion Control BMPs vs. Passive Treatment (LSC Environmental Products)

IGP Basics Part 1: What is the IGP?

Summary of the New CGP - Part 2

IGP Basics Part 2: What Am I Expected To Do?

IGP Basics Part 3: "How To" Tips of Sampling

BMP Selection For Stormwater Management and Sediment Control

Stormwater Management: How to Safely Manage Stormwater with PFAS

America's Proven First Line of Defense for Stormwater Runoff Pollution Abatement

Kick the Can

Summary of the New CGP - Part 3

Municipal Stormwater BMPs for Public Agencies

SWAW Keynote: Which Permit Does My Project Need? -New De-watering Requirements in the 2022 CGP

The Fundamentals of Stormwater Treatment

2022 CGP Significant Changes

Caltrans WPCM Training updated for 2022 CGP

Summary of the New CGP - Part 4

The Soil Carbon/Storm Water Management Connection: Why It's Important!

Industrial Storm Water Engineering Assessments

Municipal Storm Water BMP Inspections - Observations from the Field

Jobsite Safety for Storm Water Professionals

Creative PDH Ideas - Stop Watching Boring Videos!

Summary of the New CGP - Part 5

SWAW Keynote: What To Expect When You Get Inspected (Industrial Facilities)

The Voices of the Watershed

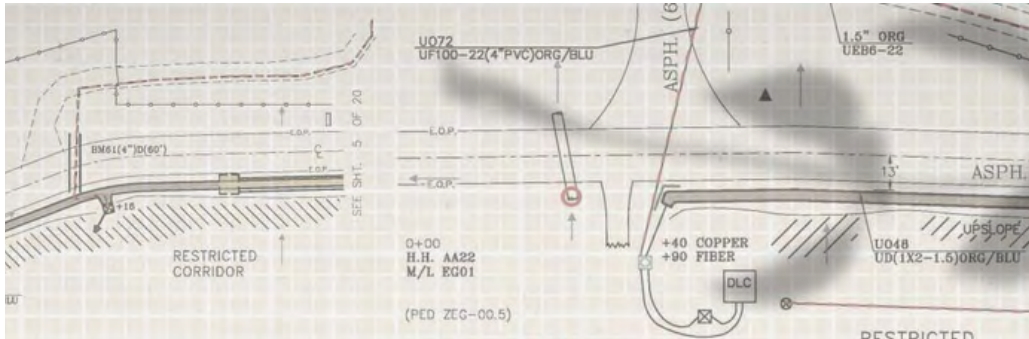
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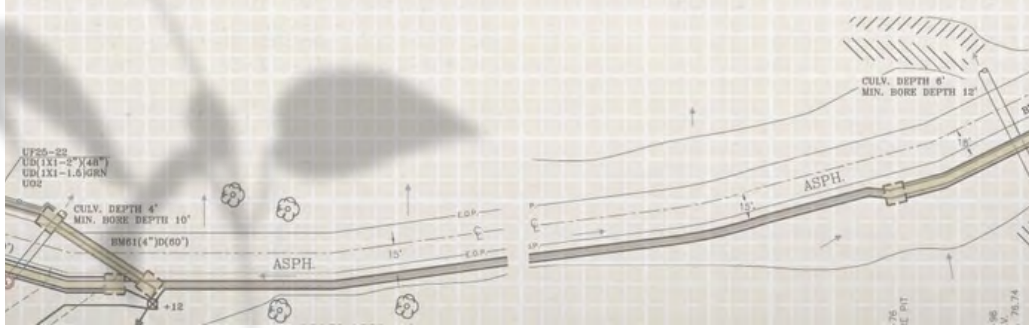
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FORGE

PERMIT PREVIEW

A preview of changes that are ahead for construction sites according to the 2022 Construction General Permit.

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BMP SEASON

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more...

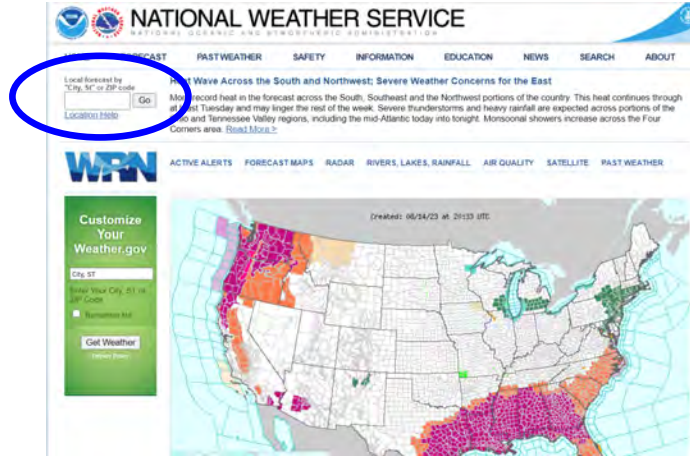
bmpoutlet.com

Four Types of Rain Events Identified in the Construction General Permit:

