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SAMPLE REPORT
Analysis of Weather Conditions at 323 Smith St, Brooklyn, New York on January 4 - 10, 2018

Prepared for:

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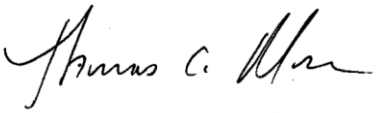
April 26, 2020

This report is subject to revisions based on new information and data if any becomes available

This report is an analysis of weather conditions between January 4 and January 10, 2018 at the location of a slip and fall accident which occurred at approximately 12:30 am Eastern Standard Time (EST) on January 10, 2018, at 323 Smith St, Brooklyn, New York. The analyses, findings and opinions in this report are based on relevant weather and other data records available at the time the report was written. This report has been prepared for use with this specific case only, and is subject to revision based on new information and data if any becomes available.

This report was prepared by Thomas C. ("TC") Moore, Certified Consulting Meteorologist. Mr. Moore has been a practicing meteorologist for over 30 years, and specializes in providing forensic meteorological services for a wide variety of clients as President, Atlantic States Weather. Clients of this firm have included the U.S. Department of Justice, the U.S. Department of Defense, the North Carolina Attorney General's Office, and over 110 law offices and other clients representing both plaintiffs and defendants in legal cases in 26 states, the District of Columbia, Puerto Rico, the United Kingdom, and Greece.



Thomas C. Moore
Certified Consulting Meteorologist
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Raleigh, North Carolina
April 26, 2020

I. Summary

At the time of the accident, there was approximately 3-5” of snow on untreated/unplowed surfaces at 323 Smith St, Brooklyn, New York (hereafter referred to as “the property”). This includes snow piles on/near the sidewalk from previous shoveling/plowing. This snow was the remnant of 8” of snow that fell January 4, 2018. Aside from a trace of snow and freezing rain that fell for approximately two hours on the afternoon of January 8, 2018, no precipitation was observed at the property between January 4, 2018 and the time of the accident.

From January 4, 2018 to January 8, 2018, the temperatures at the property were well below normal, and did not rise above freezing during this period. As a result, little if any of the snow that fell on January 4, 2018 melted during this period, allowing the snow cover to remain intact. Similarly, any piles of snow on/near the sidewalk resulting from shoveling or plowing actions would have also experienced little melting, and would have remained intact.

The temperatures at the property rose above freezing for approximately 12 hours during the day prior to the accident, leading to melting of the snow cover, to include melting from the snow piles on the sidewalk.

The air temperature just above the surface of sidewalk at the property was below freezing for a period of 1.5 – 3.5 hours prior to the time of the accident, leading to the formation of a dark, thin sheet of ice from the water left from the previous day’s melted snow on the sidewalk.

II. Report Preparation Process

Two sources of data were analyzed to determine the weather conditions at the property from January 4, 2018 to the time of the accident on January 10, 2018.

NOAA/NCEI’s Local Climatological Data (LCD)

Local Climatological Data (LCD) consist of hourly, daily, and monthly weather observation summaries for approximately 1,600 U.S. locations. For this report, the data from the John F. Kennedy International Airport, NY (hereafter referred to as “JKF Airport”), located 5 miles east of the property were reviewed for the month of January, 2018. This airport is equipped with government sponsored and maintained observing systems, which provide continuous observations of weather conditions. Since the property is in close proximity to this airport, weather observations from this airport can be used to determine conditions at the property.

Figure 1 shows a map of the property in relation to JFK Airport.

