

DRAFT MEMORANDUM

DATE: April 4, 2025

TO: Chet Hagen, Multnomah County

FROM: Monica Leal, PE, PTOE
Phoebe Kuo, EIT
Richard Martin, EIT

SUBJECT: Sandy Blvd A&E Services – Lighting Analysis for Existing Conditions

P24-074

This memorandum provides a summary of the lighting analysis conducted for NE Sandy Boulevard, spanning from the Gresham City Limits to NE 230th Avenue in Multnomah County, Oregon. Based on the Multnomah County Mid County Street Lighting Zone Map, NE Sandy Boulevard falls within the Neighborhood Decorative Zone. Figure 1 shows a vicinity map of the analysis area.

The purpose of this analysis is to evaluate the current lighting conditions and compare them with the Multnomah County Lighting Design Standards to identify any deficiencies in intersection and roadway lighting along the corridor. This memorandum includes the following sections:

- Lighting Analysis Procedures
- Existing Lighting Conditions
- Existing Light Levels and Results
- Summary and Findings

LIGHTING ANALYSIS PROCEDURES

An analysis of the existing lighting conditions was conducted using the AGI32 lighting software package. The illuminance method of calculation was used for this analysis. Intersection and roadway target light level values are based on the functional classification of the roadways¹ and Multnomah County Roadway Lighting Design Standards².

Information on existing luminaire types and pole locations was obtained from the Multnomah County GIS mapping resources³. Additionally, a field investigation was conducted on February 6, 2025, to gather further details on lighting hardware and existing conditions necessary for the lighting analysis. The existing lighting analysis was conducted under the assumption of a low level of pedestrian activity throughout the entire project area, based on the surrounding residential usage.

¹ Multnomah County Comprehensive Framework Plan's Policy 34: Trafficways and the Functional Classification of Trafficways Map.

² Multnomah County Lighting Design Standards, Section 5.120, Revised 4-29-2024.

³ Mid-County Street Lighting Service District Map. Link provided by Multnomah County, Email dated March 19, 2025.



⊗ = Study Intersection

Figure 1: Vicinity Map

EXISTING LIGHTING CONDITIONS

Along NE Sandy Boulevard within the project limits, there is a mix of cobra head style and ornamental post top luminaires. A summary of the existing luminaires is included below.

Cobra Head Style Luminaires

The existing cobra head style luminaires include Leotek GreenCobra (GC), Cree XSPR, and Cree XSP LED luminaires, which are mounted on wood utility poles predominantly located on the south side of NE Sandy Boulevard. These luminaires have mounting heights ranging from 30 to 35 feet. Most of the signalized intersections feature combination traffic signal/light poles with LED luminaires, predominantly Leotek GC cobra head style luminaires. One high pressure sodium (HPS) luminaire was identified on the northwest corner of the NE Sandy Boulevard and 201st Avenue intersection. Figure 2 shows an example of the existing cobra head style luminaires located along NE Sandy Boulevard.

Ornamental Post Top Luminaires

Holophane post top luminaires are located on the north side of NE Sandy Boulevard, between the Quail Access Roadway and NE 223rd Avenue, all with an assumed mounting height of 16 feet. Figure 2 shows an example of the existing ornamental post top luminaires located along NE Sandy Boulevard.



Figure 2: Cobra Head Style Luminaire
Mounted on Wood Utility Pole



Figure 3: Ornamental Post Top Luminaire

Table 1 displays the existing luminaire characteristics within the project area. The luminaire types and arm lengths were obtained from the Multnomah County GIS mapping resources and through a field investigation conducted on February 6, 2025.

Table 1: Luminaire Characteristics

Light Source	Arm Length	Correlated Color Temperature	Light Distribution Type	Light Loss Factor ⁽¹⁾	Luminaire Watts	Manufacturer, Luminaire Model
Cobra Head Style Luminaires						
HPS	12'	N/A	III (N/A, Assumed)	0.657	400	GE Lighting Solutions, M4AR40S__GMN3
LED	4'-12'	4000°K	III	0.855	135	Leotek, GCM2-40H-MV-NW-3-GY-1A-WL
LED	12'	4000°K	III	0.855	108	Leotek, GCM2-40H-MV-NW-3-GY-850-WL
LED	4'-16'	4000°K	III	0.855	58	Leotek, GCM2-30H-MV-NW-3-GY-610-WL
LED	6'	4000°K	III ⁽²⁾	0.864	56	Cree, XSPB023MEB--K 24-Q4
LED	4'	4000°K	III ⁽²⁾	0.864	42	Cree, XSPRB073MEA--K 24-Q6
LED	4'	4000°K	III ⁽²⁾	0.890	34	Leotek, GCJ1-30J-MV-40K-3R-055
Ornamental Post-Top Style Luminaires						
LED	-	3000°K	III	0.837	139	Holophane, WFCL2-P50-30K-AS-BK-L3-S-P7-AO
Notes: N/A = Not Available ⁽¹⁾ HPS Luminaire: Analysis assumes a LDD of 0.90 and LLD of 0.73. LED Luminaires: Analysis assumes a LDD of 0.90. LLD is based on manufacturer specifications. ⁽²⁾ Type III distribution was assumed. Luminaires are facing private access points.						

