



Proud to be Employee Owned

Engineers
Land Surveyors
Planners
Environmental & Safety Professionals
Landscape Architects

Hudson Valley Office

21 Fox St., Poughkeepsie, NY 12601
P: (845) 454-3980 F: (845) 454-4026
www.chazencompanies.com

Capital District Office (518) 273-0055
North Country Office (518) 812-0513

September 29, 2020

Re: Ruge Chevrolet
Chazen Project Number: 81949.02
2nd Review

Chairman Schwartz and Planning Board Members,

We are providing this letter in response to the RUGE Application currently open for public hearing and associated topics related to exterior lighting and stormwater. Both of these topics have been raised during the opening of the Public Hearing as well as through correspondence received from the County as well as the Town Conservation Advisory Committee. We would like to take a moment and provide the Planning Board with some background information as they review and consider the application before them. The Applicant has provided a proposed lighting plan as well as an erosion and sediment control plan, including an engineering report. For the purposes of this letter, we are going to provide comments regarding the exterior lighting, followed by stormwater. We previously provided review comments, dated July 6, 2020, and is included for convenience.

EXTERIOR LIGHTING

The proposed lighting plan includes the intention to remove some existing cobra-style lights located along the NYSDOT Rt 44 roadway and incorporate new lighting through the use of four, 15 feet high, light poles. Each light pole includes 4 luminaires. The Applicant provided a photometric plan that provided light levels reported in the units of foot candles. The light levels indicated on the plans have an overall average light level of 2.1 fc. The lighting levels generally range from 0.1 fc to 3.0 fc with brighter areas under each pole as high as 13.2 fc. Chazen, acting as the consultant to the Planning Board, provided a technical review and written comment letter to the Applicant's submission. Our review is based on our professional experience as well as the Town Code.

TOWN CODE

The Town Code Section 485, Subsection 5. Lighting provides guidance as to light levels beyond property boundaries as well as fixture heights. However, the Code does not define exact light levels on property. Attached is Town Code Section 485 Subsection 5. When reviewing lighting options, we often consider light level averages, light level distribution (high to low ratios), light color, pole height, spacing, cut off shields and with some newer technologies such as BUG (Glare) ratings. Unfortunately, the code is silent on most of these topics.

Included herein are some parameters and some opinions that may provide appropriate background for the Board Members.

Average Light Levels

Exterior lighting is often measured in foot candles (fc, ftca). 1 foot candle is equal to 1 lumen per square foot at a distance of 1 foot. A lumen is the intensity of light. Think of a 50 lumen flashlight vs a 300 lumen flashlight, more lumens = brighter discharge. Most building codes are focused on interior (building) related light levels and often use illumination levels and a unit of lux. The various building codes have many uses listed and the associated illumination levels. Rarely do building codes suggest or provide exterior light levels. However, included in the table below are some references for your consideration. Additionally, we have added recommended light levels published and often used as best engineering practices.

Table 1: Various Code Light Levels

Source	Code Reference
NFPA 101 Life Safety Code. Section 7.8.1.3	The floors and other walking surfaces within an exit and within portions of the exit access and exit discharge designated in 7.8.1.1 shall be illuminated to values of <u>at least 1 footcandle</u> measured at the floor.
NFPA 101 Performance of Systems. Section 7.9.2.1	<u>Emergency illumination</u> shall be provided for a period of 1½ hours in the event of failure of normal lighting. Emergency lighting facilities shall be arranged to provide initial illumination that is <u>at least an average of 1 footcandle and a minimum at any point of 0.1 footcandle</u> measured along the path of egress at floor level. Illumination levels may decline to 0.6 footcandles average and a minimum at any point of 0.06 footcandles at the

	end of the emergency illumination lighting time duration. A maximum to minimum illumination uniformity ratio of 40-to-1 shall not be exceeded.
Uniform Building Code. Section 1003.2.9.1	Any time a building is occupied, the means of egress shall be illuminated at an intensity of <u>not less than 1 footcandle</u> at floor level.
International Building Code. Section 1006.2 - Illumination Level	The means of egress illumination level <u>shall not be less than 1 footcandle</u> at the floor level.
International Building Code. Section 1006.4 - Performance of Systems	Emergency lighting facilities shall be arranged to provide initial illumination that is <u>at least an average of 1 footcandle and a minimum of any point of 0.1 footcandles</u> measured along the path of egress at floor level.
U.S. General Services Administration 6.15 Lighting Exterior Lighting Parking and Roadway Lighting.	<p>Parking and roadway lighting should be an HID source and should not exceed a 10 to 1 maximum to minimum ratio and a 4 to 1 average to minimum ratio.</p> <p>Parking lots should be designed with high-efficiency, pole mounted luminaries. High- pressure sodium lamps are preferred but consideration should be given to existing site illumination and the local environment. Emergency power is not required for parking lot lighting.</p>
Energy Trust of Oregon – Foot Candle Light Guide	Exterior Parking lot average parking lot is 1 foot candle to 1.5 foot candle. Automotive exterior sales lot suburban 15 foot candles (Urban 20 foot candles).
FEMP –Guide to FEMP- Designated Parking to Lighting	Min – 0.2 fc, uniformity ratio 20:1, average 1 fc, 2.5 fc enhanced.

