



TOPGOLF
LOUISVILLE

OXMOOR CENTER

www.topgolflouisville.com

Lighting Waiver
Case No. 18ZONE1014

Lighting Requirements

- LDC 4.1.3.B.2.c-All luminaires over 3500 lumens must be “fully shielded”
- LDC 4.1.3.B.6-Recreational lighting *within 500 feet of residential uses* must be controlled or highly shielded-Topgolf not within 500 feet
- There are no Recreational lighting fixtures that can meet this requirement



LDC Lighting measurement

- Measuring lighting to determine light trespass- LDC 4.1.3.D.1.c states that an inspector should stand at the property line and measure light 3' from grade. “The average of the vertical and horizontal measurements shall be used to determine compliance with applicable standards.”
- Standard here is .5 footcandles over existing or .5 footcandles, *whichever is greater.*





Exposure Time: 1/20
sec.



Exposure Time: 1/60
sec.



Exposure Time: 1/100
sec.



Lights at Huntsville Top Golf #1

Steve Porter Photo



Exposure Time: 1/13
sec.



Exposure Time: 1/50
sec.



Exposure Time: 1/100
sec



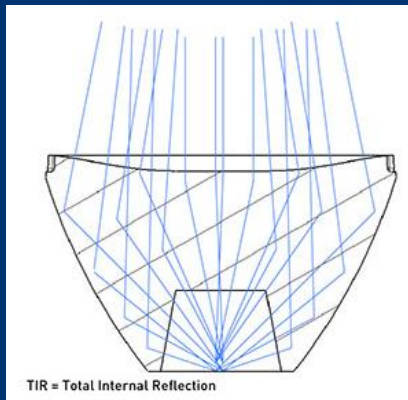
Huntsville, AL Top Golf lights #2

Steve Porter Photo

Gamechanger Fixture



TIR – Total Internal Reflection Lens Technology

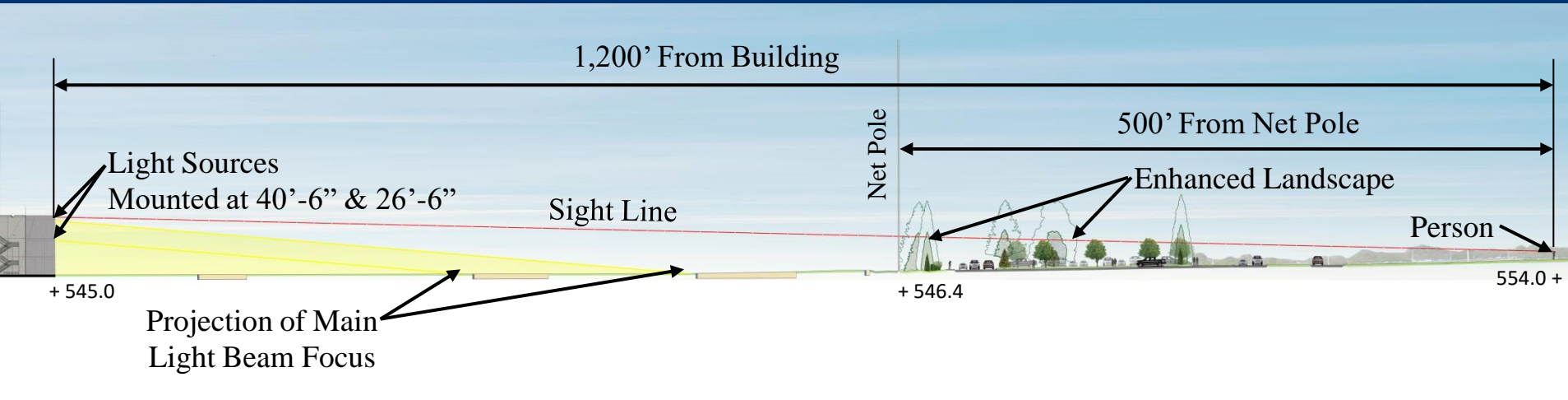


- 16 Total Fixtures 40' and 26' Mounting Heights
- Highly directional, aimable, state-of-the-art LED design
- Built-in Glare Control with TIR (Total internal Reflection)
- External Visor to be provided to further mitigate glare
- Intensity is dimmable, angle is Adjustable for site conditions

