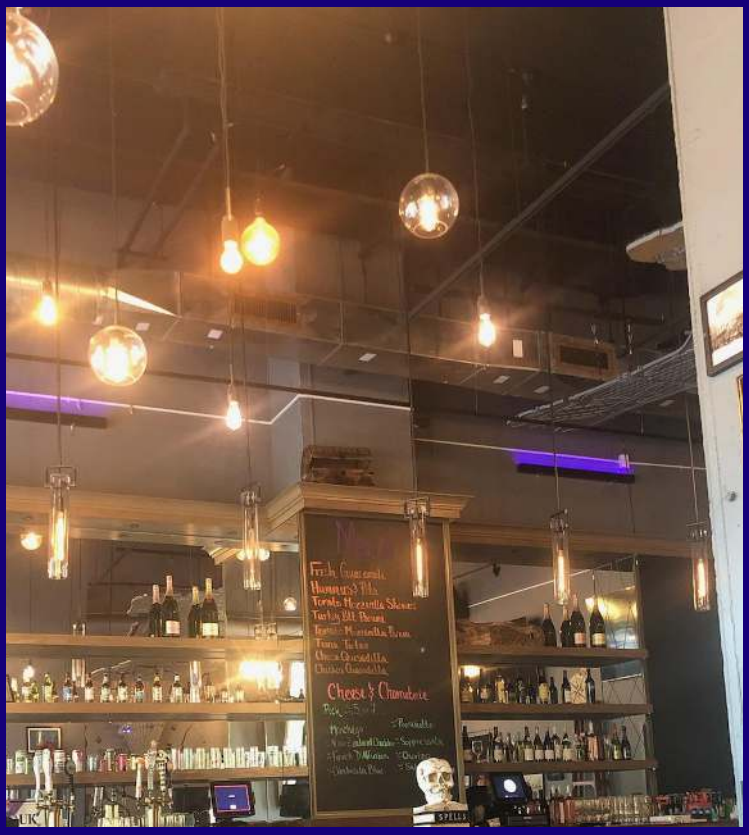

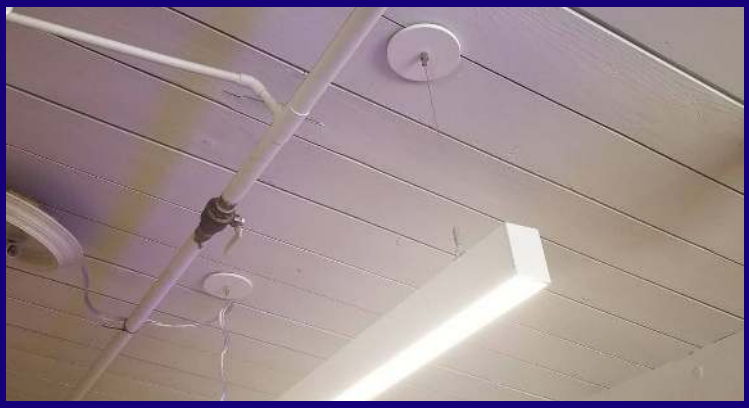

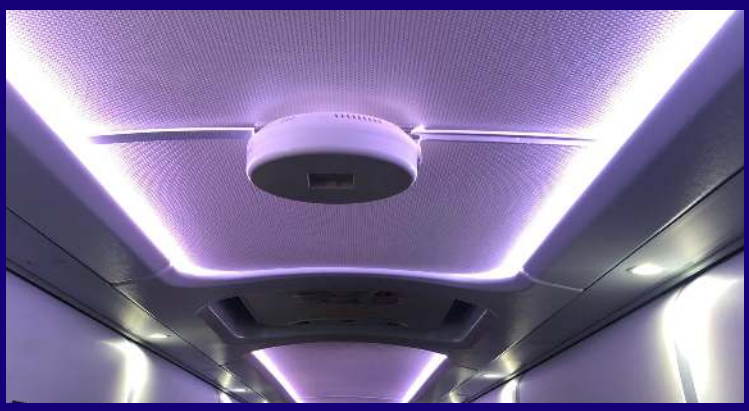

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November 23, 2020 R(5)

Mr. Murray Sarway
President
Integrated Luminosity LLC
254 36th Street
Brooklyn, NY 11232

E Mail:murray@solarelectricway.com

Subject: **Culturable *Bacteria, Legionella & COVID-19 (SARS-CoV-2) Sampling***
Morton Williams Markets, Inc.
Lounge Area - Ground Level
15 West End Avenue
New York, NY, 10023

Dear Mr. Sarway,

At the request of **I-Luminosity, LLC, AET Group Global,** (Client), ATC Group Services LLC (ATC) conducted Culturable Bacteria, Legionella and COVID-19 (SARS-CoV-2) sampling of the Lounge and Rest rooms area - Ground Level of the Morton Williams Market located at the above referenced location. It is our understanding that ultraviolet (UVC-280n) I-Luminosity Light–Emitting Diode (LED) light germicidal irradiation systems are installed in the lounge and public restrooms areas, of the above referenced building. The Client authorized ATC to perform an indoor air quality (IAQ) survey before and after the UVC-280n **I-Luminosity LED** constant indirect, and direct systems were commissioned.