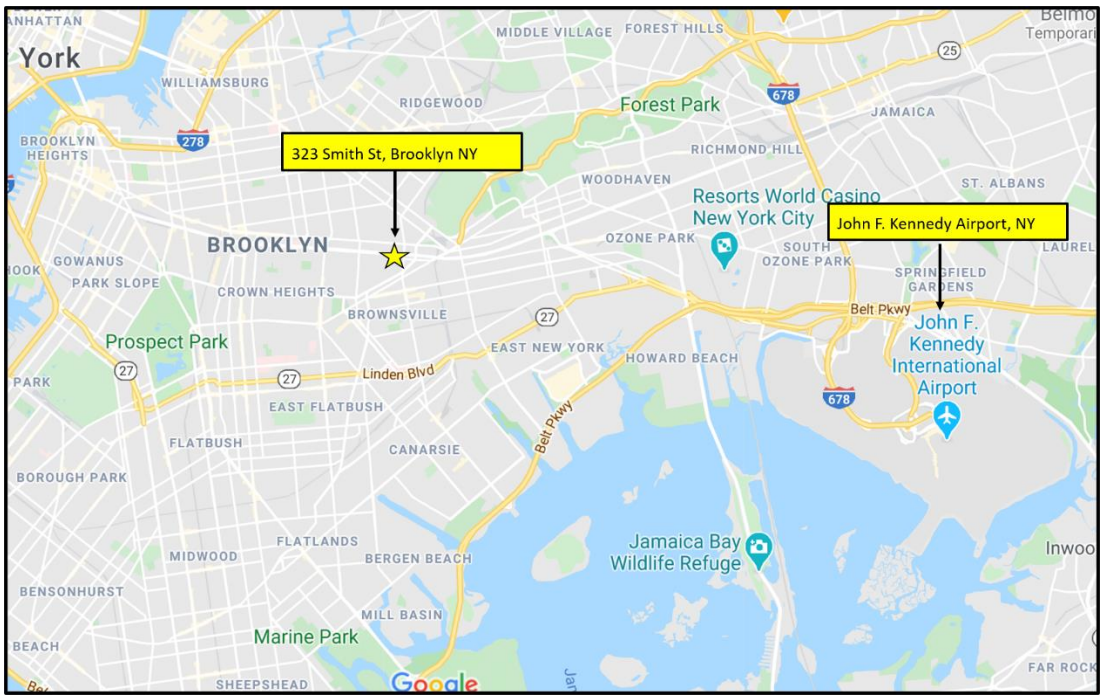

Fig. 1: *Location of property and JFK Airport. Property is located approximately 5 miles west of the airport*

National Weather Service (NWS) Weather Prediction Center (WPC) Surface Analysis Archive.

The WPC archives a selection of United States and North American surface analyses. These surface analyses include depiction of weather fronts and high- and low-pressure systems for every three hours, similar to what you see on TV or Internet “Weather Maps”. These archived analyses are useful for determining the large-scale weather conditions for a time, date and location. For this report, surface analyses for the United States for the period January 4 through January 10, 2018 were reviewed.

III. Timeline of the Event

Following is the reconstructed weather condition timeline for the location of the slip and fall, for period January 4 – 10, 2018.

January 4

- 8” of snow fell as temperatures remained below freezing throughout the day

January 5-7

- Very cold temperatures (well below normal): Highs 14 - 19°F, lows 4 - 9°F
- Little if any melting of snow occurred during this period.

January 8

- Moderating temperatures during the day, but still at or below freezing (high of 32°F)
- Some minor settling and compacting of snow, but little if any melting occurred. JFK Airport recorded 8” of snow depth on January 8, 2018, indicating no melting occurred
- Two hours of light freezing rain, snow and sleet were observed during the afternoon (trace accumulation). This had no impact on the snow cover or conditions at the property on January 10, 2018

January 9

- Temperatures reached 43° F during the day at the property, under mostly sunny skies. This allowed for some melting of the snow piled up on the sidewalks (from previous shoveling/plowing actions) during the daytime hours
- JFK Airport record 5” of snow depth (a loss of 3”) on January 9, 2018, consistent with the melting of the snow during daylight hours
- Temperatures begin falling under clear skies and light winds after sunset, to 33°F, observed at both at 11:00 pm and midnight EST

January 10

- At the time of the accident, the observed temperature at the property was 32°F.
- Temperatures continued to fall to a low of 22°F during the early morning hours

Table 1 shows the maximum and minimum daily temperatures (Columns 2 and 3) and departure from normal (Column 5) for JFK Airport for January, 2018:

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data, and Information Service
Current Location: Elev: 11 ft. Lat: 40.6386° N Lon: -73.7622° W
Station: **JFK INTERNATIONAL AIRPORT, NY US WBAN: 74486094789 (Unknown)**

