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April 25, 2024

VIA ELECTRONIC MAIL

Melanie Bachman
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: Petition No. 1609 - TRITEC Americas, LLC notice of election to waive exclusion from Connecticut Siting Council jurisdiction, pursuant to Connecticut General Statutes §16-50k(e), and petition for a declaratory ruling, pursuant to Connecticut General Statutes §4-176 and §16-50k, for the proposed construction, maintenance and operation of a 0.999-megawatt AC solar photovoltaic electric generating facility located at 250 Carter Street, Manchester, Connecticut, and associated electrical interconnection. **Submission of Testimony and Evidence**

Dear Executive Director Bachman:

As a pending status Party, I hereby submit a Testimony document with respect to the Stormwater Management Plan provided in PE 1609. Also attached and enclosed are Evidence documents related to this Testimony. I am delivering fifteen (15) paper copies of the Testimony and the Evidence to the Siting Council offices.

I certify that I am including on the distribution of this emailed submission all the parties on the Service List shown on the Siting Council's website as of today as well as parties with pending applications for Party and/or Intervenor status.

Respectfully,

Raymond Welnicki

cc: cc John F. Sullivan, Attorney for Town of Manchester, Raymond Welnicki, Rachel and Dana Schnabel, Rosemary Carroll (on behalf of MARSD), Attorneys for the Petitioner: Paul R. Michaud, Bernadette Antaki, Dylan J. Gillis

Petition 1609

Testimony – Stormwater and Groundwater

Submitted by Ray Welnicki, Party (status pending on date of submission)

The testimony below was developed with respect to Petition 1609 that was filed with the Siting Council on January 24, 2024. As I was going to print with this testimony, I became aware of substantial stormwater management revisions that the Petitioner included with their April 23, 2024 filing of responses to Connecticut Siting Council's interrogatories. I have not had the opportunity to fully analyze this new submission, but my quick review leads me to conclude that my testimony below continues to be applicable.

Therefore, in order to meet the testimony and evidence deadline of April 25, I am submitting this testimony with the caution that some of the quantifications used in this testimony may need to be changed in light of the new Petitioner stormwater management proposal. Nevertheless, the substance of the analysis and conclusions remain valid. If anything, based on a quick review of the filing, it appears that the revised stormwater management proposal only serves to increase the potential for serious adverse consequences to properties directly and proximately below the stormwater basin. Please read this testimony knowing that it remains directionally accurate and that updated quantifications and analysis in response to new information will be provided in a later submission.

Likely Increase in Stormwater and Groundwater Flows onto Amanda Drive Properties

It is my testimony that the location at 250 Carter St. in Manchester, CT for the solar electrical generation facility proposed in Petition 1609 poses unacceptable risks to the properties located downslope of that site. I will show that the properties abutting 250 Carter St. in Manchester currently experience high volumes of stormwater and groundwater. I will then show that the stormwater management plan proposed in Petition 1609 will:

- Substantially increase the volumes of stormwater and groundwater flowing onto the properties below the southern portion of the solar array – i.e., PDA-1B;
- Substantially increase the volume of groundwater exfiltrating onto properties below the northern portion of the solar array – i.e., PDA-1A;
- Substantially increase the volume of stormwater runoff onto properties below the northern portion of the solar array (i.e., PDA-1A) during and after intense periods of rainfall.

Therefore, this testimony will disprove the conclusion stated in the Petition's Stormwater Management Report that "the proposed solar array will not result in any adverse conditions

to the surrounding areas and properties." In fact, the proposed solar array will exacerbate existing adverse conditions at the surrounding areas and properties.

Existing Conditions

My property at 121 Amanda Drive in Manchester abuts 250 Carter St. and lies approximately 100 feet in elevation downslope of the proposed facility. Currently, groundwater exfiltrates out at 4 primary locations. When we purchased the property in 2013, a French drain that had been installed in 2001 (when the house was built) was failing leading to ponding in my backyard as close as 25 feet from the house. In May 2014, I measured the flow rate of the groundwater exfiltrating from the hill at one location about 3 feet above the level of my backyard less than 50 feet from my house. The four measurements I took showed an average flow of 800 gallons a day at that one location. Taken together, I estimate that the four primary exfiltration areas on my property generate over 1,000 gallons of exfiltrated ground water at the base of the hill in question at various times of the year.