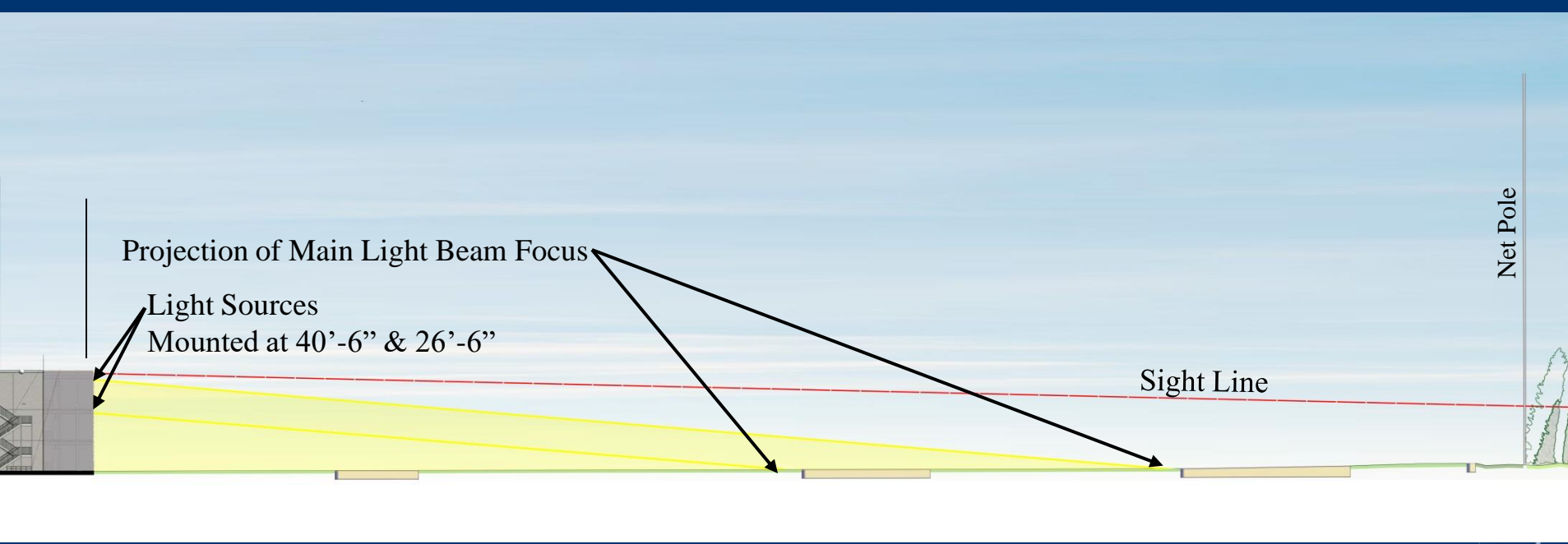


Gamechanger Fixture





Note: Elevations for Homes on Paddington Drive Range from Approximately 560 to 568