Local Climatological Data
Daily Summary
January 2018
Generated on 06/13/2019

National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

Date	Temperature (F)							Degree Days (base 65F)		Sun (LST)		Weather	Precipitation (in)			Pressure (inHg)		Wind	Maximum Wind Speed = MPH / Direction = Degrees			
	Max	Min	Avg	Dep	ARH	ADP	AWB	Heat	Cool	Rise	Set	Weather Type	TLC	Snow Fall	Snow Depth	Avg Stn	Avg SL	Avg Speed	Peak Speed	Peak Dir	Sust. Speed	Sust. Dir
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
01	18	7	13	-20.7	48	-2	10	52	0	0719	1639		0.00	0.0	0	30.34	30.36	17.6	34	310	29	310
02	26	13	20	-13.6	53	5	16	45	0	0719	1639		0.00	0.0	0	30.35	30.38	15.6	29	270	23	260
03	28	12	20	-13.4	49	6	18	45	0	0719	1640		0.00	0.0	0	30.26	30.25	8.2	23	270	20	260
04	29	19	24	-9.3	81	18	22	41	0	0719	1641	SN FZFG BR BLSN FG	0.49	8.0	1	29.49	29.48	28.2	55	330	44	340
05	19	9	14	-19.2	49	-2	10	51	0	0719	1642		0.00	0.0	8	29.75	29.83	25.1	46	290	36	290
06	14	7	11	-22.0	44	-7	7	54	0	0719	1643		0.00	0.0	8	30.19	30.25	22.2	39	270	31	300
07	18	4*	11	-21.9	55	-1	9	54	0	0719	1644		0.00	0.0	8	30.50	30.52	13.8	31	320	24	320
08	32	17	25	-7.8	67	16	22	40	0	0719	1645	FZRA SN PL	0.02	T	8	30.21	30.20	13.3	26	220	23	230
09	43	26	35	2.3	64	24	31	30	0	0719	1646		0.00	0.0	7	30.12	30.19	13.4	30	310	26	310
10	39	21	30	-2.6	75	25	30	35	0	0719	1647		0.00	0.0	5	30.42	30.46	4.9	12	130	9	170
11	48	37	43	10.4	94	41	42	22	0	0718	1648	MIFG BR FG	0.00	0.0	3	30.33	30.34	2.9	16	180	13	190
12	54	42	48	15.5	100	49	49	17	0	0718	1649	RA FG BR	0.45	0.0	1	29.93	29.88	16.1	38	170	29	170
13	53	20	37	4.5	69	25	32	28	0	0718	1650	RA FG BR	0.08	0.0	0	29.76	29.87	20.6	40	180	33	180
14	25	15	20	-12.4	45	1	15	45	0	0717	1651		0.00	0.0	0	30.53	30.59	15.7	27	010	23	330
15	30	17	24	-8.4	69	14	20	41	0	0717	1652		0.00	0.0	0	30.59	30.60	11.8	24	040	20	030
16	39	21	30	-2.3	85	27	30	35	0	0717	1654		0.00	0.0	0	30.45	30.46	6.3	12	090	10	030
17	37	23	30	-2.3	87	29	31	35	0	0716	1655	RA SN BR	0.22	0.2	0	30.21	30.22	11.5	23	320	20	320
18	34	19	27	-5.3	51	11	22	38	0	0716	1656		0.00	0.0	0	30.03	30.04	14.9	27	330	21	330
19	38	22	30	-2.3	58	18	27	35	0	0715	1657		0.00	0.0	0	30.01	30.04	10.3	20	260	16	260
20	54	29	42	9.7	57	26	36	23	0	0715	1658		0.00	0.0	0	29.89	29.93	13.3	31	270	25	270
21	51	30	41	8.7	69	31	37	24	0	0714	1659		0.00	0.0	0	30.11	30.15	6.8	17	330	14	340
22	52	40	46	13.6	88	40	42	19	0	0713	1701	RA BR	T	0.0	0	30.13	30.15	5.3	20	090	16	080
23	54*	40	47	14.6	86	43	45	18	0	0713	1702	RA FG BR TS	0.22	0.0	0	29.73	29.73	14.0	37	210	30	210
24	44	27	36	3.6	55	23	33	29	0	0712	1703		0.00	0.0	0	29.88	29.96	17.3	32	290	25	310
25	35	23	29	-3.5	37	5	22	36	0	0711	1704		0.00	0.0	0	30.31	30.39	15.4	31	310	24	320
26	36	24	30	-2.6	49	13	26	35	0	0710	1705		0.00	0.0	0	30.63	30.67	8.5	19	190	16	200
27	49	31	40	7.4	82	36	38	25	0	0710	1707		0.00	0.0	0	30.43	30.42	11.8	26	190	22	190
28	50	42	46	13.3	90	44	46	19	0	0709	1708	RA BR	0.26	0.0	0	30.22	30.24	5.2	19	190	15	190
29	44	32	38	5.2	67	30	36	27	0	0708	1709	SN	T	0.1	0	30.14	30.15	15.2	28	050	22	040
30	36	24	30	-2.8	75	23	28	35	0	0707	1710	SN BR	0.10	1.4	1	29.98	30.01	15.3	37	330	29	320
31	32	18	25	-7.9	53	11	22	40	0	0706	1712		0.00	0.0	T	30.17	30.20	13.9	29	210	24	210
	37.5	22.9	30.2									Monthly Averages | Totals	1.84	9.7		30.16	30.19	13.4				
	-1.6	-3.4	-2.5									Departure from Normal (1981-2010)	-1.32									

Table 1. *JFK Airport Daily Summary of Observations for January, 2018*

IV. Sidewalk Surface Temperature Discussion

The temperatures noted in the preceding section are valid for the standard observing height of approximately 1.5 – 2 m (5 – 6.5 feet). However, under certain nocturnal atmospheric conditions, to include high pressure, clear skies, and light winds, the actual air temperature immediately above the surface of ground after sunset can be as much as 2-7°F colder than the temperature at the standard observing sensor height. During the evening of January 9-10, 2018, the property was under high pressure conditions, with clear skies and light winds (See Figure 2).