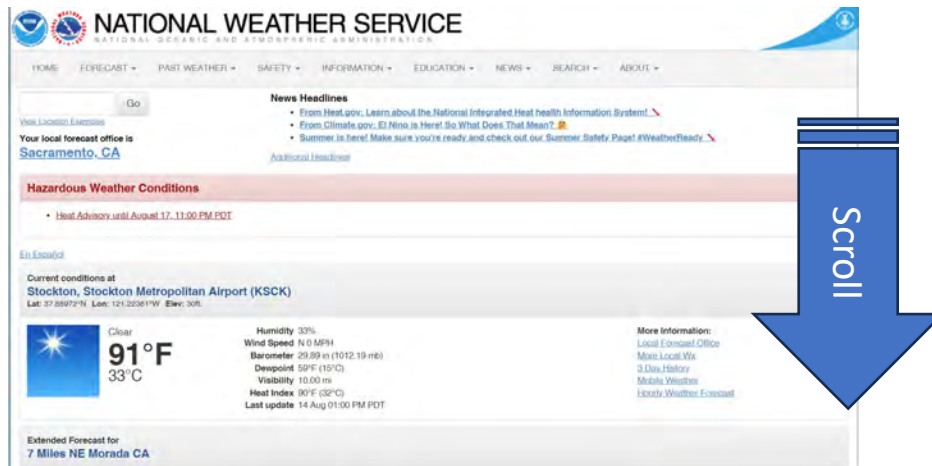
Qualifying Precipitation Event (QPE): Qualifying precipitation event is any weather pattern that is forecast to have a 50 percent or greater Probability of Precipitation (PoP) **and** a Quantitative Precipitation Forecast (QPF) of 0.5 inches or more within a 24-hour period. The event begins with the 24-hour period when 0.5 inches has been forecast and continues on subsequent 24-hour periods when 0.25 inches of precipitation or more is forecast. **2022 CGP, Attachment B**

How to determine a QPE:

1. Go to <https://www.weather.gov/> and enter the location using “City, State” or “Zip Code.”



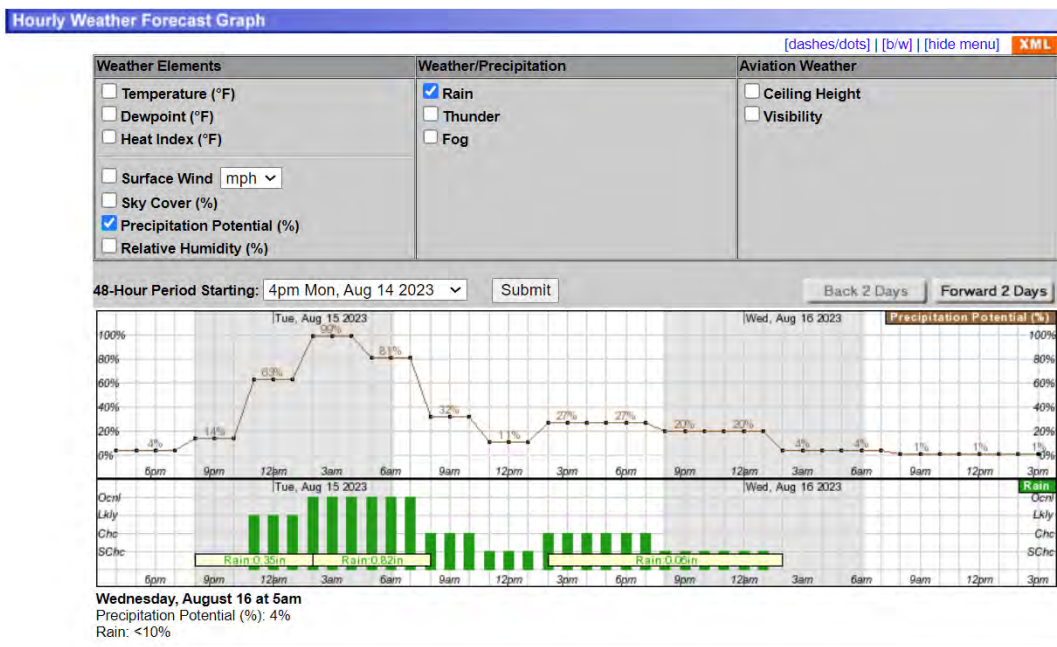
2. Scroll down the weather forecast page for your location.