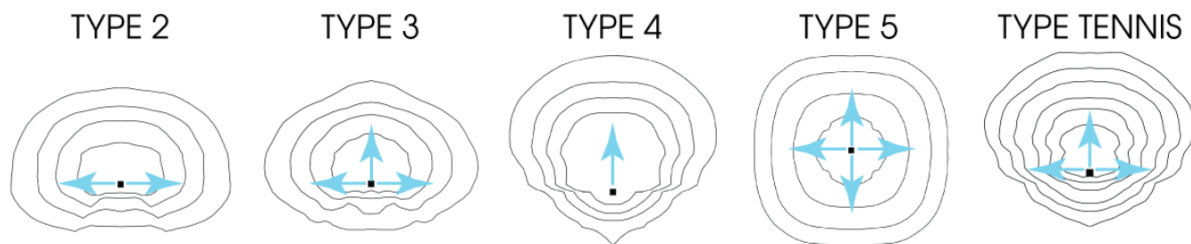
The light levels provided within the table are associated with various codes, non of which are included in the Town Code. I include several of these references so that Board Members can understand that recommending light levels below 1 fc is very contradictory to other codes and might even be considered unsafe. Although there is no official set of codes for exterior lighting, we did include a reference from the Energy Trust of Oregon for the Applicant’s use. The ETO suggests an urban automotive sales lot to have an average of 20 fc and a suburban parking lot is suggested at 15 fc. A generic parking lot would have 1 to 1.5 fc. The Federal Energy Management Program suggests an parking lot (enhanced) should have an average light level of 2.5. An enhanced parking lot is a parking lot used for the public and is not considered an automotive sales lot. Automotive use may warrant higher light levels, as suggested with the Oregon Energy Trust parameters.

The average lighting level that this application is suggesting is 2.1 fc. This level is slightly above a standard parking lot (1.5 fc) and far lower than the recommendations for an automotive sales lot (15 fc). Again, the Town Code does not speak to an exact average light level.

Light Level Distribution, Ratios, and Cutoff Shields

Light distribution is generally divided into 5 categories Type I – Type V. Included are examples of various distribution patterns. Each manufacturer develops a set of distribution patterns. Included below is an example of various distribution patterns a manufacture provides. Combining multiple luminaires, as this applicant is proposing, will deviate from the single luminaire patterns due to overlap of each luminaire distribution. The applicant is proposing multiple luminaires for each pole to provide lighting in each direction of the pole.

Figure 1: Distribution Patterns



Lighting ratio is the ratio difference between the brightest light levels and the lowest light levels. Parking lots with bright area, often referred to as burn spots, followed by areas of very low light levels create a non-uniform light distribution over an area. An example of a poorly distributed area is included below. In general, an area being more uniformly lite is more welcoming and does not strain an individual’s eyes as they move from bright to dark to bright spots.

Figure 2: Non-Uniform Light Distribution



Cutoff shields are often used along lights located near a property line or an area where a user wants to ensure that light distribution does not extend. Shields can vary but are often an accessory added to a standard light system.

The Applicant's pattern choice is Type 4. The Applicant's maximum ratio is 13.2 : 0.1. The FEMP recommends a ratio of 20:1. This ratio will be difficult to achieve given the current Town Code. One of the industries preferred methods of minimizing larger ratio differences is to elevate the luminaires so that a distribution becomes more uniform and widespread. The Applicant is proposing a pole height of 15 feet which is the maximum the Town Code allows. Based on the positioning of the light system in the center area of the parking lot, cut off shields are not applicable. The Town Code does not speak to pattern distribution types or distribution ratios. The distribution pattern selected is appropriate for the light pole locations and attempt to cover the parking lot more evenly.

Light Color

Light color can vary from type of light source as well as modifications to certain light sources. Light color, sometimes referred to as color temperature generally ranges from 1,000 to 10,000 kelvin. The lower the number the less white a color will look. Most residential and commercial applications fall in the range of 2,000k to 6,500k. For example, a 2,700k light color is often

used in interior use of kitchens, living rooms, and bedrooms and has an appearance of “*warm white*”. A 3,000k is recommended for residential front door or entryways lights also has an appearance of “*warm white*”. A 5,000k light is recommended for garages or exterior uses or task lighting and has an appearance of “*cool daylight*”.

The applicant has proposed a 4,000k light color that falls between a standard outdoor use (5,000k) and a softer residential use (3,000k). Again, the Town Code does not speak to an exact light color.

BUG

To avoid “cutoff” terms, the lighting industry created the BUG values. BUG stands for backlight, up light, and glare. BUG values have become a more commonly used set of values when trying to evaluate exterior lighting. The B value is related to back lighting. For poles located in the center of parking lots, this value is of little concern. The U value, up lighting, references the amount of up lighting. For an urban environment such as a downtown area, up lighting building faces or maybe a sports field will be of importance. The third component G associated with glare is the most often evaluated criteria for BUG values. Unfortunately a lower G is not a direct correlation to less glare, as glare is subjective. A pedestrian could perceive glare from a luminaire differently from a driver. A G rating should be recognized as having limited use and simply comparing G ratings does not get you a completely predictable outcome.