The IAQ survey activities were performed to evaluate the effect on microbiological flora as well as SARS-CoV-2 virus in the air and on surfaces of the lounge area and public rest rooms. This evaluation included surface swab and air samples for culturable bacteria, and SARS-CoV-2 viruses and preparation of bacterial impaction plates to determine the levels of microbiological flora and SARS-CoV-2 virus in the Morton Williams Market before and after the UVC-280n I-Luminosity LED system activation. The evaluation was conducted over two-(2) sampling events, on October 15, 2020 and October 21, 2020, and considered the difference in IAQ data before and after the **UVC-280n I-Luminosity LED** system activation. It was reported that the UVC-280n I-Luminosity LED systems had been activated on October 15, 2020 after initial sampling and had been running continuously until the final sampling on October 21, 2020.

ATC observed that one of the UVC-280n LED direct devices above the restaurant bar sink drain board was non-operational at the time of the assessment on October 21, 2020. It was not known or reported when the UVC-280n LED device under counter over bar sink / drain board area had failed since the systems were commissioned on October 15, 2020.

SCOPE OF WORK

ATC Industrial Hygienist, Ms. Nancy Guevara working under the supervision of a **Certified Industrial Hygienist (CIH)**, performed the pre-installation sampling on October 15, 2020 and the post-installation sampling on October 21, 2020. The scope of services for the sampling efforts included the following:

- Individual air and swab surface samples were collected for culturable bacteria, Legionella, and COVID-19 (SARS-CoV-2). Sampling was accomplished before the **UVC-280n I-Luminosity systems** were set up and after they are installed and operating.
- Ten (10) swabs, eleven-(11) air samples, for culturable bacteria, Legionella and SARS-CoV-2 RNA, and one (1) potable water sample for Legionella were collected during the pre-installing activities of the UV systems. In addition, quality control blanks were submitted with each set of samples. Ambient air samples were submitted with the air samples for culturable bacteria and Legionella. In all, an estimated twenty-two (22) samples, including blanks, were collected, and analyzed.
- Ten (10) swabs, nine-(9) air samples, for culturable bacteria, Legionella and SARS-CoV-2 RNA, were collected for post-installing activities of the UV systems. In addition, quality control blanks were submitted with each set of samples. At the request of the Client, potable water samples and ambient air samples were not collected during post-installation sampling activities. In all, nineteen-(19) samples, including blanks, were collected, and analyzed.
- All samples were sent to an accredited third-party laboratory for analysis. Culturable bacteria and SARS-CoV-2 RNA samples were analyzed with a one-week turnaround time, from receipt at the laboratory. Samples for air and swab for COVID-19 (SARS-CoV-2) were analyzed via Polymerase Chain Reaction/Ribonucleic Acid (PCR/RNA). Legionella samples were analyzed with a required 14-day minimum turnaround time, from receipt at the laboratory.
- Culturable bioaerosol samples for cultural bacteria and Legionella were collected using an Andersen cascade impactor. Collection time and volume of the samples was confirmed with the laboratory for the samples. Bacteria swab samples were supplied by the laboratory were employed to sample surface areas.
- Potable water samples were collected, one-(1) first draw and one-(1) flush sample from one (1) location for culturable Legionella. The samples were submitted to a New York State certified independent third-party laboratory for culturable Legionella analysis via ISO 11731 method, with a standard 10-14-day analysis turnaround time from receipt at the laboratory.

BACKGROUND

All the mitigating containment factors must be taken into consideration. The test area was approximately 800 sq. ft. represents a relatively small area, of the approximately 20,000 sq. ft. specialty supermarket. In an occupied high rise, with a large common area in the building. High people foot traffic with pets. A constant common ventilation HVAC system, services the entire lease space area and operates during the stores business hours. Additionally, at that time, the outside sliding glass doors are to be left open during the evening hours, to serve patrons, seated outside on the sidewalk.

At the request of the Client, ATC conducted Culturable Bacteria, Legionella and COVID-19 (SARS-CoV-2) sampling of the lounge areas at the ground level of the Morton Williams Market located at 15 West End Avenue New York, NY, 10023. A total of ten (10) ultraviolet (UVC-280n) indirect I-Luminosity LED light fixture devices were installed in the lounge area, two-(2) direct 24” under counter LED strip channels above the stainless sink, in service bar, two (2) I-Luminosity 48” indirect devices (1)-one in each of the bathrooms, and one (1) 48” indirect device in kitchen of the above referenced building. The Client requested that swab and air sampling be performed before and after the **UVC-280n I-Luminosity LED systems** are installed. It was reported that the UVC-280n LED systems had been activated on October 15, 2020 after initial sampling and had been running continuously until final sampling on October 21, 2020.