And click on “Hourly Weather Forecast” ...



3. Select the “Precipitation Potential” and the “Rain” forecasts. (You can turn off the other elements to make the graph less busy.)



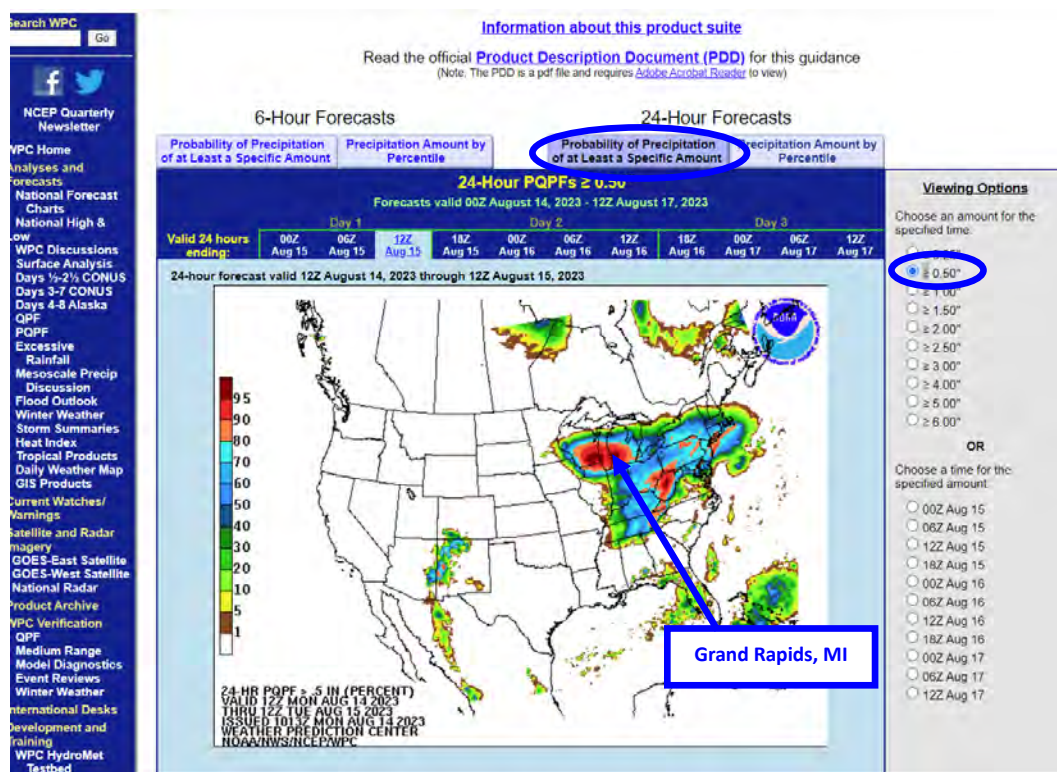
In this example, August 15 is a QPE because it has a PoP of 90% (which is $\geq 50\%$) and a QPF of approximately 1.2" (which is ≥ 0.5 "). The QPE is only on August 15 because there is less than 0.25" predicted for August 16.

4. Check the weather forecast for a 24-hour period that has **both** a probability of precipitation (PoP) 50% or greater and has a quantitative precipitation forecast (QPF) of 0.5 inches or more of rain. The rain event continues the subsequent day, and each day thereafter, that has a QPF of 0.25 inches or more. The event ends when 0.25 inches is not forecasted for a subsequent day.

Forecasted Precipitation Event (FPE): Forecasted precipitation event is any weather pattern that is forecasted to have a 50 percent or greater chance of producing 0.5 inches of precipitation in a 24-hour period in the project area. The discharger shall obtain precipitation forecast information from the National Weather Service Forecast Office (e.g., by entering the zip code of the project’s location at <https://forecast.weather.gov>). Precipitation events end when there are two sequential 24-hour periods with less than 0.25 inches of precipitation forecast for each period. **2022 CGP, Attachment B**

How to determine an FPE:

1. Go to https://www.wpc.ncep.noaa.gov/pqpf/conus_hpc_pqpf.php?fpd=24 and identify the project’s location on the U.S. map. (Warning: It is not possible to achieve high resolution on this map and you will have to do your best at estimating the actual site location.) Above the map, select the tab “Probability of Precipitation of at Least a Specific Amount” under “24-Hour Forecasts” and, to the right of the map, select “≥ 0.50”.



