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MILLER
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Revised November 25, 2015

Mr. Luca Spensieri
Primo Sports
PO Box 422
Goshen, New York 10924

**Re: Primo Sports Athletic Field Noise and Lighting Assessment
Town of Chester, NY**

Dear Mr. Spensieri:

Tim Miller Associates, Inc. was retained to complete an assessment of potential noise and lighting impacts from the proposed Primo Sports athletic fields located on Route 94 in the Town of Chester, New York. In June of 2015 TMA completed a noise study which was conducted according to the "Protocol for Noise and Lighting Study - Primo Sports Site Plan", dated June 10, 2015, which was reviewed and approved by the Town of Chester Planning Board. The noise and lighting assessment were completed to address Planning Board and neighbors concerns regarding the proposed sports facility and the facilities' potential impacts from noise and lighting.

Purpose and Scope

The scope and methodology for this noise and lighting analysis followed the Protocol for Noise and Lighting Study, dated June 10, 2015. In order to assess potential noise impacts, ambient (existing) noise measurements were collected at the Primo Sports project site on Route 94 in Chester.

Noise measurements were also collected at two existing sports fields, prior to and during soccer games. The two facilities measured were the Primo Sports soccer fields in Pine Island New York and the Torne Valley Sports Center in Hillburn, New York. These measurements provide noise conditions that represent active sports events or future noise conditions at the Primo Sports facility, when in operation. Noise measurements are further described below.

A detailed lighting plan has been developed for the Primo Sports facility. The lighting plan provides a schedule of lighting fixtures, fixture type, pole height and pole location. The plan also provides isolines to show the level of lighting on the fields and at the edges of the project site. The proposed lighting for the Primo Sports facility is further described below.

Noise Background

Noise can be defined as undesirable or "unwanted sound". Even though noise is somewhat subjective, it affects the full range of human activities and must be considered in local and regional planning. Most of the sounds heard in the environment are not composed of a single frequency, but are a band of frequencies, each with a different intensity or level. Levels of noise are measured in units called decibels. Since the human ear cannot perceive all pitches or frequencies equally well, these measures are adjusted or weighted to correspond to human hearing.

This adjusted unit is known as the A-weighted decibel, or dBA. Since dBA describes a noise level at just one instant and since ambient noise levels are constantly varying, other ways of describing noise levels, especially over extended periods, are needed. A commonly used descriptor is the Leq.

The Leq noise level is the level of a constant noise source which has been averaged over a period of time, based upon a measurement over a certain time period. A one decibel change in noise is the smallest change detectable by the human ear under suitable laboratory conditions. Under normal conditions, a change in noise level of two or three decibels is required for the average person to notice a difference. Table 1 shows the typical perception of noise change. Ten dBA represents a doubling or halving of the perceived loudness of sound.

To the average person in an outside environment and close to the noise source, a noise level increase of 2 to 3 dBA is barely perceptible, an increase of 5 dBA is noticeable, and an increase of 20 dBA is perceived as a dramatic change. Annoyance frequently results from increases of 10 dBA or more, depending on the frequency and duration of the noise events.

Table 1	
Perception of Noise Changes	
Change (dBA)	
Human Perception of Change	
2-3	Barely perceptible
5	Readily noticeable
10	A doubling or halving of the loudness of sound
20	A dramatic change
40	Difference between a faintly audible sound and a very loud sound
Source: Bolt Beranek and Neuman, Inc., <u>Fundamentals and Abatement of Highway Traffic Noise</u> , Report No. PB-222-703. Prepared for Federal Highway Administration, June 1973.	

Noise Standards

The Town of Chester does not have a noise standard or limits in the Town Zoning Code. The New York State Department of Environmental Conservation (NYSDEC) has issued a guidance policy for the evaluation of noise from facilities regulated by the Department, entitled Assessing and Mitigating Noise Impacts (DEP-00-1, Revised February 2, 2001). The purpose of the policy is to provide direction to NYSDEC staff and the regulated

community for the evaluation of sound levels generated from existing and proposed facilities. The policy presents noise impact assessment methods, examines the circumstances under which sound creates significant noise impacts, and identifies avoidance and mitigative measures to reduce or eliminate noise impacts.

In the assessment of noise impacts, multiple factors need to be considered, including the ambient noise levels, future noise levels, the location of the noise sources compared to the receptor locations, increases in Sound Pressure Levels over existing conditions, and sharp and startling noise.

As stated in the NYSDEC policy, the goal of any permitted operation should be to minimize the increase in sound pressure level above ambient levels at the selected sound receptors. Increases ranging from 0 to 3 dBA should have no appreciable affect on receptors. Increases from 3 to 6 dBA may have the potential for adverse noise impact only in cases where the most sensitive receptors are present. Noise level increases of more than 6 dBA may require a closer analysis of impact potential depending upon the character of surrounding land uses and receptors. Typical reaction to increases in sound are shown in Table 2, below.