UVC radiation is generally known to be a good disinfectant for air, water, and nonporous surfaces. UVC radiation has effectively been used for decades to reduce the spread of bacteria, such as tuberculosis. For this reason, UVC technology operating in the 100~400n range are often called or referred to as "germicidal". This particular testing results refer to **I-Luminosity 280n LED.**

The methods, results, and interpretations are discussed below. The laboratory reports are provided in Attachment 1 and 2. Site photographs are provided in Attachment 3, and additional CDC and FDA reference documentation and methodologies are included in Attachment 4.

SAMPLING METHODS

BACTERIAL PLATE COUNTS

ATC utilized an SAS 180 Microbial Impaction Sampler to collect airborne bacteria samples on trypticase soy agar (TSA). TSA is a general-purpose nutrient medium for a large variety of typical indoor bacteria. The SAS Sampler was designed to collect air and deposit entrained bacteria onto the surface of the agar. A total of four (4) indoor samples were collected in the center of the lounge and near the restroom area during the sampling events. Ambient control samples were also collected near the entrance to the lounge during the first sampling event. Control blanks were also submitted with the batch of samples during each sampling events. The samples were 84.9 liters each to provide consistent volume basis for comparison of results. The plates were cultured/incubated at room temperature for 1 week and analyzed to identify and enumerate the bacteria species. The survey looked for overall reduction over the duration of the multiday survey. The results of the Culturable Bacteria by Air Samples are shown in Table 1. **There are no published standards for the bacterial counts. These will be discussed below.**

Table 1: Culturable Bacteria by Air Sample Results for I-Luminosity Units

Sample location	Sample No.	Sample type	Volume (L)	Results	Conc. (CFU/ml)
Lounge – Restroom Area	S1	Pre-Installation	84.9	*Dermacoccus nishinomiyaensis* *Gram negative rod* *Microbacterium sp* *Micrococcus luteus* *Micrococcus lylae*	72 12 24 12 36
	S1	Post-Installation	84.9	*None Detected*	**ND**
Lounge – Bar/Restaurant Area	S2	Pre-Installation	84.9	*Dermacoccus nishinomiyaensis* *Staphylococcus capitis*	12 12
	S2	Post-Installation	84.9	*None Detected*	**ND**
Background Ambient	S3	Pre-Installation	84.9	*Bacillus megaterium* *Bacillus sp.* *Chryseobacterium indologenes* *Moraxella catarrhalis* *Sphinogopyxis macrogoltabida*	12 36 48 60 96
Control Blank	S4	Pre-Installation	84.9	*None Detected*	**ND**
	S3	Post-Installation	84.9	*None Detected*	**ND**

Notes:
** The detection limit is equal to 1 colony forming unit (CFU) per agar plate*
L –liter
CFU/in² – colony forming units per square inch
ND – not detected

Table 1 shows the data for Culturable Bacteria by Air Sample results before and after the UVC-**280n LED I-Luminosity systems** were installed in the Morton Williams Market Lounge Areas. ***When comparing the post-installation results to the baseline results, the airborne bacterial counts in the Morton Williams Market Lounge Areas generally decreased to undetectable levels when the UVC-280n LED I-Luminosity system was activated***.

Bacterial aerosols are dispersed into the air from various sources, such as soil, plants, and water, as well as through the activities of animals, humans, and industrial operations, all of which can occur in an urban environment. Generally ambient air, bacterial aerosols are often less abundant than fungal spores or pollen grains. Seasonal variations in and dispersion of bacterial communities have also been observed between geographical locations as has their correlation with specific atmospheric factors. Statistically, the most important meteorological factors in the viability of airborne bacteria were identified to be temperature and UV radiation (Ruiz-Gil et al., 2020). The results of the background ambient air samples conducted during the first sampling event indicate some of the most abundant phylums in the air are found in urban environments, including Protobacteria, Firmicutes and Bacteroidetes phylums (Sphingomonadales and Bacillales).

CULTURABLE BACTERIA SURFACE SAMPLES

ATC collected surface swab samples for Culturable Bacteria before and after the installation of the **I-Luminosity UVC-280n system**. These samples were analyzed for Identification and Enumeration of Culturable Bacteria. ATC identified high-touch surfaces that were in the lounge area. Five (5) surface swab samples were collected during each sampling event using sterile swabs supplied by the analytical laboratory. A blank sample, sterile swab, was included for laboratory quality assurance purposes. The samples were shipped overnight and submitted under **chain-of-custody (COC) to EMSL Analytical, Inc. (EMSL) in Cinnaminson, New Jersey**. Table 2 below shows the results for the Culturable Bacteria by Swab Sampling event.