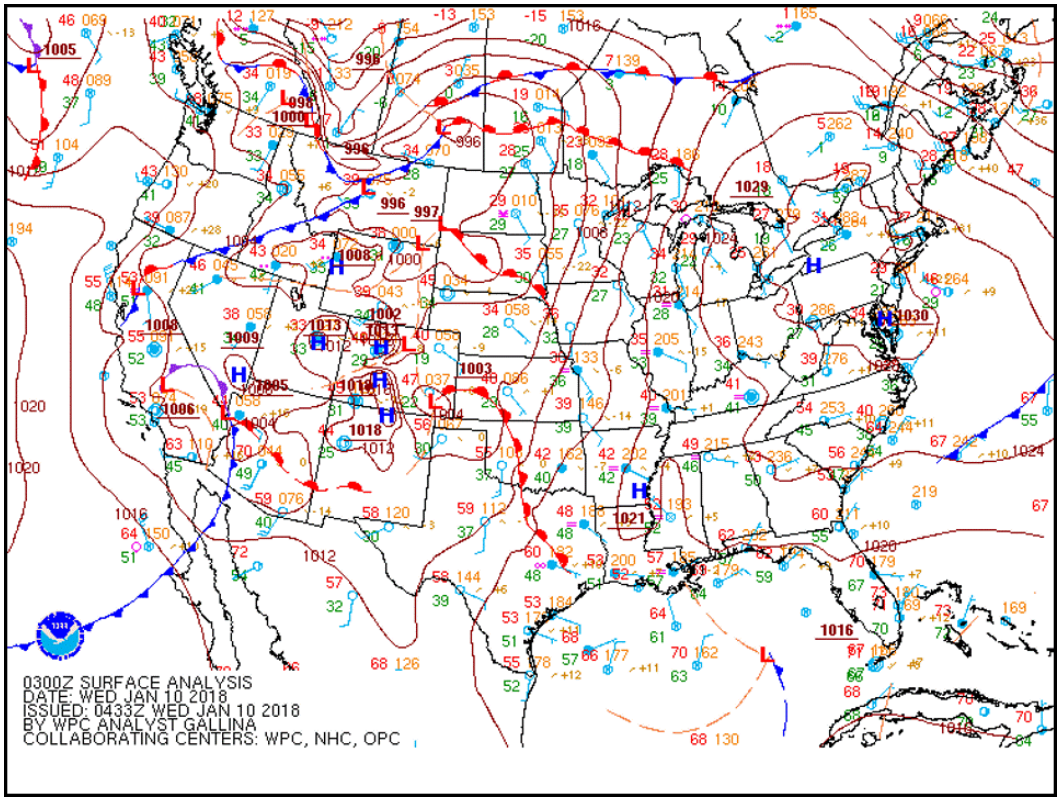

Fig. 2: *NWS Surface analysis for 10:00pm EST January 9, 2018. Analysis shows high pressure controlling weather over the northeastern US, including the property.*

Given these conditions, it can be conservatively estimated that the air temperature immediately above the surface of the sidewalk at the property was 2°F colder than the observed temperature of 33°F at 11:00 pm and midnight on January 9, 2018. Therefore, the air temperature just above the sidewalk surface was below freezing for at least an hour and half prior to the accident, and possibly for as much as three and half hours (given observed temperature of 35°F at 9:00 pm and 10:00 pm). This would have been more than sufficient time to allow the water on the sidewalk (from melting snow piles during the day) to freeze into a thin, dark sheet of ice on the sidewalk prior to the time of the accident.