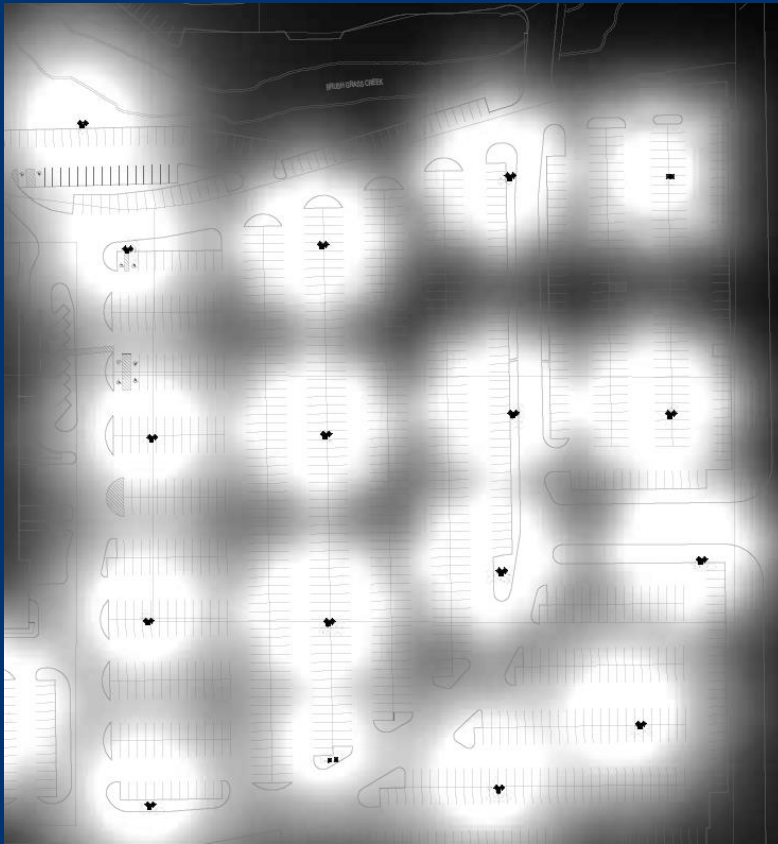
Existing Lighting



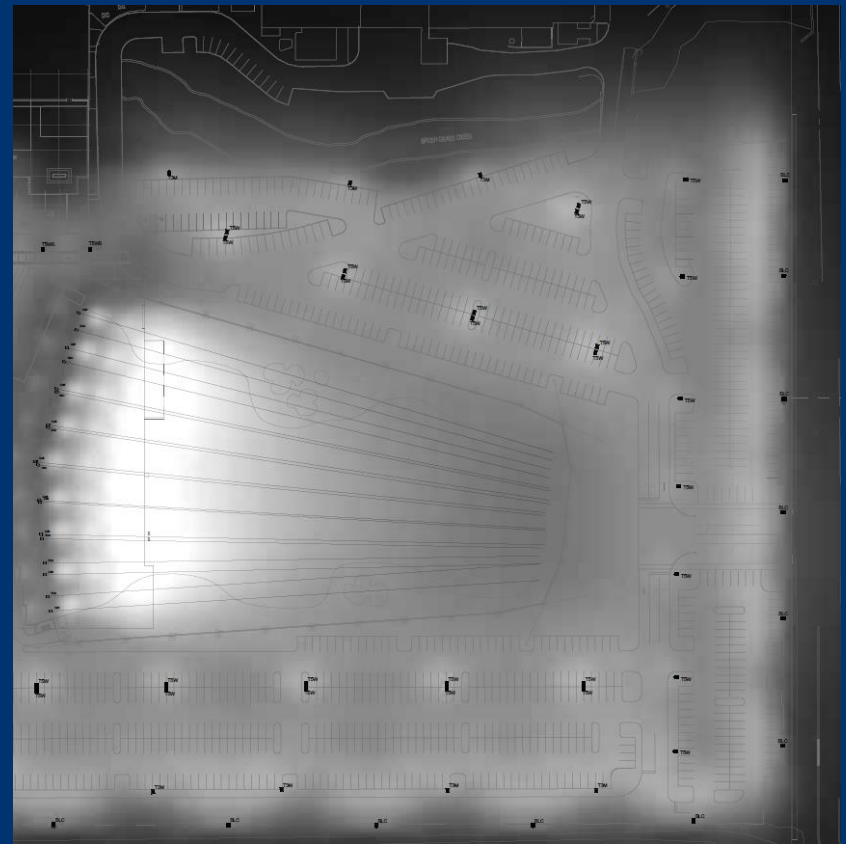
- 240,000 – 300,000 lumens per lighting pole
- Mounted at 50' above grade
- No glare control. No shielding.
- Existing fixtures are much closer to existing neighborhood than new Topgolf Gamechanger
- Total lumens of existing fixtures just on Southeast side of Oxmoor = **3,675,000 Lumens**



Old v. New Lighting



- Higher foot candle values across site
 - Total = 3,675,000 Lumens
- Fails to meet LDC at property boundaries



- Lower foot candle values across site
 - Total = 2,544,000
- Designed to meet LDC at property boundaries



Lighting Take-aways

- Lighting design is a science and “math” (Calculus) – intensity of a given source decreases as an inverse function of distance squared.