Table 2: Culturable Bacteria by Swab Sample Results Direct Systems

Sample location	Sample No.	Sample type	Sample Measure (in²)	Results	Conc. (CFU/in²)
Bar Sink - Left Side Flat Surface Center	S1	Pre-Installation	1	*Corynebacterium tuberculostearicum* *Pseudomonas putida* *Staphylococcus epidermidis*	2,200 100 4,200
	S1	Post-Installation	1	*Microbacterium sp.* *Staphylococcus capitis*	27,000 3,000
Bathroom Door - Right Bathroom Door Handle	S2	Pre-Installation	1	*Brevibacillus sp.* *Micrococcus luteus*	100 200
	S2	Post-Installation	1	*Staphylococcus pasteuri*	300
Beer Tap - Brooklyn Lager Handle	S3	Pre-Installation	1	*None Detected*	ND
	S3	Post-Installation	1	*Microbacterium sp*	700
Blank	S4	Pre-Installation	1	*None Detected*	ND
	S4	Post-Installation	1	*None Detected*	ND
HVAC Return Vent	S5	Pre-Installation	1	*Bacillus cereus* *Gram positive rod* *Microbacterium arborescens*	100 100 100
	S5	Post-Installation	1	*Kocuria rhizophila* *Microbacterium sp.*	100 1,100

Notes:

** The detection limit is equal to 1 colony forming unit (CFU) per agar plate*

L –liter
CFU/in² – colony forming units per square inch
ND – not detected

Table 2 shows the data for Culturable Bacteria by Swab Sample results before and after the UVC-280n systems were installed in the Morton Williams Market Lounge Areas. When comparing the post-installation results to the baseline results, the surface bacterial counts in the Morton Williams Market Lounge Areas generally show no direct correlation with regards to the effectiveness of the installation of the UVC-280n systems. ATC observed that the UVC-280n lamp above the restaurant bar sink was non-operational at the time of the assessment. The bar area appeared untidy with multiple steel bins placed on the sink surface, appearing to have been in use during the evaluation period. It was not known or reported when the UVC lamp under the bar sink had been turned off since the systems were commissioned on October 15, 2020.

It should be noted that in-situ trials suffer from many uncontrolled variables, such as unexpected customer and staff traffic, unexpected bacterial sources (sneezes/coughs), or external contributions. These confounding variables will continue to affect any in-situ evaluation. One such variable is occupant loading. The more people that pass through the area in any given period of time will contribute bacteria to the general areas. Persons with allergies or mild colds can skew the results. It should be also be noted that ATC observed general customer and staff traffic into the restroom areas and behind the bar sink areas during the sampling periods.

LEGIONELLOSIS AND *LEGIONELLA* BACTERIA

Legionellosis is an infection in humans caused by inhalation of *Legionella* bacteria. *Legionella* bacteria cause two distinct types of disease: Legionnaires' disease and Pontiac fever. Legionnaires' disease is the more serious disease that causes lung infections and pneumonia, while Pontiac fever is thought to be an immune response from exposure to the bacteria (not an infection) which results in self-limiting flu-like symptoms.

By far, most Legionnaires' disease outbreaks in the U.S. are caused by *Legionella pneumophila* serogroup 1. Legionnaires' disease is characterized by fever, myalgia, cough, and pneumonia. Legionnaires' disease occurs more frequently in older individuals (those over 50 years old), in individuals with pre-existing lung disease or poor health status, in cigarette smokers (both current and former), and in individuals with weakened immune systems due to chemotherapy or serious infections. However, anybody is at risk if exposed to a high enough dose.

The infection usually begins two to ten days after exposure to the bacteria. Patient symptoms can include fever, non-productive cough, malaise, muscle aches, headaches, and chest pain; symptoms are generally quite severe. Unfortunately, once infected, an individual's probability of subsequently dying from Legionnaires' disease ranges from 5% to 30%. Those who do recover from Legionnaires' disease often require a long period of convalescence.

In contrast, Pontiac fever usually affects young to middle-aged adults and may occur in more than 90% of exposed individuals. Usually within one to two days after an exposure, infected individuals can begin to experience fever, cough, muscle aches, headaches, and chest pain, but no sputum production. These individuals usually recover fully from their infection within three to five days without medical complications or treatment.

Legionella bacteria are not rare or unusual organisms and are commonly found in low levels in lakes, streams, and wet soils throughout the world. Optimal growth occurs between 80- and 120-degrees Fahrenheit (°F). If both proper temperature and nutrient conditions are present in an environment, such as in a cooling tower, the bacteria can grow and amplify. Other sources for amplification of *Legionella* bacteria include potable water systems, particularly hot water heaters, showerheads, and faucets; and many other types of water systems such as hot tubs, spas, humidifiers, and decorative fountains.