Table 2 shows the hourly temperatures (Column 7, “Dry Bulb Temp”) before and after the accident, for JFK Airport (January 9-10, 2018):

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data, and Information Service
Current Location: Elev: 11 ft. Lat: 40.6386° N Lon: -73.7622° W
Station: **JFK INTERNATIONAL AIRPORT, NY US WBAN: 74486094789 (Unknown)**

Local Climatological Data
Hourly Observations
January 2018
Generated on 06/13/2019

National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

Date	Time (LST)	Station Type	Sky Conditions	Visibility	Weather Type (see documentation)	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Hum %	Wind Speed (MPH)	Wind Dir (Deg)	Wind Gusts (MPH)	Station Press (inHg)	Press. Tend	Net 3-Hr Change (inHg)	Sea Level Press. (inHg)	Report Type	Precip Total (in)	Altimeter Setting (inHg)
					AU | AW | MW	(F)	(C)	(F)	(C)	(F)	(C)											
09	2051	7	FEW:02 250	10.00		35	1.7	30	-1.1	21	-6.1	57	14	330		30.32			30.35	FM-15	0.00	30.35
09	2151	7	FEW:02 250	10.00		35	1.7	30	-1.1	21	-6.1	57	7	350		30.34	1	-0.07	30.36	FM-15	0.00	30.36
09	2200	4		9.94		35	1.7	30	-1.1	21	-6.1	57	7	350		30.33	1	-0.07	30.36	FM-12		
09	2251	7	FEW:02 250	10.00		33	0.6	29	-1.7	21	-6.1	61	6	340		30.37			30.38	FM-15	0.00	30.39
09	2351	7	CLR:00	10.00		33	0.6	29	-1.7	20	-6.7	58	7	320		30.37			30.40	FM-15	0.00	30.40
10	0051	7	FEW:02 250	10.00		29	-1.7	26	-3.3	19	-7.2	66	5	350		30.37	1	-0.04	30.40	FM-15	0.00	30.40
10	0100	4		9.94		29	-1.7	26	-3.3	19	-7.2	66	5	350		30.37	1	-0.04	30.40	FM-12		
10	0151	7	FEW:02 250	10.00		29	-1.7	26	-3.3	19	-7.2	66	6	320		30.40			30.42	FM-15	0.00	30.43
10	0251	7	FEW:02 250	10.00		26	-3.3	24	-4.4	19	-7.2	75	3	360		30.42			30.44	FM-15	0.00	30.44
10	0351	7	FEW:02 250	10.00		24	-4.4	22	-5.6	19	-7.2	81	0	000		30.43	1	-0.06	30.46	FM-15	0.00	30.46

For the Hours 2051 (8:51pm EST) Jan 9, 2018 through 0351 (3:51 am EST) Jan 10, 2018

Table 2. *JFK Airport Hourly Observations; January 9-10, 2018 (8:51 pm EST to 3:51 am EST)*

The air temperature just above the surface of the sidewalk at the property was colder than the observed temperature of 33 - 35°F noted in Table 2. By 1:00 am EST January 10, 2018, the temperature at the property was well below freezing at both the standard observing height and just above the surface of the sidewalk.

IV. Findings and Opinions

- At the time of the accident, there was approximately 3-5” of snow on untreated/unplowed surfaces at the property. There were also piles of snow on/near the sidewalks at the property, from previous plowing and shoveling actions. This snow was left over from 8” of snow that fell on January 4, 2018.

- From January 4, 2018 to January 8, 2018, the temperatures at the property were well below normal, and did not rise above freezing during this time. As a result, little if any of the snow that fell on January 4, 2018, melted during this period.

- A trace of snow, sleet and freezing rain fell for two hours on the afternoon of January 8, 2018. Other than this, no precipitation was observed at the property between January 4, 2018 and the time of the accident on January 10, 2018.

- The temperatures at the property were above freezing for approximately 12 hours during the day prior to the accident. This led to melting of the snow cover, to include melting from the piles of snow on/near the sidewalk.

- The ground temperature at the property was below freezing for 1.5 - 3.5 hours prior to the time of the accident. This resulted in the freezing of water on the sidewalk from the snow piles that melted during the day, and the formation of a thin, dark sheet of ice on the sidewalk prior to the time of the accident.

VI. References

National Weather Service (NWS) Weather Prediction Center (WPC) Surface Analysis Archive: Surface analysis for the United States for January 4-10, 2018. Available online at https://www.wpc.ncep.noaa.gov/archives/web_pages/sfc/sfc_archive.php

NOAA/National Center for Environmental Information, NCEI: Local Climatological Data including monthly summary, hourly observations, and hourly precipitation for January, 2018 for John F. Kennedy International Airport, NY. Available online at: https://www.ncdc.noaa.gov/cdo-web/datatools/lcd

Roadway Icing and Weather: A Tutorial (Surface Temperature and Air Temperature Observations: How Are They Related?). Available from the University of Washington Department of Atmospheric Sciences online at: https://www.atmos.washington.edu/~cliff/Roadway2.htm