Guidance

Qualifying Precipitation Event Guidance

For the 2022 Construction Stormwater General Permit (2022 CGP)
(Order WQ 2022-0057-DWQ)

Purpose

The 2022 Construction Stormwater General Permit (2022 CGP) relies on qualifying precipitation events (QPEs) to prompt Risk Level or Risk Type 2 and 3 dischargers, to assess best management practice implementation through visual inspections and stormwater discharge monitoring. A QPE is any weather pattern that is forecasted to have a 50 percent or greater probability of precipitation **and** a quantitative precipitation forecast of 0.5 inches or more within a 24-hour period. This document provides guidance for the following:

- Obtaining official forecasts.
- Determining a Qualifying Precipitation Event.
- Associated visual inspection and monitoring requirements.
- Examples of forecasts.

Obtaining Official Forecasts

The 2022 CGP requires the discharger to obtain weather forecasts from the National Weather Service (NWS) for each required inspection (weekly at a minimum) and retain the forecasts with their records. Typically, the site's Qualified Stormwater Pollution Prevention Plan Practitioner (QSP) or a trained delegate is tasked with obtaining weather forecasts. Although weather forecasts are required with each inspection, State and Regional Water Board staff advise QSPs and trained delegates to check forecasts more frequently when any precipitation is predicted, as forecasts are subject to change prior to the date precipitation is expected.

Water Board staff recommends using the NWS Weather Table interface (https://www.weather.gov/wrh/WxTable) to assess if local forecasts indicate a QPE. Below are the instructions to use the NWS Weather Table interface:

1. Scroll down to the middle of the webpage under "**Weather Table**".
2. Verify that the "**Number of Days**" field is set to 7 days and that the "**Interval (hours)**" field is set to 6 hours.
3. Enter the project site latitude and longitude, or click on the map, to locate the project site.

4. Copy the "**Permanent link for this location**" and add to bookmarks to easily access the NWS Weather Table interface in the future.
5. Click "**Go!**" next to "**Printer friendly link:**" to generate the forecast Weather Table.

The State Water Board is aware of vendors that offer programs to assist dischargers with determining when a QPE is forecasted. It is the discharger's responsibility to verify the programs utilize data from the NWS and accurately report when a QPE is forecasted based on the 2022 CGP definition of a QPE in Attachment B.

Determining a Qualifying Precipitation Event

Figure 1, below shows an example of the Weather Table for a given location. It provides forecasted weather data the discharger may use to determine a QPE. The Weather Table includes the 6-hour time intervals; the "**Prob. of Precip (%)**", identified below as probability of precipitation; and "**6 Hr. Precip (in)**" rows, identified below as Quantitative Precipitation Forecast. The Quantitative Precipitation Forecast represents total precipitation (including snow) as if it were a liquid.

Figure 1: Example of an NWS Extended Forecast Weather Table

Date	Tue Nov 19				Wed Nov 20				Thu Nov 21				Fri Nov 22				Sat Nov 23				Sun Nov 24				Mon Nov 25			
High Temp(F)	56				53				61				59				60				57				56			
Low Temp(F)	35				49				50				50				52				46				46			
Intervals → Time	4am	10am	4pm	10pm	4am	10am	4pm	10pm	4am	10am	4pm	10pm	4am	10am	4pm	10pm	4am	10am	4pm	10pm	4am	10am	4pm	10pm	4am	10am	4pm	10pm
Temp(F)	37	47	56	50	50	50	52	52	51	54	61	55	51	56	57	56	53	56	58	51	48	52	56	49	48	51	55	49
Dew Point(F)	33	36	36	34	35	42	48	49	47	48	51	49	45	50	55	55	53	56	54	50	47	51	52	48	45	50	52	49
Relative Humidity(%)	86	66	48	55	56	75	83	91	86	79	71	79	79	78	93	98	100	99	86	98	99	98	85	95	92	97	88	99
Wind Direction	N	SE	S	S	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	S	S	S	S	S	S	SE	S	S	SE	S	S	S
Wind Speed(mph)	1	2	6	8	12	15	12	10	10	10	6	6	8	10	7	8	8	9	6	5	6	7	6	5	6	8	6	5
Wind Gust(mph)	3	7	12	18	24	29	22	22	21	22	14	13	17	21	16	17	17	17	13	10	10	13	10	9	12	15	12	10
Cloud Cover(%)	35	25	95	85	95	95	95	95	85	80	75	65	70	85	95	95	85	85	80	80	65	75	75	75	70	80	75	65
Probability of Precipitation → Prob. of Precip(%)	--	--	5	5	70	90	95	90	70	55	50	45	50	75	95	90	80	80	75	70	50	60	60	65	60	70	60	50
Quantitative Precipitation Forecast → 6 Hr. Precip(in)	0.00	0.00	0.00	0.00	0.15	0.37	0.42	0.45	0.35	0.20	0.17	0.19	0.25	0.45	0.51	0.31	0.19	0.13	0.08	0.08	0.07	0.09	0.13	0.21	0.16	0.10	0.11	0.08
6 Hr. Snow(in)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Snow Level(ft)	3300	3200	3800	4100	5200	7400	9000	9500	9800	9800	9400	8900	8700	8700	8700	8000	6600	5800	5600	5200	5000	4900	5100	5000	5000	5100	5100	4900