COLD WATER SUPPLY

Domestic cold water is provided at a single-entry point in the ground floor lounge by the City of New York.

ASTM International makes no recommendation on cold-water delivery temperature. The World Health Organization (WHO) document, *Legionella and the Control of Legionellosis* (2007), states that cold water at the tap should not exceed 77ºF (25ºC) and where possible, the temperature should be less than 68ºF (20ºC). Cold-water delivery temperature was measured using a waterproof digital thermometer (Model 9842, Taylor Instruments, +/- 1ºF).

RESIDUAL CHLORINE

The presence of free residual chlorine in drinking water is correlated with the absence of disease-causing organisms, and thus is a measure of the potability of water. When chlorine is added to water, some of the chlorine reacts with organic materials and metals in the water and is not available for disinfection. This is typically referred to as the “chlorine demand”. The remaining chlorine concentration after the chlorine demand is accounted for is called total chlorine. Total chlorine is further divided into the amount of chlorine that has reacted with nitrates and is unavailable for disinfection, which is called combined chlorine, and the free residual chlorine, which is the chlorine available to inactivate disease-causing organisms, such as *Legionella*. While public water systems in the U.S. are chlorinated to reach a drinkable concentration of one to two milligrams per liter (mg/L) free chlorine, the Safe Drinking Water Act (SWDA) only requires that a detectable residual chlorine, or about 0.2 mg/L, be present at the customers’ connection.

Free residual chlorine testing was performed using a digital Hach Pocket Colorimeter II photometer. Powdered DPD (N,N diethyl-p-phenylene diamine) is added to a premeasured amount of water, which causes a color change to pink in the presence of chlorine. The meter can measure free residual chlorine concentrations between 0.01 and 2.00 mg/L. Measured residual free chlorine levels ranged from <0.01 to 0.10 mg/L in the outlets tested.

LEGIONELLA POTABLE WATER SAMPLING

Potable water samples were collected from the lounge bar sink. The samples were collected in sterile, 250-milliliter (mL) plastic containers, with sodium thiosulfate added in order to neutralize any residual chlorine. A total of two (2) water samples were collected from one location in the lounge bar sink.

At the faucet location, a 'pre-flush' and 'post-flush' sample was collected. The pre-flush sample consisted of the first water drawn from the outlet. The water was then allowed to continue to flow while the temperature was monitored. Once the temperature of the water stream stabilized, a second, 'post-flush' sample was then collected. In addition, water temperature and free residual chlorine levels were measured at each outlet.

Following collection, the samples were placed in a cooler and packaged so that the sample containers could not move around. The samples were shipped via overnight courier, **following appropriate chain-of-custody procedures, to EMSL Laboratories (EMSL) located in New York, NY. EMSL is an environmental microbiology laboratory that is certified under the Centers for Disease Control and Prevention's (CDC)** Environmental *Legionella* Isolation Techniques Evaluation (ELITE) Program for Legionella analysis. In addition, they are an **AIHA accredited Environmental Microbiology laboratory** and are approved by the New York State Department of Health for Legionella analysis of potable water samples. The samples were analyzed via viable culture method (ISO 11731:2017)) with identification and enumeration of *L. pneumophila* plus individual serotyping for serotypes 1 through 14.

The reported detection limit for the analysis is approximately 0.2 colony forming unit per milliliter of water (CFU/ml). The results of the sampling indicated no detectable levels of *Legionella* were present in the location sampled. The results are presented in Table 3.

Table 3: *Legionella* Potable Water Sample Results

Sample location	Sample type	Water temp (°F)	Free chlorine (mg/L)	Results	Conc. (CFU/ml)
Lounge – Bar	First draw	66.2	0.01	*L. pneumophila* SG-6	0.15
	Post-flush	65.7	0.01	*L. pneumophila* SG-6	0.05

Notes:
mg/L – milligrams per liter
CFU/ml – colony forming units per milliliter

Data interpretation guidelines from the AIHA indicate that, for potable water systems, *Legionella* concentrations less than ten (10) CFU/ml are considered to be low, concentrations between 10 and 100 CFU/ml indicate possible amplification within the system, and concentrations greater than 100 CFU/ml indicates that amplification is occurring. Please note that these values are not based upon a quantitative risk assessment, but rather are recommendations for interpreting sample results based upon currently available guidance and knowledge. In addition, these levels may not be protective for elderly persons and immunocompromised individuals.

The findings show that conditions within the piping system and/or plumbing fixtures are not favorable to the growth of *Legionella* bacteria. In the location sampled for this survey, *Legionella* concentrations were found to be low from an amplification standpoint.