I replaced the failing French drain in 2014 so that we could fully use our backyard and to prevent groundwater from seeping into our basement. So far that drain system is working but I am concerned that an increase in stormwater and groundwater flows will overwhelm this drain.

My driveway has several significant cracks that reopen even after repairs. I believe that this is due to groundwater exfiltrating from below the driveway. I am concerned that any increase in groundwater flows below the driveway will worsen existing cracks, cause further cracks and require the driveway to be replaced.

Neighbors along Amand Drive experience similar and in some cases worse issues currently. One example is the almost continuous flow of stormwater and groundwater at 161 Amanda Drive. For almost year round, groundwater flows from the base of the hill to the south of the driveway, ponds on the property just east of the sidewalk, overflows onto the sidewalk and then over the curb and onto Amanda Drive where it enters storm drains that carry the water ultimately towards Birch Mountain Brook. That flow increases when it rains but the fact that it persists long after the rain indicates that it is groundwater exfiltration. And the water on the sidewalk freezes over during the winter creating a significant hazard.
Here is a picture of that flow on February 28, 2024:

Other pictures and videos of existing stormwater and groundwater flows are being introduced into Evidence.

Likely Conditions After Facility is Constructed

A. **Area Shown in Stormwater Management Report as EDA-1B and PDA-1B**

The Stormwater Management Report (hereinafter referred to as"Report") indicates that the proposal is to separate the existing site into two primary stormwater drainage areas designated as EDA-1 for the proposed development and EDA-2 for the proposed wetland crossing area. We will only address the drainage area EDA-1 since that is the area that primarily affects the properties on Amanda Drive.

The Report proposes two separate stormwater management solutions for EDA-1 which are designated PDA-1A and PDA-1B. It appears that no specific stormwater measures are proposed for PDA-1B, which is about 5.16 acres on the southern side of the development area. If no stormwater measures are proposed for that area and given that trees in the area will be replaced with solar panels, it defies logic that one could claim, as the Report does, that ""the proposed solar array will not result in any adverse conditions to the surrounding areas and properties." I believe that the contrary is true – i.e., that stormwater flows from PDA-1B will increase from existing conditions and send additional runoff and sediment onto the downslope properties.

It is widely known and acknowledged that trees help reduce stormwater and groundwater flows. The EPA indicates at Soak Up the Rain: Trees Help Reduce Runoff | US EPA "Trees are increasingly recognized for their importance in managing runoff. Their leaf canopies help reduce erosion caused by falling rain. They also provide surface area where rain water lands and evaporates. Roots take up water and help create conditions in the soil that promote infiltration." There is no need to go into any deeper analysis to show that the Petitioner cannot claim that there will be no increase in stormwater and groundwater flows to properties that lie below PDA-1B.

B. **Area Shown in Stormwater Management Report as EDA-1A and PDA-1A**

While the Report proposes stormwater measures for the 7.5-acre northerly portion of the development (EDA-1A), I believe that these measures will cause adverse effects on the properties downslope from that area. Let's address groundwater first and then stormwater.

1. **Groundwater in Area Below PDA-1A**

The Report proposes that grassed swales will be deployed to divert stormwater from throughout the 7.5-acre PDA-1A to an infiltration basin on the northwestern portion of the developed site just below the solar array area. This will concentrate the infiltration of stormwater above several properties directly and proximately downslope from the infiltration basin. This includes my property at 121 Amanda Drive.

Consider the rainstorm that deposited 2.66 inches of rain in 12 hours in Manchester. At about 27,154 gallons of water per inch per acre, that storm dropped about almost 542,000 gallons of water over the PDA-1A area. We recognize that not all of that amount of rain would flow into the infiltration basin but we can probably assume that 200,000 gallons or more would flow into the infiltration basin in a storm like that. It's not clear from the Report but it appears that the maximum surface area of the infiltration basin is just under 13,000 square feet or about 0.3 acres. Thus, in the absence of the swales and the infiltration basin, the amount of rain that would have fallen in the area of the infiltration basin would have only been about 22,000 gallons.

Therefore, I think it is clear that the infiltration basin would infiltrate a significantly greater volume of water into the ground directly above my property. That groundwater will not magically dissipate; it will migrate both horizontally and vertically down the hill. It is highly likely that this stormwater management proposal would greatly magnify the amount of groundwater that exfiltrates into my backyard, below my driveway and towards my basement. The potential adverse consequences from that should be clear. I also believe that my adjacent neighbors would experience similar consequences.