2. Now at the time of this demonstration there was no predicted rainfall in California, but if we consider another location such as Grand Rapids, Michigan, using the color coded index, we can see that there is a 90 – 95% chance of receiving 0.5 inches of rain. For your project to meet the FPE definition, it would need to be located at least within the **light blue section**.
3. Another consideration is that the times on this forecasting tool are reported in Zulu Time (or Greenwich Mean Time). In California, we are 7 hours behind Zulu Time (during daylight savings). You can access a converter here: <https://savvytime.com/converter/z-to-pst>

Any Precipitation Event (APE): As defined in Attachment B of the 2022 CGP, a “precipitation event is any weather pattern that results in precipitation (rain, snow, sleet, or hail).” The Construction General Permit Training Team’s reissuance training refers to the National Weather Service definition of “the process of water vapor condenses in the atmosphere to form water droplets that fall to Earth as rain, sleet, snow, hail, etc.” and “the discharge of water, in a liquid or solid state, out of the atmosphere, generally onto a land or water surface.” **CGPTT / CASQA CGP Reissuance Training Group 3, Module 7**

Measurable Storm Event (MSE): The term is not specifically defined in the 2022 CGP. The [National Weather Service](#) defines “measurable” as “precipitation of 0.01-inches or more.” **CGPTT / CASQA CGP Reissuance Training Group 3, Module 7**

References for these four weather terms in the 2022 CGP:

Qualifying Precipitation Event (QPE):

Applicability	Permit Reference	Comments
Numeric action levels apply to QPEs	Order IV.C.3.	Risk Levels 2 & 3 for pH and turbidity.
Pre-storm inspections must be made of QPEs	Order V.D.2, Attachments D & E III.C.3	By a QSP, within 72 hours of a forecasted QPE (or 120 hours when an extended NWS forecast is available).
During-storm inspections must be made of QPEs	Attachments D & E III.C.4	By a QSP or delegated inspector for each subsequent 24-hour period forecast to have at least 0.25 inches of precipitation.
Post-storm inspections must be made of QPEs	Attachments D & E III.C.5	By a QSP or delegated inspector within 96 hours after a QPE if 0.5 inches or more precipitation is measured in an onsite rain gauge.
Weather information about the beginning and end times and rain gauge volumes for QPEs need to be included in the inspection checklist	Attachments D & E III.C.7	Although a rain gauge is used, it is only for determining if a post-storm inspection is required. Otherwise, it is just for data collection.
Discharge samples at Risk Level 2 and 3 project must be collected for each 24-hour period of QPEs.	Attachments D & E III.D.1.b	Sampled by a QSP or delegated inspector from each discharge location.
Receiving water samples for triggered Risk Level 3 project are to be collected once every 24-hour period of a QPE.	Attachments D & E III.D.2.e	Sampled in the receiving water by a QSP or delegated inspector.
Inspection of a passive treatment zone surface condition within 48 hours after a QPE.	Attachment G D.3	A QSP must visually inspect the passive treatment zone surface condition.

Forecasted Precipitation Event (FPE):

Applicability	Permit Reference	Comments
Inactive projects must be inspected by a QSP or delegated inspector once a calendar month and prior to any weather pattern that is forecasted to have a 50 percent or greater chance of 0.5 inches or more in a 24-hour period.	Order III.G.2.b	The Order does not use the term Forecasted Precipitation Event but the definition is the same as that of a FPE in Attachment B. Apparently, a QSP or delegated inspector must inspect inactive sites prior to FPEs at inactive sites.
Discontinue the application of any erodible landscape material at least 2 days before an FPE.	Attachments D & E II.A.4.c	The frequency of FPEs may be less than QPEs and should be tracked separately.
Complete corrective action as soon as possible, prior to the next FPE.	Attachments D & E II.J.1	The frequency of FPEs may be less than QPEs and should be tracked separately.
Inspection of a passive treatment zone surface condition within 72 hours before an FPE.	Attachment G D.3	A QSP must visually inspect the passive treatment zone surface condition.

Any Precipitation Event (APE):

Applicability	Permit Reference	Comments
Remove any excess sediment or other construction activity-related materials that are deposited on the impervious roads by vacuuming or sweeping prior to APE.	Attachments D & E II.F.4	Street sweeping should be conducted prior to any rain predictions.

Measurable Storm Event (MSE):

Applicability	Permit Reference	Comments
For dischargers to Areas of Special Biological Significance (ASBS), perform runoff sampling during a storm event that is greater than 0.1 inch and generates runoff, and at least 72 hours from the previously measurable storm event (MSE).	Attachment I F.1	A MSE is the determiner of when or when not to sample a discharge to or within an ASBS.