LEGIONELLA AIR SAMPLING

ATC utilized an SAS 180 Microbial Impaction Sampler to collect airborne Legionella samples on trypticase soy agar (TSA). TSA is a general-purpose nutrient medium for a large variety of typical indoor bacteria. The SAS Sampler was designed to collect air and deposit entrained bacteria onto the surface of the agar. A total of four (4) indoor samples were collected in the center of the lounge and near the restroom area during the sampling events. Ambient control samples were also collected near the entrance to the lounge during the first sampling event. Control blanks were also submitted with the batch of samples during each sampling events. The samples were 84.9 liters each to provide consistent volume basis for comparison of results. The plates were cultured/incubated at room temperature for a minimum required 14 days and analyzed for Identification, Enumeration & Serotyping of L. pneumophila (1-14) & 10 other individual Legionella species. The survey looked for overall reduction over the duration of the multiday survey. Table 4 shows the results for Legionella Detection by Air Sampling.

Table 4: Legionella Air Sample Results

Sample location	Sample No.	Sample type	Volume (L)	Results	Conc. (CFU/ml)
Lounge – Bar/Restaurant Area	S1	Pre-Installation	84.9	-	***OVERGROWN****
	S1	Post-Installation	84.9	*None Detected*	ND
Lounge – Restroom Area	S2	Pre-Installation	84.9	*None Detected*	ND
	S2	Post-Installation	84.9	*None Detected*	ND
Control Blank	S3	Pre-Installation	84.9	*None Detected*	ND
	S3*	Post-Installation	84.9	*None Detected*	ND
Background Ambient	S4	Pre-Installation	84.9	*None Detected*	ND

Notes:
***Report Comment: Sample 1 was **overgrown with non- Legionella bacteria**. This inhibits the labs ability to report Non-Detect for this sample.*

L –liter
CFU/ml – colony forming units per milliliter
ND – not detected

The table above shows the data for Legionella Detection by Air Sample results before and after the UVC systems were installed in the Morton Williams Market Lounge Areas. When comparing the post-installation results to the baseline results, the airborne Legionella counts in the Morton Williams Market Lounge Areas generally **decreased to undetectable levels when the UVC-280n LED I-Luminosity system was activated** for the samples in the Bar/Restaurant area. For the other samples in the restroom area and background ambient, Legionella was found to be None-Detected for both pre-installation and post-installation of UVC-280n LED systems in both sampling events.

SARS-CoV-2 (COVID-19) SURFACE SAMPLING

ATC collected surface swab samples for the SARS-CoV-2 virus before and after the UVC-280n systems were installed. These samples were analyzed using RT RealTime polymerase chain reaction (PCR). This test is designed to specifically detect the RNA-dependent RNA polymerase of the SARS-CoV-2 virus. ATC identified high-touch surfaces that were in the lounge area. Five (5) surface samples were collected using sterile swabs supplied by the analytical laboratory. A blank sample, sterile swab, was included for laboratory quality assurance purposes. The samples were shipped overnight and submitted under chain-of-custody (COC) to EMSL Analytical, Inc. (EMSL) in Cinnaminson, New Jersey.

The EMSL SARS-CoV-2 testing method is based on the CDC 2019-Novel Coronavirus (2019-nCoV) Real-Time RT-PCR Diagnostic Panel document dated March 30, 2020, and authorized for (vitro diagnostic test) IVD emergency use by the United States Food and Drug Administration (FDA). The CDC 2019-nCoV Real-Time RT-PCR Diagnostic Panel is a molecular in vitro diagnostic test that aids in the detection and diagnosis 2019-nCoV and is based on widely used nucleic acid amplification technology. The product contains oligonucleotide primers and dual-labeled hydrolysis probes (TaqMan®) and control material used in rRT-PCR for the in vitro qualitative detection of 2019-nCoV RNA in specimens. This method is widely used in hospitals and clinical diagnostic labs throughout the country. The CDC Validation Report is included in the Attachment C.

Table 5: Rapid Detection of Surface SARS-CoV-2 Virus (COVID-19) Swab Sample Results

Sample location	Sample No.	Sample type	Sample Measure (in²)	2019-nCoV_N1 RNA Target	2019-nCoV_N2 RNA Target
Bar Sink - Left Side Flat Surface Center	S1	Pre-Installation	1	Not Detected	Not Detected
	S1	Post-Installation	1	Not Detected	Not Detected
Bathroom Door - Right Bathroom Door Handle	S2	Pre-Installation	1	Not Detected	Not Detected
	S2	Post-Installation	1	Not Detected	Not Detected
Beer Tap - Brooklyn Lager Handle	S3	Pre-Installation	1	Not Detected	Not Detected
	S3	Post-Installation	1	Not Detected	Not Detected
Blank	S4	Pre-Installation	1	Not Detected	Not Detected
	S4	Post-Installation	1	Not Detected	Not Detected
Bar HVAC Return Vent	S5	Pre-Installation	1	Not Detected	Not Detected
	S5	Post-Installation	1	Not Detected	Not Detected

Notes:

** The detection limit is equal to 1 colony forming unit (CFU) per agar plate*

L –liter
CFU/in² – colony forming units per square inch
ND – not detected

Based on the laboratory results, SARS-CoV-2 Virus (COVID-19) was not detected in either of the swab surface sampling events collected at the Site.