The Petitioner has provided no data and analysis to show that the additional groundwater infiltrating from the stormwater basin will not adversely affect properties below PDA-1A. It's almost as though the Petitioner is suggesting that once the stormwater reaches the

infiltration basin there are no further rain water issues to solve (other than addressing possible overflows from the basin). The reality is that groundwater considerations are important also since they can cause significant adverse environmental effects. The Petitioner has the burden of proving that those effects will not occur and so far that burden has not been even addressed let alone met.

2. **Stormwater Below PDA-1A**

A second major concern with the stormwater management proposal for PDA-1A is that storms will certainly occur that will lead to overflows from the stormwater basin. That overflow is currently designed to flow directly towards my property and the properties of my nearest neighbors. This places us at considerable risk for adverse consequences from much greater stormwater volumes in certain storms than would be the case if the facility were not developed.

The Report modeled stormwater flows resulting from 2-year, 25-year, 50-year and 100-year storm events. It's not clear from the Report but it appears that no modeling was done of intense storms that drop considerable rainfall in a short time period, such as 3 or 6 hours. Those intense rainfalls have a probability of occurrence that makes it highly likely that they will occur multiple times over the course of the next 20 years. For example, using the Point Precipitation Frequency Table in the Report, a 1.69-inch rainfall in a three-hour period is likely to occur every two years. The table also indicates that a 25-year storm event for a 6-hour rainfall is 3.92 inches. A storm like that, particularly on already saturated ground, would lead to runoff that would quickly overflow the infiltration basin. Consider that a 3.92-inch rainfall would drop 798,000 gallons of water over the 7.5-acre PDA-1A drainage area. Much of that would certainly flow into the infiltration basin which has a capacity of about 350,000 gallons (i.e., 46,881 cu. ft.). It is likely that several hundred thousands of gallons of water would then cascade down the hill with potentially severe to devastating results for properties such as mine that lie below the infiltration basin.

The Precipitation Point Frequency Table was, I believe, developed in 2017. According to the EPA, "Scientific studies indicate that extreme weather events such as heat waves and large storms are likely to become more frequent or more intense with human-induced climate change." (see Climate Change Indicators: Weather and Climate | US EPA). Given that, the likelihood of the just discussed storm event will be greater over the coming years. As Governor Lamont said on July 16, 2023: "These storms are biblical in terms of the torrential rainfall you get and they're happening more and more frequently." (reported at 5 people were killed by raging floodwaters in southeastern Pennsylvania. 2 children are still missing | CNN)

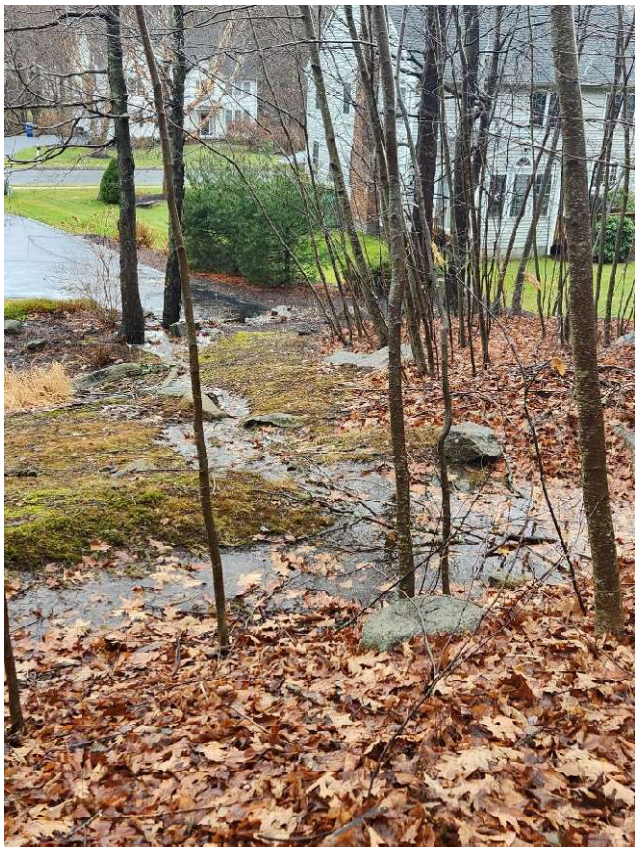
I think several storm events that have occurred in the last 70 years should also be considered in assessing the potential consequences of the proposal. In August 1955, Hurricane Connie dropped up to 8 inches of rain in Connecticut. Only five days later, Hurricane Diane poured up to another 16 inches of rain across parts of the state. (see

“Hurricanes Connie and Diane Deliver Double Hit” as reported at connecticuthistory.org. And as reported by the Hartford Courant on August 30, 1997, 6 inches of rain fell in Manchester in just 2 hours. It’s likely that either of these events would channel over 1 million of gallons of water into the 350,000 gallon capacity infiltration basin leading to more than 500,000 gallons of water cascading downslope towards my property and those of my immediate neighbors. There would certainly be significantly adverse consequences.