Table 2	
Human Reaction to Increases in Sound Pressure Levels	
	Outdoor Noise (dBA)
Under 5	Unnoticed to Tolerable
5 - 10	Intrusive
10 - 15	Very Noticeable
15 - 20	Objectionable
Over 20	Very Objectionable to intolerable

Source: NYSDEC Policy DEP-00-1, Rev. February 2, 2001

Establishing a maximum sound level at a given receptor location is one approach to addressing potential adverse noise impacts. Most people find a sound level of 60 to 70 dBA as beginning to create a condition of significant noise effect (EPA 550/9-79-100, November, 1978). In general, the EPA's "Protective Noise Level " guidance found that ambient noise levels of 55 dBA was sufficient to protect public health and welfare, and in most cases, did not create an annoyance (EPA 550/9-79-100, November, 1978). In non-industrial settings, the sound level should probably not exceed ambient noise by more than 6 dBA at the receptor. The addition of any noise source, in a non-industrial setting should not raise the ambient noise level above a maximum of 65 dBA.

Ambient Noise Measurements

Ambient noise measurements were collected at the Primo Sports facility on June 19, 2015. Location 1 was near the Green Drive cul-de-sac, approximately 50 feet northeast from Green Drive. This location provides the ambient noise conditions for residents of Green Drive. Location 2 was 75 feet south of Route 94 in the approximate center of the property. This location was selected to provide ambient noise conditions for residents near Route 94,

and to reflect the existing traffic noise on Route 94. The two noise monitoring locations are shown in Figure 1 on an aerial photograph of the area.

Noise measurements were collected using a Casella Type D-badge measuring unit, and were collected from approximately 1:30 PM on June 19 continuously until June 20 at 11:00 AM. At monitoring Location 1, the instrument battery ran out of power at 1:10 AM on June 20, but this did not affect the overall monitoring results and analysis, since the data until 11:00 PM on June 19, 2015 (used for comparison) was collected. At both locations the instrument microphone was placed on a tripod, 3 feet from the ground surface. Each of the machines were calibrated before being set up for the monitoring period. There was no precipitation during the monitoring period and wind was light during daytime and still at night. A wind shield was used on each noise instrument microphone.

Primo Sports Facility, Pine Island, NY

Noise measurements were collected on June 13, 2015 at the Primo Sports facility, 547 Glenwood road, Pine Island, New York. The soccer facility is an open field surrounded by agricultural fields and with a golf range to the southwest. A small subdivision of homes is located northeast of the fields. Glenwood Road borders the property to the southeast.

Noise monitoring Location 1 was approximately 20 feet from the edge of the soccer field, and location 2 was 150 feet northeast from the edge of the field. Monitoring locations are shown in the aerial photograph, Figure 2.

Ambient noise measurements were collected prior to the soccer game from approximately 12:30 until 1:00 PM and pre-game measurements from 2:55 until 3:40 PM. The soccer game started at 3:40 PM and measurements ended at half-time at approximately 4:25 PM. Approximately 70 parents and fans were in attendance. As described above, noise measurements were collected with a Cassella Type-D badge monitor, mounted on a tripod. Weather during the measurements was clear with generally windy conditions during ambient measurements (noon-time), and calmer conditions later in the afternoon. Wind may have elevated the noise conditions prior to the soccer game. Traffic noise from Glenwood Road was not noticeable.

Torne Valley Sports Complex, Hillburn, NY

Noise measurements were collected on June 16, 2015 at the Torne Valley Sports Complex, 115 Torne Valley Road, Hillburn New York. The sports facility is a stadium type facility with spectator stands on the eastern side, an indoor sports building and an indoor inflatable dome facility. Torne Valley Road borders the property to the east and Interstate 87 is located approximately 1,400 feet west of the property. Some traffic noise from Interstate 87 was audible during the measurement period.

Noise monitoring Location 1 was approximately 20 feet from the edge of the soccer field, and location 2 was 150 feet south from the edge of the field. Monitoring locations are shown in the aerial photograph, Figure 3.

Pre-game noise measurements were collected prior to the soccer game from approximately 6:40 PM to 7:25 PM. The soccer game started at 7:25 PM and measurements ended at

half-time at approximately 8:38 PM. Approximately 80 parents and fans were in attendance. Weather during the measurements was clear with generally calm conditions.