SARS-CoV-2 (COVID-19) Air SAMPLING

ATC collected air samples for the SARS-CoV-2 virus before and after the UVC-280n systems were installed. These samples were analyzed using RT RealTime polymerase chain reaction (PCR). This test is designed to specifically detect the RNA-dependent RNA polymerase of the SARS-CoV-2 virus. Two general indoor areas were tested during the sampling events. A total of four (4) indoor air samples were collected. Ambient control samples were also collected near the entrance to the lounge during the first sampling event. Control blanks were also submitted with the batch of samples during each sampling event. The samples were 1500 liters each to provide consistent volume basis for comparison of results. The survey looked for overall reduction over the duration of the multiday survey.

The samples were shipped overnight and submitted under chain-of-custody (COC) to EMSL Analytical, Inc. (EMSL) in Cinnaminson, New Jersey. Table 6 below shows the results from the SARS-CoV-2 Virus (COVID-19) Air Sampling.

Table 6: Rapid Detection of Airborne SARS-CoV-2 (COVID-19) Air Sample Results

Sample location	Sample No.	Sample type	Sample Volume (L)	2019-nCoV_N1 RNA Target	2019-nCoV_N2 RNA Target
Lounge – Bar/Restaurant Area	S1	Pre-Installation	1500	Not Detected	Not Detected
	S1	Post-Installation	1500	Not Detected	Not Detected
Lounge – Restroom Area	S2	Pre-Installation	1500	Not Detected	Not Detected
	S2	Post-Installation	1500	Not Detected	Not Detected
Blank	S3	Pre-Installation	-	Not Detected	Not Detected
	S3	Post-Installation	-	Not Detected	Not Detected

Based on the laboratory results, SARS-CoV-2 Virus (COVID-19) was not detected in either of the swab surface sampling events collected at the Site.

CONCLUSIONS

This report has been prepared to assist I-Luminosity, LLC, AET Group Global in evaluating the efficiency of the UVC-280n LED constant indirect and direct I-Luminosity system based on analytical results from Culturable Bacteria, Legionella and COVID-19 (SARS-CoV-2). Samples collected from the Morton Williams Market Lounge Area located at 15 West End Avenue New York, NY, 10023. Based on the results data for the Culturable Bacteria, Legionella and COVID-19 (SARS-CoV-2) sampling events, ATC concludes the following:

- **The airborne bacteria count for the post-installation sampling event generally decreased to undetectable levels when comparing it the baseline background levels after the UVC-280n systems were turned on.**

- The surface bacteria count for the post-installation sampling event generally shows no direct correlation with regards to the effectiveness of the installation of the **UVC-280n I-Luminosity systems.** This improvement may be better than shown because it may be masked by the variables and range of values between the sampling events. In addition, the UVC-280n LED devices above the restaurant bar sink was non-operational at the time of the assessment on October 21, 2020. It was not known or reported when the UVC-280n LED direct under counter above bar sink area had inadvertently failed, since systems were commissioned on October 15, 2020.

- **The airborne Legionella count for the post-installation sampling event generally decreased to undetectable levels when comparing it to the baseline background levels after the UVC-280n I-Luminosity systems were turned on.**

- SARS-CoV-2 Virus (COVID-19) was not detected in either of the swab surface or air sampling events collected at the Site. Per the FDA, UVC 280n LED radiation has been shown to destroy the outer protein coating of the SARS-Coronavirus, which is a different virus from the current SARS-CoV-2 virus. The destruction ultimately leads to inactivation of the virus. UVC radiation may also be effective in inactivating the SARS-CoV-2 virus, which is the virus that causes the Coronavirus Disease 2019 (COVID-19)

- It should be noted that in-situ trials suffer from many uncontrolled variables, such as unexpected customer and staff traffic, unexpected bacterial sources (sneezes/coughs), or external contributions. These confounding variables will continue to affect any in-situ evaluation. One such is significant variable mixed pets and human occupants and foods / product loading. The more people that pass through the area in any given period of time will contribute bacteria to the general areas. Persons with allergies or mild colds can skew the results. ATC also observed general customer and staff traffic into the restroom areas and behind the bar sink areas during the sampling periods.