In this regard, it should be noted that the total rainfall from Hurricane Diane fell over two 24-hour periods (I believe 32 hours in total) and so not all of it would be reflected in the precipitation tables of maximum 24-hour storm events.

The Report did not mention anything about the magnitude of the slope of the hill shortly after the infiltration basin’s overflow outlet. The grade is modest for a bit until just past the clearing above the underground natural gas pipeline. After that point, the slope increases to an average of approximately 20% from that point until the bottom of the hill in the backyards of abutting properties along Amanda Drive. In some stretches the slope exceeds 25%. Therefore when significant volumes of water overflow from the infiltration basin, the velocity of the runoff will accelerate once it travels about 100 feet. I am concerned that the force of large volumes of water traveling at accelerating velocities will do considerable damage and could very possibly cause substantial erosion while sending downed tree limbs, rocks and mud towards our properties. This could be catastrophic.

I will be including in Evidence some videos that show the velocity of some of the stormwater flows to my property from recent rainstorms. Below is a picture of one of the several stormwater flows from the hill onto my property on De. 18, 2023.



And here is a picture of a stormwater flow from the same storm on the opposite side of my property:

I didn't find anything in the Report that addressed how the stormwater discharges would change when the ground is frozen. We have had years of extreme cold such as in 1989 when the high temperature did not rise above freezing in Hartford for 19 consecutive days. If a considerable rainstorm occurred at the end of a cold snap of even half that length, we would expect that soil infiltration rates throughout the PDA-1A drainage area and the infiltration basin would be significantly reduced, leading to faster runoff accumulation in the infiltration basin than when the ground is warm. Thus, we believe that if the modeled storm events – as well as the more intense rainfalls that were not modeled - were to occur after a cold snap, the resulting stormwater volumes overflowing the infiltration basin would be greater than accounted for in the Report.

Finally, I will note that the vast majority of solar panels were treated as not being impervious surfaces in determining the post-development stormwater discharges. I believe the engineering firm indicated that this is acceptable to DEEP with respect to satisfying permit requirements or obtaining a Certificate of Environmental Compatibility. But the Petitioner is not seeking a permit at this stage and is specifically seeking a declaratory ruling in lieu of a Certificate of Environmental Compatibility.

I contend that the standard to obtain a declaratory ruling is different than for permits or certificates. In fact, I believe it is more rigorous, namely, that the Petitioner must prove that there will be no significant adverse environmental effects as a result of the development. Establishing that the stormwater management plan meets certain metrics set by DEEP can be a factor in that regard but I don't believe it is dispositive of "no significant adverse environmental harm". Introducing an industrial risk into a rural residential area – effectively re-zoning that neighborhood – requires more than just standard permitting considerations. The latter become operative only after a determination is made that the location is suitable from broader and higher order considerations. With respect to stormwater management, extra care should be taken to assure that introduced hazards do not increase the potential for catastrophic consequences to the property to be developed, to the neighborhood as a whole or to any individual property owner. Stormwater management is not an exact science even when due rigor is employed, and the possibility of human error in execution and ongoing management cannot be ignored. Coupled with the unpredictability of weather events, particularly as influenced by climate change over the next 20 years, the risk of significant adverse environmental consequences are too great to grant approval of Petition 1609.

Submitted April 25 by Raymond Welnicki

PETITION 1609

EVIDENCE RELATED TO:

STORMWATER MANANGEMENT PLAN

Submitted by Ray Welnicki, Party

April 25, 2024

Soak Up the Rain: Trees Help Reduce Runoff

Trees are valued for the beauty and many other benefits they bring to our landscapes and neighborhoods. Trees are increasingly recognized for their importance in managing runoff. Their leaf canopies help reduce erosion caused by falling rain. They also provide surface area where rain water lands and evaporates. Roots take up water and help create conditions in the soil that promote infiltration.