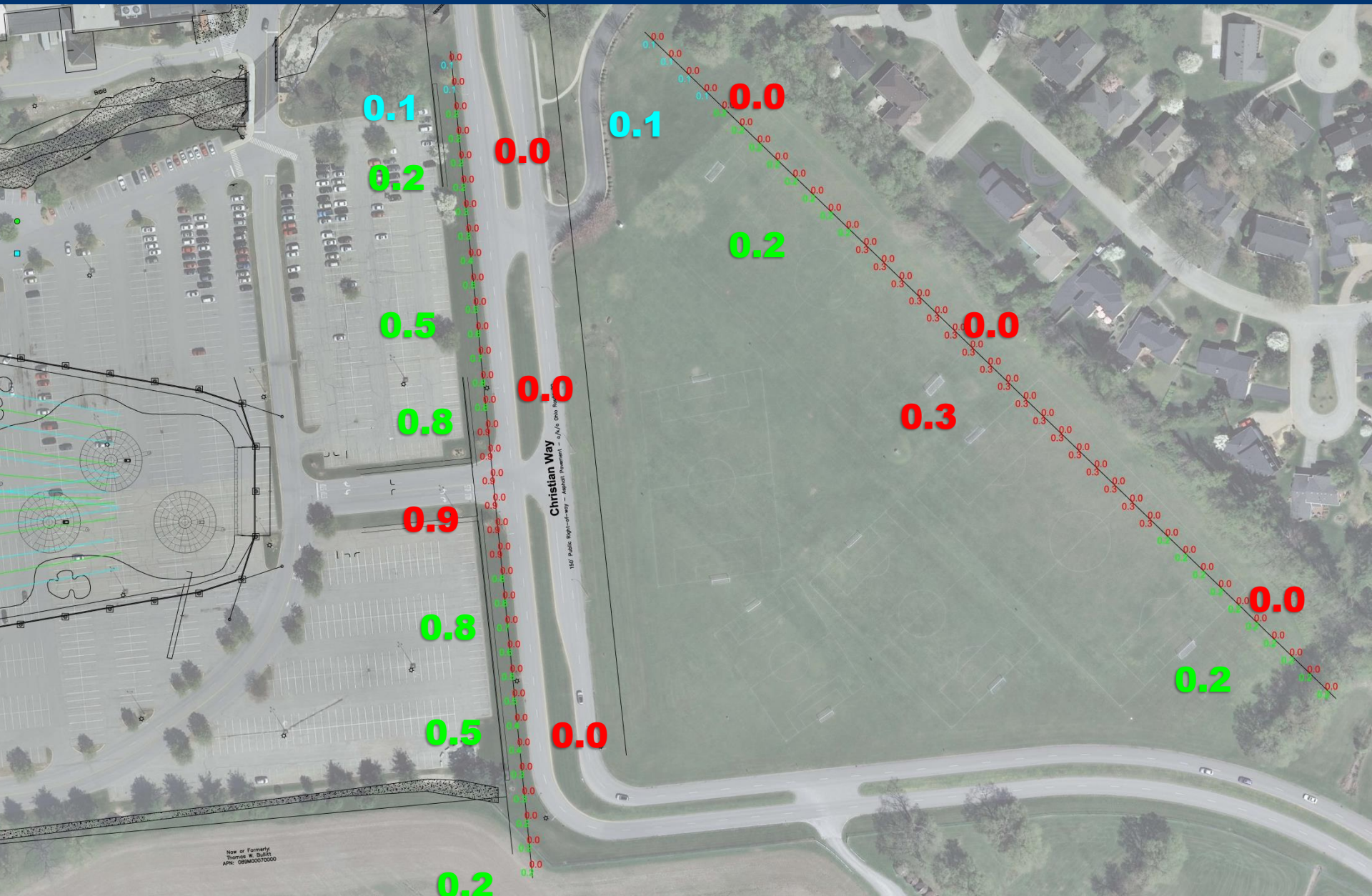
$$P = \int I \cdot dA$$

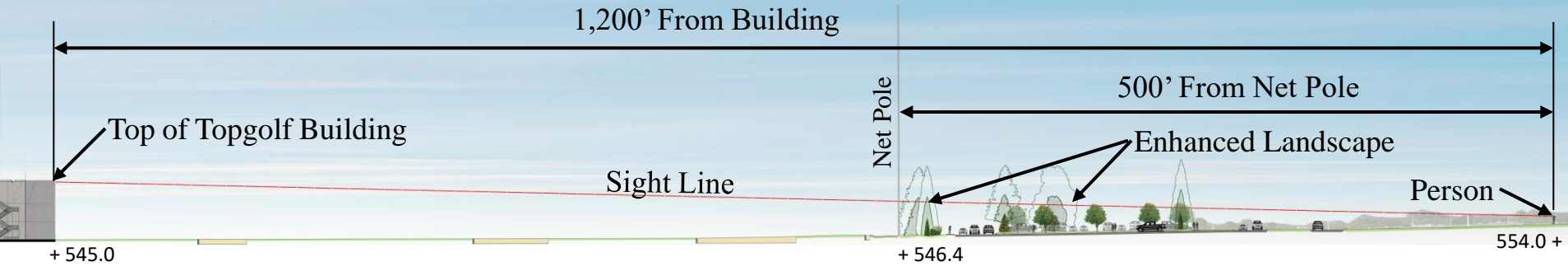
$$\text{So } I = P/(x)^2$$

- Lighting values are controllable via:
 - Light source intensity