Monitoring Results

Noise measurements were collected continuously over periods that included pre-game and game period times at the two sports events. Also, noise measurements were collected continuously over an approximate 22 hour period extending from June 19 through June 20, 2015 at the proposed Primo Sports facility property in Chester, NY. Summary tables of the noise measurements are provided as Attachment A. Also attached is Cassella instrument data. Table 2 below provides a summary of the noise monitoring results.

Table 3 Ambient Sound Levels (dBA - Leq) Comparison of Noise Analysis					
		Date of Measurement	Start Time	End Time	Leq -dBA Average
Primo Sports Field Afternoon	Location 1	June 19, 2015	1:19 PM	3:00 PM	58
	Location 2	June 19, 2015	1:30 PM	3:00 PM	61
Primo Sports Field Evening	Location 1	June 19, 2015	3:00 PM	7:00 PM	54
	Location 2	June 19, 2015	3:00 PM	7:00 PM	61
Primo Sports Field Night	Location 1	June 19, 2015	7:00 PM	11:00 PM	53
	Location 2	June 19, 2015	7:00 PM	11:00 PM	59
Pine Island Ambient	Location 1	June 13, 2015	12:25 PM	1:02 PM	53
	Location 2	June 13, 2015	12:26 PM	1:03 PM	54
Pine Island Pre-game	Location 1	June 13, 2015	2:59 PM	3:40 PM	55
	Location 2	June 13, 2015	2:54 PM	3:40 PM	52
Pine Island Game	Location 1	June 13, 2015	3:40 PM	4:20 PM	55
	Location 2	June 13, 2015	3:40 PM	4:26 PM	52
Torne Valley Pre-game	Location 1	June 16, 2015	6:38 PM	7:25 PM	55
	Location 2	June 16, 2015	6:40 PM	7:25 PM	52
Torne Valley Game	Location 1	June 16, 2015	7:25 PM	8:37 PM	61
	Location 2	June 16, 2015	6:40 PM	7:25 PM	57
Notes: Measurements were collected using a Casella Type D Badge dosimeter.					

The ambient measurements collected at the Primo sports facility reflect noise levels consistent with the time and setting. Measurements collected near Route 94 (Location 2) show higher average noise levels during the day and evening (61 dBA) and slightly lower levels at night (59 dBA). These readings likely reflect less traffic noise during the nighttime. At Location 1, near Green Drive, the noise levels were also reduced during the nighttime period, falling from 58 dBA during daytime to 53 dBA at night.

The ambient noise levels measured at the Pine Island site reflected the windy noon-time conditions, since noise levels at Location 1 were higher (53 dBA) than during the pre-game and game periods (52 dBA). The pre-game and game noise levels at the Pine Island site were generally consistent: 55 dBA at Location 1 near the field and 52 dBA at a location 150 feet from the field. These results may be influenced by the moderately windy conditions before and during the game and the fact that the field is open and there are no structures to reflect sound.

At the Torne Valley sports facility, the pre-game noise levels at location 1 near the field were 55 dBA and the level 150 feet from the field (Location 2) was 52 dBA. During the game the level increase to 62 at Location 1 and 57 at Location 2. This is an increase in noise of 6 dBA immediately next to the field and 5 dBA 150 feet from the field. It should be noted that the Torne Valley facility is unlike the Pine Island site and the proposed Primo Sports Chester site in that the field is surrounded on three sides by buildings and pavement. These hard surfaces reflect and amplify sound from the field. In addition, noise monitoring Location 2 was near a structure and across a paved parking lot from the soccer playing field. According to the Federal Highway Administration (FHWA) guidance, sound decreases less over paved surfaces than compared to soft ground or grass surfaces. For example, sound from a highway decreases 3 dBA for each doubling of distance from the noise source over paved surfaces. Over grass or soft ground the most suitable drop-off rate is 4.5 dBA per distance doubling¹.

Noise Analysis

It is anticipated that the noise from future sporting events at the Primo Sports facility in Chester will be similar to conditions measured at the Pine Island site, which is open field and less influenced by buildings and pavement. As described above, noise conditions from a soccer game and fans at the Pine Island site were similar to ambient and pre-game conditions. Under worst case conditions (Torne Valley Sports Facility), noise levels increased 5 dBA 150 feet from the playing field, during a typical soccer game.

According to NYSDEC policy, increases ranging from 0 to 3 dBA should have no appreciable affect on receptors. Increases from 3 to 6 dBA may have the potential for adverse noise impact only in cases where the most sensitive receptors are present.

It should be noted that the average noise measured 150 feet from the soccer game at the Torne Valley site, at 57 dBA, was 4 dBA less than the average day-time and evening ambient noise measurements (61 dBA average) near Route 94, at the Primo Sports Chester site. The 57 dBA result from the soccer game was also lower than the night-time noise measurement near Route 94 at 59 dBA average. These results indicate that for residents located near Route 94, traffic noise would remain higher than the anticipated noise from sports activities at Primo Sports Chester.