A potential QPE starts with the first 6-hour time interval reflecting a Probability of Precipitation of 50% or greater. The discharger then sums the Quantitative Precipitation Forecast amounts for the initial 6-hour time interval and the following three intervals to determine if the 24-hour period is a QPE. **If the sum of Quantitative Precipitation Forecasts amounts is 0.5 inches or greater, that 24-hour period is a QPE.**

Note: A QPE can span over multiple 24-hour periods. A QPE extends for multiple 24-hour periods if each subsequent 24-hour period has a total Quantitative Precipitation Forecast of 0.25 inches or greater. The QPE ends when there is a subsequent 24-hour period with a Quantitative Precipitation Forecast total of less than 0.25 inches. The extension of a QPE is not determined using the Probability of Precipitation.

Examples of determining and calculating QPEs based on a variety of forecasts are provided starting on page 6 of this document.

Associated Visual Inspection and Monitoring Requirements

The following 2022 CGP visual inspection and monitoring requirements apply when there is a QPE forecast:

- All dischargers shall have a QSP conduct a pre-QPE inspection within 72 hours of the start of the QPE, though the QSP may conduct the pre-QPE inspection up to 120 hours in advance of the QPE when extended forecasts (greater than three days) are available (Attachment D/E, Section III.C.3).
- All dischargers shall have a QSP or their trained delegate conduct one visual inspection during each 24-hour period of the QPE (Attachments D and E, Section III.C.4).
- Risk Level 2 and 3 Traditional Construction dischargers shall obtain one sample from each discharge location per 24-hour period of the QPE when there is active discharge (Attachment D, Section III.D.1.b).
- Risk Type 2 and 3 Linear Underground/Overhead Project dischargers shall obtain one sample from each representative sample location per 24-hour period of the QPE when there is active discharge (Attachment E, Section III.D.1.b).
- All dischargers, except for Risk Type 1 Linear Underground/Overhead Projects, shall have the QSP or their trained delegate conduct a post-QPE inspection within 96 hours from the end of the last 24-hour period of the QPE if the on-site rain gauge total for the QPE measures 0.5 inches or greater (Attachments D and E, Section III.C.5).

The 2022 CGP requires dischargers to maintain records of forecasts with each inspection report (Attachments D and E, Section III.C.7.c). These records serve as the basis for the decisions that the discharger, QSP, or trained delegates made to comply with the inspection and monitoring requirements. Water Boards staff recognize that forecasts may change unexpectedly resulting in potential non-compliance and have prepared guidance for the following scenarios[1]:

[1] For these scenarios an “initial NWS forecast” refers to the first forecast obtained by the QSP or trained delegate, usually during the weekly inspection, that predicts

1. The initial NWS forecast indicated a QPE, but an updated forecast no longer indicates a QPE.
    - The pre-QPE, during-QPE, post-QPE visual inspections and during-QPE stormwater discharge monitoring are no longer required. If the QSP already conducted the pre-QPE visual inspection, it may count towards the QSP's required monthly inspection or the weekly inspection.

2. The initial NWS forecast indicated a precipitation event did not meet the criteria for a QPE, but an updated forecast now indicates a QPE.
    - The QSP shall conduct the pre-QPE inspection, if time allows, otherwise document it as a missed inspection with the justification the previous forecast did not indicate a QPE and that the updated forecast was changed to predict a QPE. The discharger should include the dates they obtained the forecasts if not readily apparent. The discharger is still required to conduct a during-QPE inspection and stormwater discharge monitoring. If the on-site rain gauge measured 0.5 inches or greater over the span of the QPE, the post-QPE inspection is also required.

3. The initial NWS forecast indicated a QPE on Tuesday, but an updated forecast now indicates the QPE a day earlier or a day later.
    - If the updated QPE weather forecast shifts to an earlier 24-hour period (e.g., Monday), and the QSP already completed the pre-QPE inspection; the during-QPE inspection, during-QPE stormwater discharge monitoring, and post-QPE inspections would shift to an earlier date according to the updated forecast. However, if the QPE shifted to a later timeframe (e.g., Wednesday), the pre-QPE inspection may have been completed outside the 120-hour window required by the permit and would therefore require a new pre-QPE inspection within 120 hours prior to the start of the QPE. If a new pre-QPE inspection is not feasible, the QSP should document the missed inspection in the inspection report by writing a short description referring to the obtained forecasts.