 - Light source placement
 - Light source integral optical design
 - Light source aiming

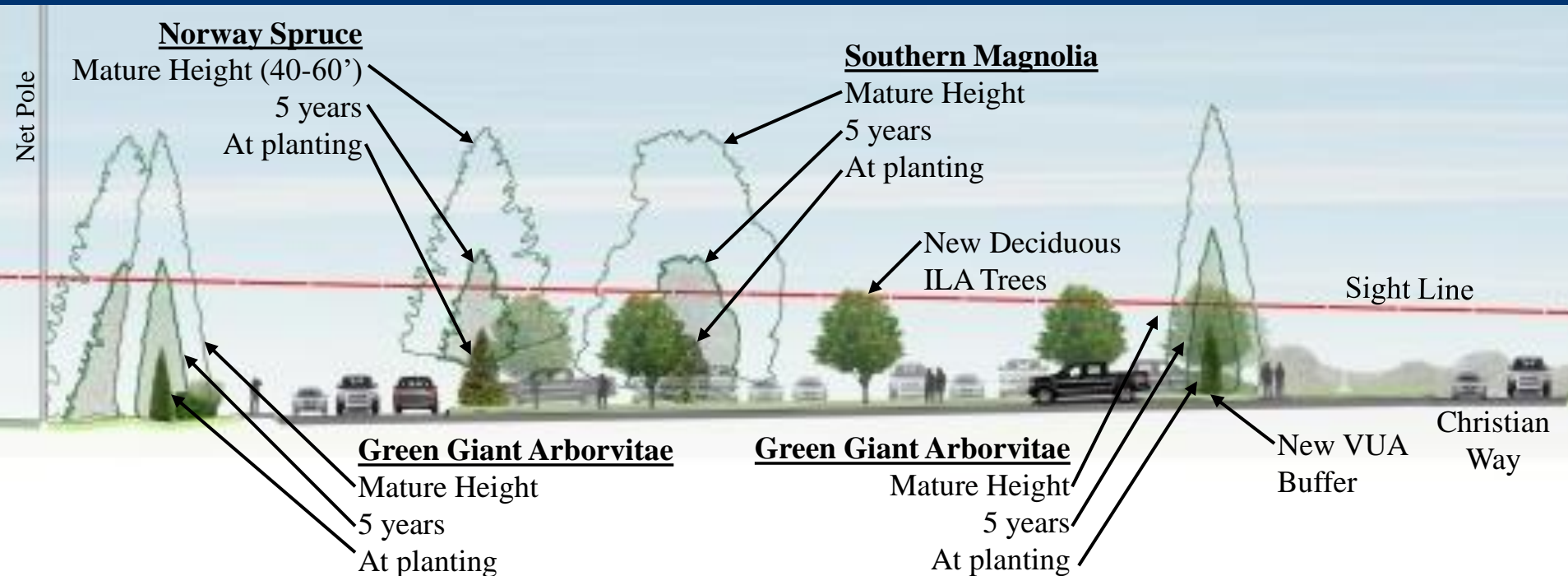
This Topgolf design has been engineered to meet the LDC