However, for this review, we are going to focus on the G rating to assist with understanding glare. Glare ratings are based on four zones FVH, BVH, FH, and BH. These ratings provide lumens in various viewing angles – close to horizontal. The G rating maximum zonal lumens is then determined from a ratings table. Included below is a ratings table to show the ranges of the G ratings.

Table A-3: Glare Ratings (maximum zonal lumens)

**Glare Rating for
Asymmetrical Luminaire Types (Type I, Type II, Type III, Type IV)**

Secondary Solid Angle		G0	G1	G2	G3	G4	G5
		FVH	10	100	225	500	750
BVH	10	100	225	500	750	>750	
FH	660	1800	5000	7500	12000	>12000	
BH	110	500	1000	2500	5000	>5000	

**Glare Rating for
Quadrilateral Symmetrical Luminaire Types (Type V, Type V Square)**

Secondary Solid Angle		G0	G1	G2	G3	G4	G5
		FVH	10	100	225	500	750
BVH	10	100	225	500	750	>750	
FH	660	1800	5000	7500	12000	>12000	
BH	660	1800	5000	7500	12000	>12000	

The Applicant has provided a fixture with a BUG rating of B1-U0-G2. The G level, Type 4 distribution would fall in the first table. In general, the fixture appears to fall low on the backlight and up light range and in the mid range for glare. Again, the Town Code does not speak to exact BUG rating criteria.

LIGHTING SUMMARY

The Town Code is silent to several of the parameters used for selecting and evaluating exterior lighting options. We suggest using caution when considering the language of the Town Code. The Applicant has met the height and property boundary lighting levels. As our July 2020 letter states, the proposed lighting meets the Code Standards and from a general practices overview, the lighting design appears reasonable. We would caution that suggesting average lighting levels less than 1.0 fc, as this may create a safety concern. Further, the Board should consider that based on the existing and continued use of the parking lot area, the light levels suggested might want to be higher during operating hours.

STORMWATER

The Applicant has provided an Erosion and Sediment Control Plan and Engineer's Report. Stormwater requirements are regulated by NYSDEC General Permit requirements as well as Town of Washington Requirements. We are going to focus on both sets of requirements.

NYSDEC

Construction projects that require site disturbance and alter impervious area are subject to NYS Stormwater regulations. For the Town of Washington, these regulations are the responsibility of NYSDEC. Included with the Stormwater Management Guidelines are many techniques for managing stormwater runoff and quantifying impacts from impervious surfaces. Following NYSDEC regulations also requires following NYSDEC definitions and interpretations. During our review, we looked very closely at definition of disturbance as well as the definition of impervious area. The NYSDEC considers gravel parking lots to be impervious area. Also, the NYSDEC considers the area of the parking lot that is being paved, including the activity of preparing the surface for pavement, NOT to be disturbance.

We then asked the Applicant to consult with the NYSDEC and confirm the definitions and their applicability to this project. For this project, the NYSDEC confirmed that the majority of the site is considered maintenance and is not disturbance or new impervious surface. The Applicant provide copies of the NYSDEC confirmation. Therefore, the site disturbance is limited to the area of disturbance for the installation of the drainage swale and stormwater pond. It should be noted that the Applicant is proposing these stormwater improvements to treat and manage runoff from neighboring properties.

The total disturbance of the site is less 1-acre and does not require a Stormwater Pollution Prevention Plan (SWPPP) that includes post-construction treatment practices.

Town Code

Town Code Section 335 – Erosion and Sedimentation Control outlines requirements for activities that need Planning Board approval. In summary of Section 335, Subsection 1, this application is seeking site plan approval and would be disturbing more than ½ acre. As such, the Applicant has provided an Erosion and Sediment Control Plan and Engineer's Report. The plan and report described the intended earth work and erosion control measures. The erosion control measures follow the guidelines set by both the NYSDEC Stormwater Guidelines as well as NYS Standards and Specifications for Erosion and Sediment Control, often referred to as the "blue book".

STORMWATER SUMMARY

It is our finding that the submission includes the required stormwater and erosion control standards needed and outlined for the NYSDEC and Town Code. Based upon the confirmation from NYSDEC and review of the plans, it is not necessary to seek coverage under the NYS General Permit of Construction Activities through the preparation of a SWPPP and permit. Further, the Applicant is proposing site improvements for stormwater runoff that exceed any minimum standards set forth in the Town Code. The plan is following good engineering practices (or Best Practices) for stormwater runoff.

SUMMARY

Our intention of this letter is to provide the Planning Board with information to evaluate the application with addition technical information as well as some direct references to regulatory requirements. For both the lighting and stormwater, the applicant has demonstrated meeting regulatory requirements and no variances have been identified.

We are available for any further discussion or clarification.

A handwritten signature in black ink, appearing to read 'G. Cronk', with a long horizontal flourish extending to the right.

George Cronk, P.E.
Engineer Consultant to Town of Washington