4. The NWS forecast indicated a QPE where precipitation is expected to occur as snow.
    - The 2022 CGP defines stormwater as "rain, snowmelt, or any other liquid or solid precipitation that may result in runoff and drainage from a site."
    - According to the NWS, the forecast Weather Table provides the Quantitative Precipitation Forecast in inches of liquid precipitation regardless of precipitation falling as snow. Thus, if the Quantitative Precipitation Forecast is 0.5 inches or greater and the Probability of

precipitation for the site during a given week. "An updated forecast" refers to forecasts obtained between the initial forecast and the anticipated start of precipitation.

Precipitation is 50% or greater for a 24-hour period, the snow event is still considered a QPE.

- The pre-QPE, during-QPE, and post-QPE visual inspections are required unless the site is experiencing conditions that qualify for a monitoring exception per Attachments D and E, Section III.B. Additionally, visual inspections and stormwater discharge monitoring may also be reduced if Water Board staff approved the site for inactive status per Order, Section III.G.
- Large accumulations of snow produced over the course of one or multiple QPEs may result in continuous snowmelt discharges from the site for several days or weeks. Furthermore, these discharges may not occur until well after the QPE has ended. Water Board staff advise dischargers to sample snowmelt discharges from the site when there are visual cues demonstrating an impact to water quality such as:
  a. Large quantities of concentrated snowmelt that can result in erosion and the transport of sediment,
  b. Visually turbid snowmelt or construction activities or site conditions that may impact the turbidity of snowmelt, or
  c. Construction activities or site conditions that may impact the pH of snowmelt.
- Ad Hoc reports submitted for snowmelt discharges should indicate the start date as the start of the first QPE that contributed snow and the end date as the end of the last QPE that contributed snow to the snowbank.

Example Forecasts

The examples on the following pages describe the QPE definition applied to various NWS forecast scenarios using example NWS Weather Table data. Staff simplified the NWS Weather Table interface to highlight the 6-hour time intervals, Probability of Precipitation (PoP), and Quantitative Precipitation Forecast (QPF).

Figure 2 does not show any QPEs. While there are time intervals with 50% or greater Probability of Precipitation on June 14, the sum of the Quantitative Precipitation Forecast amounts is less than 0.5 inches and therefore is not a QPE. Similarly, although the Quantitative Precipitation Forecast totals more than 0.5 inches on June 17, the Probability of Precipitation was never 50% or greater and is therefore not a QPE.

Figure 2: Non-Qualifying Precipitation Events

	June 13				June 14				June 15				June 16			
Time	4a	10a	4p	10p	4a	10a	4p	10p	4a	10a	4p	10p	4a	10a	4p	10p
PoP	35	20	-	-	50	55	30	30	-	-	-	-	-	5	25	15
QPF	0.01	0.05	0.00	0.00	0.10	0.10	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00
QPE	**No QPE**				**No QPE**				**No QPE**				**No QPE**			

	June 17				June 18				June 19				June 20			
Time	4a	10a	4p	10p	4a	10a	4p	10p	4a	10a	4p	10p	4a	10a	4p	10p
PoP	35	45	40	25	-	15	20	5	-	-	-	-	-	-	-	-
QPF	0.15	0.20	0.15	0.10	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
QPE	**No QPE**				**No QPE**				**No QPE**				**No QPE**			

Figure 3 shows two QPEs: one starting with the 4:00 a.m. interval on November 12 and another starting with the 10:00 p.m. interval on November 16. Note that both QPEs start with the first 6-hour interval that has a Probability of Precipitation of 50% or greater and has a total Quantitative Precipitation Forecast of 0.5 inches or greater. Since QPEs are defined as 24-hour periods, dischargers can expect a QPE to cross multiple calendar days as shown by the 2nd QPE in Figure 3 above.