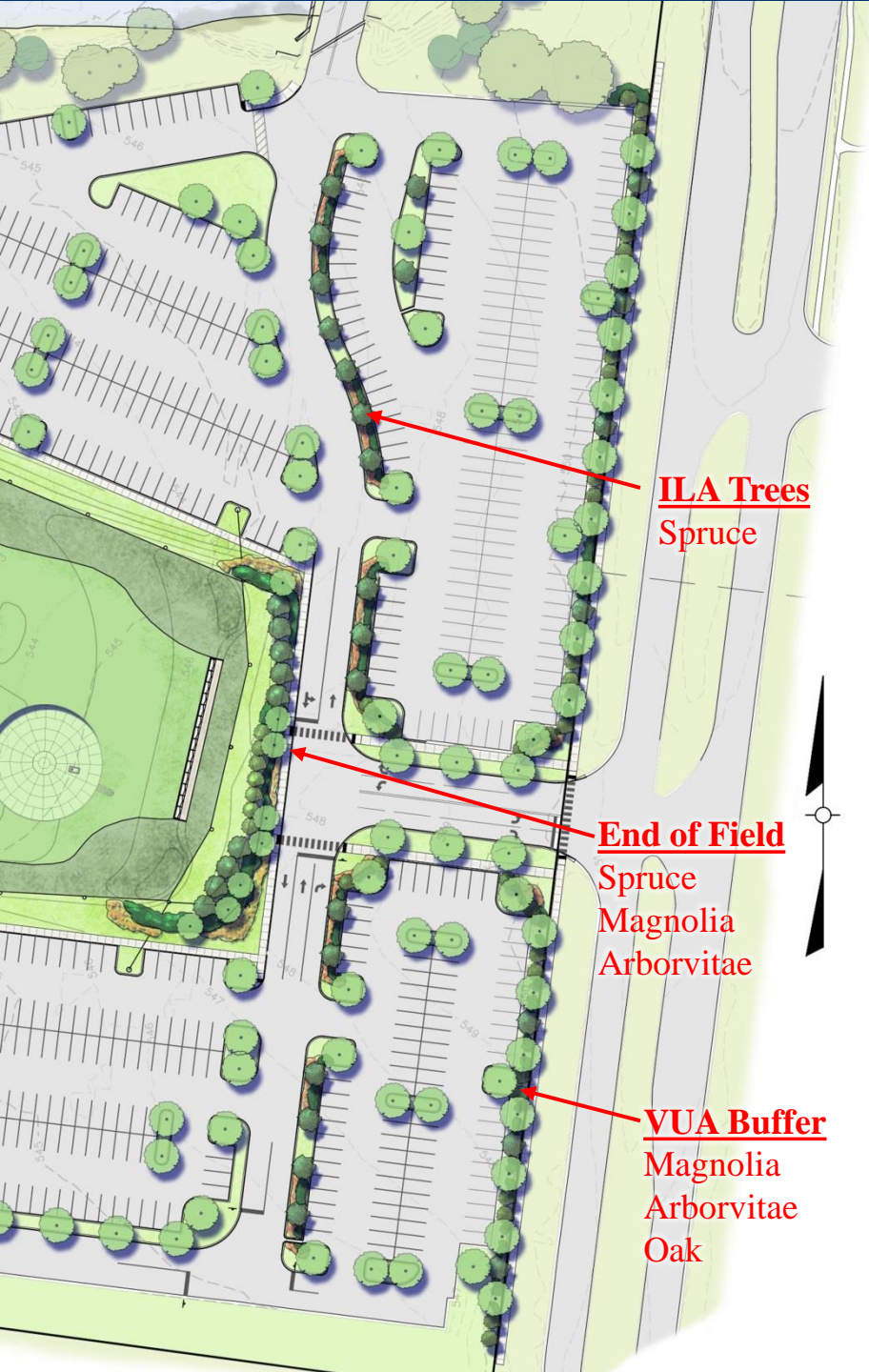
Note: Elevations for Homes on Paddington Drive Range from Approximately 560 to 568