Information About Trees

Making Urban Trees Count, Center for Watershed Protection

A robust collection of resources and research-based tools for crediting trees in stormwater and water quality management programs. Includes an urban tree canopy BMP crediting protocol, water balance model documentation, and the comprehensive literature review: *Making Urban Trees Count: A Project to Demonstrate the Role of Urban Trees in Achieving Regulatory Compliance for Clean Water*

Urban Tree Canopy, Green Infrastructure, U.S. EPA

Stormwater Trees Technical Memorandum, U.S. EPA, 2016
Trees in the urban environment provide many benefits and tree programs face challenges that can affect their success. This technical memorandum addresses planting and maintaining trees adjacent to roadways or sidewalks in urban areas where buildings and impervious surfaces create harsh environments.

Reducing Heat Islands Compendium of Strategies: Trees and Vegetation, U.S. EPA (pdf) (4.4 MB)
Shade trees and smaller plants such as shrubs, vines, grasses, and ground cover, help cool the urban environment. Describes the causes and impacts of summertime urban heat islands and promotes strategies for lowering temperatures in U.S. communities.

Climate Change Indicators: Weather and Climate

Rising global average temperature is associated with widespread changes in weather patterns. Scientific studies indicate that extreme weather events such as heat waves and large storms are likely to become more frequent or more intense with human-induced climate change. This chapter focuses on observed changes in temperature, precipitation, storms, floods, and droughts.

Why does it matter?

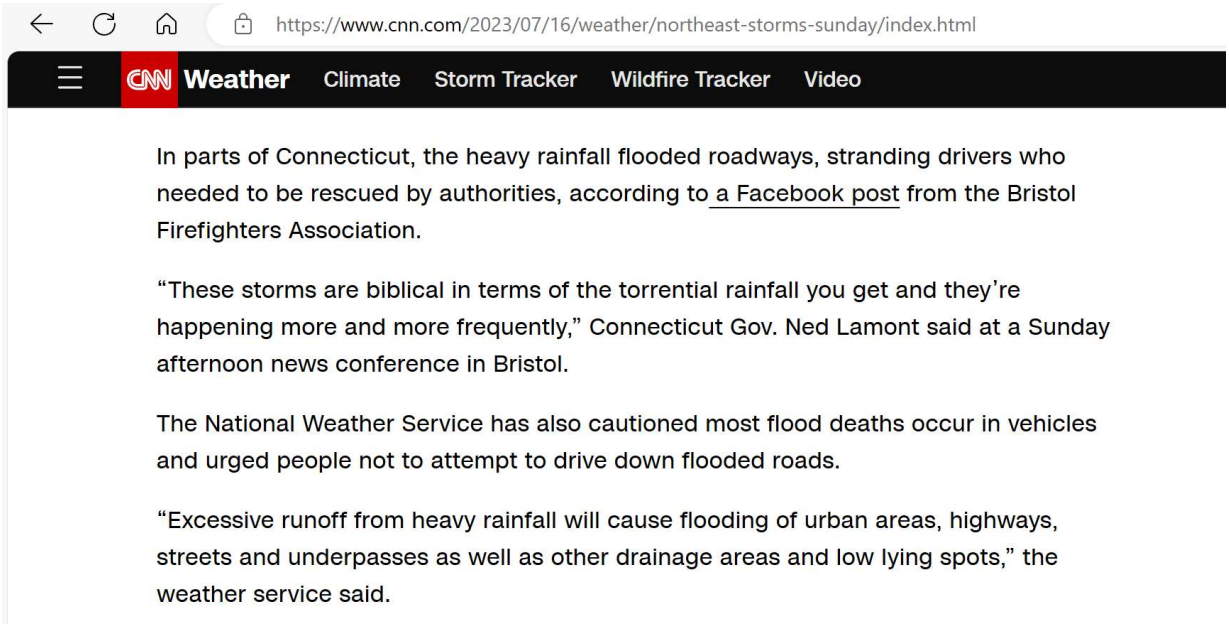
Long-term changes in climate can directly or indirectly affect many aspects of society in potentially disruptive ways. For example, warmer average temperatures could increase air conditioning costs and affect the spread of diseases like Lyme disease, but could also improve conditions for growing some crops. More extreme variations in weather are also a threat to society. More frequent and intense extreme heat events can increase illnesses and deaths, especially among vulnerable populations, and damage some crops. While increased precipitation can replenish water supplies and support agriculture, intense storms can damage property, cause loss of life and population displacement, and temporarily disrupt essential services such as transportation, telecommunications, energy, and water supplies.