Figure 3: 24-hour Qualifying Precipitation Events

	November 11				November 12				November 13				November 14			
Time	4a	10a	4p	10p	4a	10a	4p	10p	4a	10a	4p	10p	4a	10a	4p	10p
PoP	15	25	-	-	70	55	100	95	10	10	45	30	40	30	-	-
QPF	0.00	0.03	0.00	0.00	0.30	0.15	0.90	0.85	0.00	0.00	0.04	0.15	0.20	0.15	0.00	0.00
QPE	**No QPE**				**1st QPE – Start & End**				**No QPE**				**No QPE**			

	November 15				November 16				November 17				November 18			
Time	4a	10a	4p	10p	4a	10a	4p	10p	4a	10a	4p	10p	4a	10a	4p	10p
PoP	10	35	-	-	20	25	10	50	100	75	25	5	5	-	-	-
QPF	0.00	0.10	0.00	0.00	0.01	0.15	0.00	0.26	0.42	0.15	0.05	0.01	0.01	0.00	0.00	0.00
QPE	**No QPE**							**2nd QPE – Start & End**				**No QPE**				

Figure 4 shows two extended QPEs. The 1st QPE occurs between 4:00 a.m. on March 18 and 4:00 a.m. on March 20. The 1st QPE was extended because the Quantitative Precipitation Forecast for the second 24-hour period was 0.25 inches or greater. The 2nd QPE occurs between 4:00 p.m. on March 22 and 4:00 p.m. on March 25. The 2nd QPE was extended because the Quantitative Precipitation Forecast for the second and third 24-hour periods were each 0.25 inches or greater. Note that the end of the 2nd QPE is the end of the third 24-hour period (10:00 a.m. interval), not the interval when precipitation was last forecast (10:00 p.m. interval). Although not depicted in the forecast, there is no precipitation predicted for March 26.

Figure 4: Extended Qualifying Precipitation Events

	March 18				March 19				March 20				March 21			
Time	4a	10a	4p	10p	4a	10a	4p	10p	4a	10a	4p	10p	4a	10a	4p	10p
PoP	50	85	90	100	45	60	55	40	25	10	-	-	-	-	-	-
QPF	0.02	0.10	0.75	0.90	0.00	0.20	0.05	0.05	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
QPE	1st QPE – Day 1 (Start)				1st QPE – Day 2 (End)				No QPE				No QPE			

	March 22				March 23				March 24				March 25			
Time	4a	10a	4p	10p	4a	10a	4p	10p	4a	10a	4p	10p	4a	10a	4p	10p
PoP	35	45	50	45	50	50	65	75	55	50	45	30	-	-	-	-
QPF	0.05	0.11	0.17	0.07	0.21	0.15	0.15	0.35	0.10	0.20	0.17	0.10	0.00	0.00	0.00	0.00
QPE	No QPE		2nd QPE – Day 1 (Start)		2nd QPE – Day 2				2nd QPE – Day 3 (End)				No QPE			

Figure 5 shows two back-to-back QPEs where a single 24-hour period of less than 0.25 inches of precipitation separates the 1st and 2nd QPEs.

Scenarios such as these warrant additional consideration to *efficiently* comply with the inspection requirements. Both QPEs require a QSP to conduct a pre-QPE visual inspection within 120 hours before the start of the QPE. The Discharger should use the NWS weather forecast information that is available to determine the required inspections. If the pre-QPE inspection occurs on January 1 – 3, then that inspection satisfies the requirement for both the 1st and 2nd QPE. However, if the pre-QPE inspection for the 1st QPE occurred on December 31, the QSP is required to conduct another pre-QPE inspection before the 2nd QPE on January 6. That said, the during-QPE and post-QPE inspections for the 1st QPE could serve as the pre-QPE inspection of the 2nd QPE, if conducted by a QSP. Additionally, if a post-QPE inspection was required for the 1st QPE, it could be satisfied by a pre-, during-, or post-QPE inspection for the 2nd QPE if done within 96 hours after end of the 1st QPE.

Figure 5: Back-to-Back Qualifying Precipitation Events

	December 31				January 1				January 2				January 3			
Time	4a	10a	4p	10p	4a	10a	4p	10p	4a	10a	4p	10p	4a	10a	4p	10p
PoP	10	5	25	40	15	-	-	-	-	5	50	55	30	30	30	35
QPF	0.02	0.00	0.07	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.1	0.01	0.01	0.01	0.04
QPE	**No QPE**				**No QPE**				**No QPE**				**No QPE**			

	January 4				January 5				January 6				January 7			
Time	4a	10a	4p	10p	4a	10a	4p	10p	4a	10a	4p	10p	4a	10a	4p	10p
PoP	55	70	90	85	-	-	-	-	65	50	55	70	85	75	90	65
QPF	0.05	0.21	0.51	0.35	0.00	0.00	0.00	0.00	0.20	0.05	0.05	0.25	0.40	0.35	0.60	0.30
QPE	**1st QPE – Start & End**				**No QPE**				**2nd QPE – Day 1 (Start)**				**2nd QPE – Day 2 (End)**			

Additional Information

If you have any additional questions regarding Qualifying Precipitation Events, please contact the Stormwater Help Desk (stormwater@waterboards.ca.gov).

This Guidance Document was last updated on May 5, 2025.