Enhanced Landscaping







Norway Spruce (Evergreen)



Growth Rate 2-3'/Year
 Size at Planting 10-12'
 Size at 5 Years 20-27'
 Mature Height 40-60'

Green Giant Arborvitae (Evergreen)



Growth Rate 3-5'/Year
 Size at Planting 10-12'
 Size at 5 Years 25-37'
 Mature Height 40-60'

Southern Magnolia (Evergreen)



Growth Rate 1-2'/Year
 Size at Planting 10-12'
 Size at 5 Years 15-22'
 Mature Height 60-80'

White Oak (Deciduous)

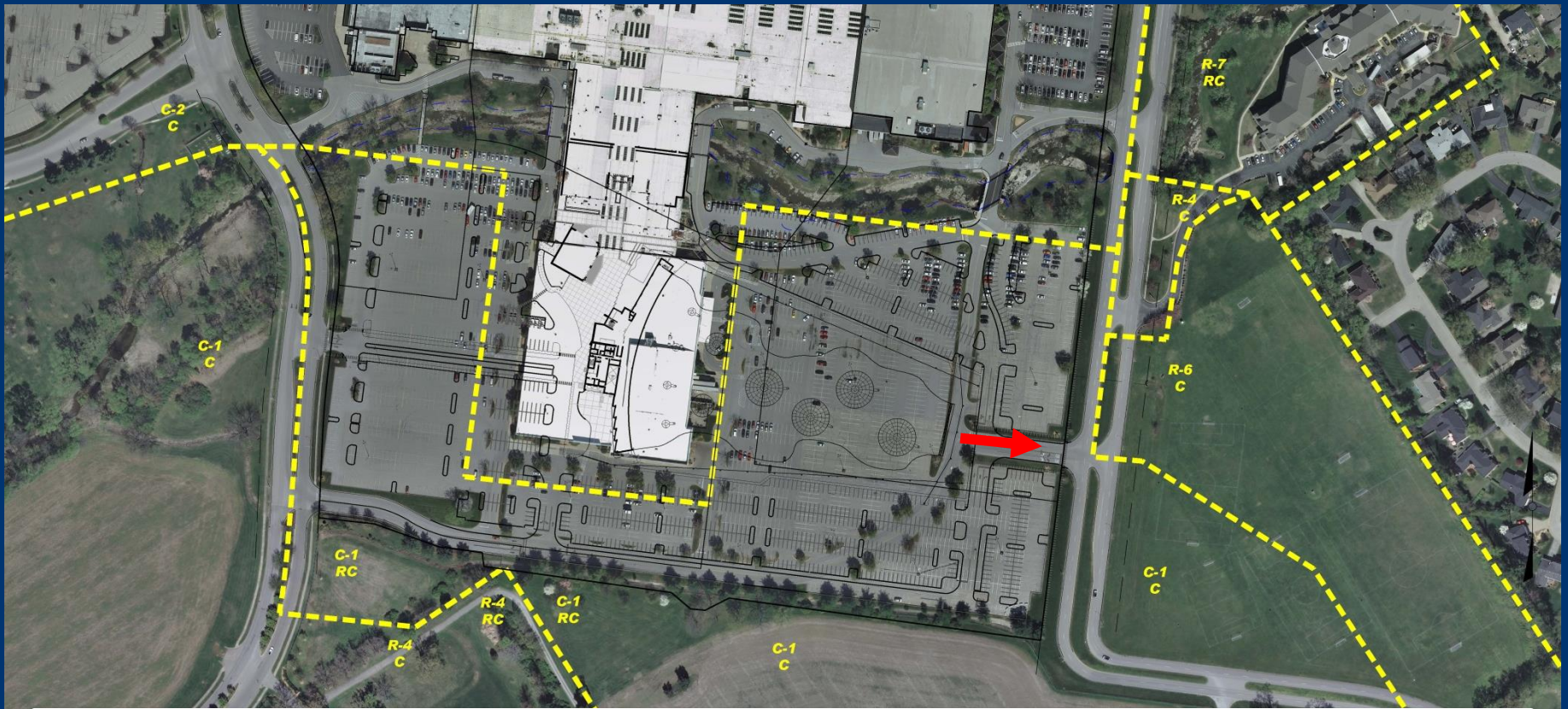


Mature Height 50-80'
 Oak trees hold onto their leaves longer than many other deciduous trees.