- The systems set up in the area are shielded for the protection of the products, occupants, pets and workers health and safety. There are differing fields of propagation power levels to deliver intensity based on the number of **UVC-280n 48" twin LED array I-Luminosity** device / fixtures at approximately fifteen-(15) feet (more devices / fixtures strategically placed, more efficacy = dosing intensity), versus the kitchen at nine and one half (9.5) feet. The public rest rooms one (1) each at (8.5) feet AFF.

- The **UVC-280nm LED I-Luminosity fixtures / devices** application provides a level of definitive effective performance in reducing the spread of SARS-CoV-2, other bacteria, and virus aerosol transmissions with indirect overhead fixtures. Similar as well for direct surface application fixtures. When operated 24-hours per day 7-days a week, properly maintained, correctly designed, installed, and validated.

- UVC technology, in general, is an established method and proven effective sanitizing method. Although there is ***absolutely no, substitute*** for established FDA, EPA, OSHA, and public health department sanitary practices and good industrial hygiene housekeeping.

- ***These UVC-280n I-Luminosity LED systems appear generally effective to reduce microbiological flora in the areas tested***. ***Justification, defining the products global effectiveness in a real world***, ***broad banded efficacy validation test.***

- SARS-CoV-2 Virus (COVID-19) was not detected in either of the swab surface or air sampling events collected at the Site, therefore no recommendations can be made regarding the effectiveness of the UVC-280n systems to reduce SARS-CoV-2 Virus (COVID-19). SARS-CoV-2 is carried or primarily transmitted by an infected human(s) and animals, not by the walls. Fortunately, no one was present at the time of IAQ IH tests, spreading that particular pathogen virous.

- The chip manufacturers and other efficacy testing, validating the proven effectiveness 280n LED with violet, ability to disable by breaking down SARS-CoV-2 COVID-19 viruses DNA. The common dwell time exposure factor becomes somewhat irrelevant, in determining efficacy, when operated 24-hours a day x 7-days a week. Delivering a constant umbrella-overhead, or fixed constant exposure surface application.

- *Requiring a separate current laboratory tests to validate results of this particular devices effectiveness against disabling SARS-CoV-2 Virus (COVID-19). SARS-CoV-2 is pending.*

LIMITATIONS

- ATC provided these services consistent with the level and skill ordinarily exercised by members of the profession currently providing similar services under similar circumstances at the time the services were provided. This statement is in lieu of other statements either expressed or implied. This report is intended for the sole use of **I-Luminosity, LLC,** AET Group Global. The scope of services performed in execution of this evaluation may not be appropriate to satisfy the needs of other users, and use or re-use of this document, the findings, conclusions, or recommendations is at the risk of said user.

- As with all such assessments, the results of the sampling represent conditions found on the date of the survey and may not represent conditions found at other times. Additionally, this assessment was limited with respect to the specific parameters indicated above and should not be construed to be a comprehensive evaluation or a definitive representation of conditions within the facility. The information presented in this report is intended to be used as a guide to evaluate the need for further investigation or the need for modifications to the processes or procedures surveyed.

- The Client recognizes and agrees that all testing and remediation methods have reliability limitations, no method nor number of sampling locations can guarantee that a condition will be discovered within the performance of the services as authorized by the Client. Additionally, the passage of time may result in a change in the environmental characteristics at this site. This report does not warrant against future operations or conditions that could affect the findings stated within discoveries. The results, findings, conclusions, and recommendations expressed in this report are based only on conditions that were observed during ATC's inspection of the site.

- It is our pleasure to provide these professional environmental consultative services to you. Please contact us if you have any questions concerning this report or the findings.

Very truly yours,

ATC Group Services LLC

Michael Donovan, CIH
Senior Project Manager

Nancy Guevara
Project Manager

Attachment 1 – *Pre-Installation Sampling Event – October 15, 2020*
Attachment 2 – *Post-Installation Sampling Event – October 21, 2020*
Attachment 3 – Field Notes and Photographs

Reference Links Back-Up Support Data

https://www.assets.signify.com/is/content/PhilipsLighting/Assets/philips-lighting/global/20200504-philips-uv-purification-application-information.pdf

https://www.ashrae.org/technical-resources/resources

https://www.cdc.gov/infectioncontrol/pdf/guidelines/environmental-guidelines-P.pdf

file:///C:/Users/RECEPT~1/AppData/Local/Temp/Ultraviolet-C_decontamination_of_a_hospital_room_A.pdf

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https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6145099/

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Lamps

https://www.ashrae.org/file%20library/technical%20resources/covid-19/i-p_s16_ch17.pdf

Medical Applications

https://www.lighting.philips.com/b-dam/b2b-li/en_AA/products/special-lighting/phototherapy/downloads/uvb_narrowband_vs_buvb.pdf