ARMSTRONG ENGINEERS INC.

J. Delvin Armstrong, P.E.
Christopher B. Fote, P.E.

1840 - 130th Avenue N.E., Suite #15, Bellevue, Washington 98005-2228 • Phone: (425) 885-2195 • Fax: (425) 556-9351

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Mr. John Grahame
Chairman
Flagstaff Dark Skies Coalition
375 Choctaw Street
Flagstaff, AZ 86001-9535

Subj: RP-6-01 Illumination Recommendations – Class III vs. Class IV

Dear John:

I have been a Member of the Illuminating Engineering Society of North America (IESNA) since May of 1967 and have been active on the Sports Lighting Committee since the early 80's. In the early 80's the Sports Lighting Committee was not very active. It's primary responsibility, RP-6, had not been revised since 1960 and, in that time, many changes had occurred in the sports lighting industry. IESNA Headquarters actually removed the current Chairman of the Committee and appointed Bill Tao, P.E. from St. Louis to head up the Committee. I was made Vice Chairman. Our primary task was to update RP-6.

A couple of years or so were spent working on the Document and several significant changes were made from the 1960 Standard. One of the significant changes was the Classification System from Class IV, the lowest to Class I, the highest NOT including lighting for television and professional sports. This system was intended to specify the amount of illumination necessary to play the particular sport. This was then defined as Class IV Illumination. Many people mistakenly believe that more skilled players cannot play at Class IV Illumination Levels. If this were the case, the Committee would be derelict in their duty. How could the Committee specify illumination levels that were NOT suitable for the play of the game. So let me emphatically state at this point that Class IV illumination levels are satisfactory for the play of the game by players of all skills.

The higher illumination levels, specified in Class III, Class II and Class I are primarily related to the number of spectators and their distance from the field of play. If you charge admission to the game and put the spectators 20 rows back, you really need to provide a higher lighting level in order for them to enjoy the game. The Committee recommendations for the type of play (recreational, etc.) then is primarily based on the expected number of spectators and their location with respect to the field. A chart was prepared to provide general guidelines on this design element. It is Table I in both RP-6-88 and RP-6-01. Unfortunately there was an error made in the preparation of this Table. It was intended that Class IV be shown as suitable for Social events, Recreational Events, Elementary Schools, Training facilities, High Schools and Amateur Leagues. The "check mark" was left off for High Schools and Amateur Leagues.

I became the Chairman of the IESNA Sports Lighting Committee in the early 90's and began receiving calls from Little League people around the Country questioning whether we were recommending that Little League fields be illuminated to the Class III recommended levels. I assured

them that was NOT the case and I could not imagine how anyone could arrive at that conclusion. This became an important issue nationally and was the subject of conversation in our Committee meetings. Everyone agreed that Class III was certainly not intended for Little League fields. It was not until 1995 or 96 that I was discussing this issue with a Little League parent who pointed out that our RP-6, Table I called for Class III. So it was over 7 years later that the error in the 1988 standard was discovered.

We were in preparation of our Section of the Lighting Handbook, published by the IESNA during the late 90's. Our first action was to ensure that the Ninth Edition of the Lighting Handbook had the correct Table. It was published in 1990 and showed the correct recommendations. We continued to work on an update to RP-6 and that was completed and published in 2001. It also shows the correct Table. I am attaching a PDF Computer File of the appropriate page from RP-6-88, the Ninth Edition of the Lighting Handbook and RP-6-01 for your information.

This has turned out to be quite a significant error. Other organizations have followed the lead of the Little League organization and reasonably decided that they needed at least the same amount of light as the younger baseball players. However, this is definitely NOT the case. Class IV illumination levels are completely adequate for the play of the game for which they are specified. In your case at Thorpe Park, you should be designing to an illumination level of 30 footcandles maintained average illuminance for the infield and 20 footcandles maintained average illuminance for the outfield. Higher lighting levels result in increased installation costs, increased maintenance costs, increased operating costs and substantially more off site impacts. In most cases they do not contribute to increased visibility for the players and, in some instances, may actually detract from the player's ability to see. This is because higher wattage luminaires are oftentimes utilized with narrow beams and the glare to the players can be quite intense.

I have been involved in the design of over 750 lighted athletic facilities in the Pacific Northwest. With the exception of the Kingdome, the Key Arena and a minor league baseball field, all have been designed to Class IV levels. There has never been a complaint in over 35 years about insufficient illumination levels. In summary, I would give my strongest recommendation to you for a design based on Class IV illumination. You will have happier players, happier owners and happier neighbors.

Sincerely,

J. Delvin Armstrong, P.E.
Principal