It is anticipated that noise levels from activities at the Primo Sports Chester site will increase noise levels less than 5 dBA from ambient conditions for neighbors of the site. Such an increase will fall into the category of "unnoticed to tolerable" (Table 2, above) and would not be objectionable for project neighbors.

¹ Highway Traffic Noise Analysis and Abatement Policy and Guidance, FHWA, June 1995

Lighting Analysis

The Town of Chester Zoning Code describes the requirements for Lighting in Section 98-15 - Lighting of Properties.

B. Lighting of commercial, industrial and residential properties subject to site plan approval.

(1) Outdoor lighting facilities of any kind where the light source is visible from outside the property lines, or where glare extends beyond the property lines or creates public hazards to traffic or public streets are prohibited.

(2) All luminaires for commercial, industrial or multifamily parking areas or private roads and drives shall be pulse-started metal halide cutoff-type shoe box units with a flat glass lens attached to a pole or building on a fixed arm with the flat glass lens oriented parallel to the ground. Lighting in the LB-SL Zones, SR-2 and SR-6 may be regulated using appropriate period lighting as approved by the Planning Board with the intent of preventing sky lighting or light pollution.

The proposed lighting for the Primo Sports facility meets the Town Zoning Requirements by preventing glare from extending beyond the property lines, as described below. The Code does not have specifications for the types of sports field lighting that is proposed for the Primo Sports field. The intent of Town Zoning Code (i.e. preventing sky lighting or light pollution), is met by the proposed lighting plan, as described below.

A detailed lighting plan has been developed for the site to provide both lighting for certain fields for nighttime play, but also safety lighting for the parking areas and building entrances. The lighting plan is provided as Figure 4. The two northern soccer fields and one little league baseball field will have lighting provided, while the southern two soccer fields and the north-central little league baseball field will not be lighted. Lighting will be provided for beach volley ball, and bocce courts at the northwest side of the recreation building.

The Lighting Plan provides a schedule of lighting fixtures, fixture type, pole height and pole location. The Plan also provides projected light isolines, which indicates the relative brightness of the lighting and the edges of the lighted field. The applicant is proposing Musco, "Green" LED fixtures. These fixtures provide the ability to precisely focus the light onto the field avoiding light "spill-over" or light extending off of the property. Specifications for the Musco lighting is provided in Attachment B, as well as photographs of lighting on an existing field. The LED lights are the latest technology in sports lighting and allow actual lowering of the lighting level, if needed.

As shown in the plan, no light will be projected towards the southern portion of the property or towards Green Drive. Light spill-over is generally avoided along the northern property boundary, or Route 94. Relatively low levels of light (1.0 foot-candles) will extend off the property and onto Glenmere Road in the northwest portion of the site. By comparison, the fields have lighting up to 30 foot-candles. No lighting is projected to extend onto neighboring private properties bordering the northwest portion of the site or bordering the southern portion of the site near Green Drive. As shown in the photos of the Torne Valley Sports Complex (see Attachment B), the glare from the lighting fixtures is only visible on the field or

immediately next to the field. Project neighbors will see the reflected light (glow) from the lighted field but the lighting is designed to eliminate any glare when viewed from the residences or adjoining roads.

Lighting Period

The applicant is proposing lighting until 11:00 PM during certain games or tournaments during the outdoor sports season (spring, summer, fall). Following discussion with Musco Lighting, other sports facilities and stadiums in the Hudson Valley, with similar settings as the Primo Sports Chester facility, have night-time games. The following facilities have Musco directed field lighting and night-time games.

- Mount Saint Marys College, Newburgh, NY. This is college athletic field in an urban setting with residences within 150 feet of the lighted playing field. According to Mount Saint Mary's staff, lighting is limited to 11:00 PM.
- Kristi Babcock Memorial Park, New Windsor, NY This is a municipal playing field which adjoins a residential subdivision to the north and west. According to Town of New Windsor staff, lighting is also limited to 11:00 PM.
- The Rock Sports Park, Chester, NY This is a private sports facility in a rural mixed use setting with several single family homes within 500 feet of the fields.

Aerial photographs of these facilities are provided in Attachment B. These public and private sport facilities operate in residential settings similar to the proposed Primo Sports facility and have night-time games. While the lighted field will be visible from the adjacent residences, the lighting is designed to eliminate any direct glare when viewed from the residences. The proposed Musco LED lighting at the Primo Sports facility will reduce impacts to neighbors during evening and night-time games.

Please contact me if you have any questions or comments.

Sincerely,



Jon P. Dahlgren
Senior Geologist
TIM MILLER ASSOCIATES, INC.

Enclosure