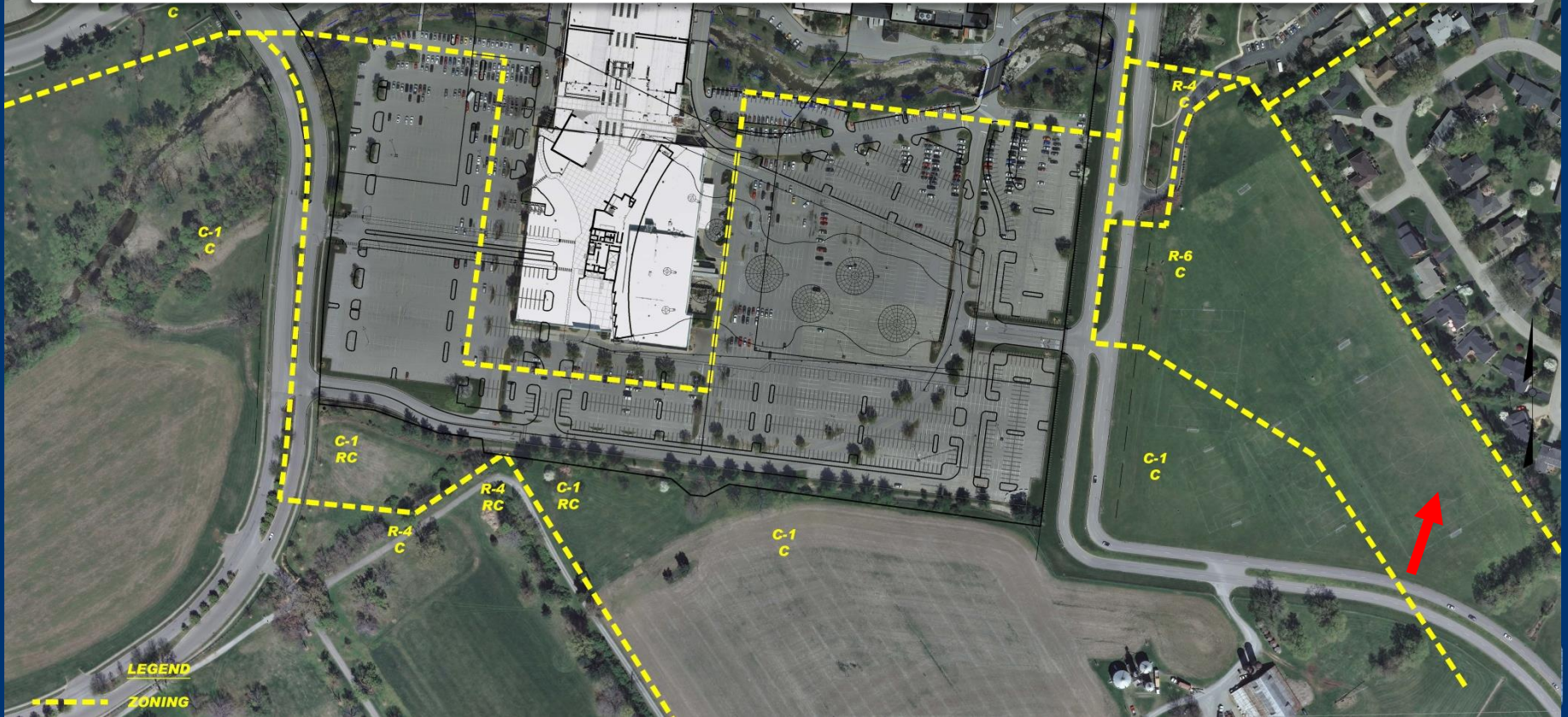
Site Photograph #3



Site Photograph #1



Site Photograph #2



Topgolf will *improve* lighting

- LDC compliance is based on standard measurement method
- LDC compliance isn't and shouldn't be based on photos
- Less light output *with Topgolf* than without
- Less glare *with Topgolf* than without
- Less light trespass than allowed by LDC