View Indicators:

<https://epa.gov/climate-indicators/climate-change-indicators-us-and-global-temperature>

<https://epa.gov/climate-indicators/climate-change-indicators-seasonal-temperature>

Excerpt from CNN, July 16, 2023 at [5 people were killed by raging floodwaters in southeastern Pennsylvania. 2 children are still missing | CNN]



Hurricanes Connie & Diane Deliver Double Hit – Who Knew?

Hurricanes Connie and Diane gave the state a double wallop in August 1955, causing 70 deaths, thousands of injuries, and hundreds of millions in property damage. Image of flood damage to railroad tracks, Derby - Archives & Special Collections of the University of Connecticut Libraries, and Connecticut History Ilustrated

…that Hurricanes Connie and Diane, which struck within days of each other in August 1955, exceeded the *combined* property damage of the Flood of 1936 and Hurricane of 1938? The latter alone had caused an estimated $100 million in property damage and the loss of 85 lives.

Connie struck first, on August 12 and 13, sparing the state high winds but dropping up to 8 inches of rain, particularly saturating southwestern Connecticut. Five days later, Diane arrived, pouring another 16 inches of rain on the state, hitting the Naugatuck Valley and the northwestern towns hard; northeastern towns such as Stafford Springs and Putnam were also hard hit, the latter suffering from the Quinebaug Dam's collapse in Southbridge, Massachusetts.

Governor Abraham Ribicoff called the floods, reported in the August 20, 1955, edition of *The Hartford Courant*, "the worst disaster in the state's history" and immediately declared a state of emergency. The

state highway department reported that at least 17 bridges had been destroyed, isolating communities, and that numerous roads were blocked by rock slides. Major dams broke, railroad tracks were swept away, homes and businesses were destroyed, and drinking-water supplies were compromised. *The Hartford Courant* reported what eyewitnesses were seeing: “Lt. Col. Robert Schwolsky of the Connecticut National Guard reported from a helicopter: ‘I’ve never seen anything like Winsted’s Main Street. It looks like someone had taken cars and thrown them at one another,’” and another officer saw “a house, complete with lawn and landscaping, floating down the swollen river. A little later,… another house being swept by, smoke coming from its chimney.”

The Connecticut National Guard was mobilized, and 16 helicopters plucked people off rooftops and out of trees. The US Navy, Sikorksy Aircraft in Stratford, Kaman Aircraft in Bloomfield, West Point, the First Army Corps of Engineers, and the US Marine Corps supplied additional aircraft, rescuing hundreds of people.

Civil defense and emergency shelters filled quickly, and the American Red Cross set up a central disaster headquarters in Hartford. Food drops were facilitated by C-47 planes from the New York Air National Guard and the Connecticut Air National Guard.

When the event was over, according to the National Weather Service, 77 Connecticut lives were lost and property damage exceeded $350 million.

Contributed by Emma Demar, a Connecticut Explored *intern and Trinity College student in 2011, and Elizabeth Normen, the magazine’s publisher.*

NEWS

IT RAINS, IT POURS, IT FLOODS IN MANCHESTER

By

PUBLISHED: August 30, 1997 at 4:00 a.m. | UPDATED: August 26, 2021 at 5:58 a.m.

A cloudburst settled over downtown Manchester Friday, pouring down more than 6 inches of rain in two hours.

Firefighters worked frantically all day to drain basements, which in a few cases, had filled with water to the top step.

Houses were struck by lightning. Cars were trapped windshield-deep in flooded streets. Storm sewers turned into gushers. More than 1,200 electricity customers lost power and many residents had to be evacuated and brought to shelters.

“For any one location, that’s something they won’t experience for another 10 or 20 years — that amount of rain in such a short period of time,” said Robert M. Thompson, meteorologist- in-charge of the regional office of the National Weather Service in Taunton, Mass. “It is unusual for any one location.”

Despite the severity of the storm, there were no reports of serious injury.

Thompson said an air mass off the Atlantic from the east collided with an air flow from the northwest, creating warm, moist air that fueled thunderstorms, some of which stalled over Manchester. The storm was so closely centered that a town away, residents experienced only heavy rain, with no severe flooding.