EXISTING LIGHT LEVELS AND RESULTS

The study area includes illumination systems within the jurisdiction of Multnomah County. Tables 1 and 2 summarize the light level standards for intersections and roadway segments according to Multnomah County standards, as well as the existing light levels. The recommended light levels are based on roadway functional classifications and low pedestrian activity levels.

Table 2: Light Levels Standards and Existing Light Levels - Intersections

Intersection # and Location	Classification ⁽¹⁾	Target Values		Existing Light Levels	
		Average Illuminance (fc)	Uniformity (Avg. to Min)	Average Illuminance (fc)	Uniformity (Avg. to Min)
1. Sandy Blvd / 201 st Ave	Arterial / Collector	1.4	3.0	1.6	3.2
2. Sandy Blvd / 205 th Ave	Arterial / Local Road	1.2	3.0	1.5	2.2
3. Sandy Blvd / 206 th PI	Arterial / Local Road	1.2	3.0	0.4	1.9
4. Sandy Blvd / Fairview Pkwy	Arterial / Arterial	1.7	3.0	1.1	2.3
5. Sandy Blvd / Blossom Hill Rd	Arterial / Local Road	1.2	3.0	0.7	7.3
6. Sandy Blvd / Arbor Crest Dr	Arterial / Local Road	1.2	3.0	0.7	6.6
7. Sandy Blvd / 223 rd Ave	Arterial / Collector	1.4	3.0	0.8	8.0
8. Sandy Blvd / 230 th Ave	Arterial / Local Road	1.2	3.0	1.4	4.5
XX = Value does not meet standards ⁽¹⁾ Multnomah County Comprehensive Framework Plan's Policy 34: Trafficways and the Functional Classification of Trafficways Map.					

Table 3: Light Levels Standards and Existing Light Levels – Roadway Segments

Location	Classification	Target Values		Existing Light Levels	
		Average Illuminance (fc)	Uniformity (Avg. to Min)	Average Illuminance (fc)	Uniformity (Avg. to Min)
Sandy Blvd, 201 st Ave to 205 th Ave	Arterial	0.9	3.5	0.5	N/A
Sandy Blvd, 205 th Ave to 206 th Place				1.0	4.8
Sandy Blvd, 206 th Place to Fairview Pkwy				0.9	4.3
Sandy Blvd, Fairview Pkwy to Blossom Hill Rd				0.6	N/A
Sandy Blvd, Blossom Hill Rd to Arbor Crest Dr				0.5	N/A
Sandy Blvd, Arbor Crest Dr to 223 rd Ave				0.9	9.20
Sandy Blvd, 223 rd Ave to 230 th Ave				0.6	N/A
XX = Value does not meet standards					

The existing lighting analysis indicates that more than half of the locations do not meet the minimum average maintained light level requirements. The uniformity values at most intersections and roadway segments are higher than the recommended values. Figure 4 provides a summary map of the existing lighting conditions compared to the target light levels. Figure 5 presents a detailed graphical output of the existing light levels.

SUMMARY AND FINDINGS

The existing lighting conditions along NE Sandy Boulevard were evaluated between NE 201st Avenue and NE 230th Avenue. Light levels at intersections and roadway segments within the project area were analyzed. The target light level values for intersections and segments are based on the functional classification of the roadways and the Multnomah County Roadway Lighting Design Standards. A low level of pedestrian activity was assumed throughout the entire project area due to the adjacent residential uses.

Along NE Sandy Boulevard within the project limits, there is a mix of cobra head style and ornamental post top luminaires. The cobra head style luminaires are mounted on utility poles, predominantly located on the south side of NE Sandy Boulevard, with mounting heights ranging from 30 to 35 feet. The post top luminaires are situated on the north side of NE Sandy Boulevard between the Quail Access Road and NE 223rd Avenue, all with an assumed mounting height of 16 feet.

The results of the existing lighting condition analysis indicate the following:

- Locations where both minimum average maintained light level and uniformity values are met:
 - Intersection of NE Sandy Boulevard and NE 205th Avenue.
- Locations where minimum average maintained light level is met but uniformity value is not met:
 - Intersection of NE Sandy Boulevard and NE 201st Avenue.
 - Intersection of NE Sandy Boulevard and NE 230th Avenue.
 - Segment of NE Sandy Boulevard between 205th Avenue and 206th Place.
 - Segment of NE Sandy Boulevard between 206th Place and Fairview Parkway.
 - Segment of NE Sandy Boulevard between Arbor Crest Drive and 223rd Avenue.
- Locations where minimum average maintained light level is not met but uniformity value is met:
 - Intersection of NE Sandy Boulevard and 206th Place.
 - Intersection of NE Sandy Boulevard and Fairview Parkway.

- Locations where both minimum average maintained light level and uniformity value are not met:
 - Intersection of NE Sandy Boulevard and Blossom Hill Road.
 - Intersection of NE Sandy Boulevard and Arbor Crest Drive.
 - Intersection of NE Sandy Boulevard and NE 223rd Avenue.
 - Segment of NE Sandy Boulevard between 201st Avenue and 205th Place.
 - Segment of NE Sandy Boulevard between Fairview Parkway and Blossom Hill Road.
 - Segment of NE Sandy Boulevard between Blossom Hill Road and Arbor Crest Drive.
 - Segment of NE Sandy Boulevard between 223rd Avenue and 230th Avenue.

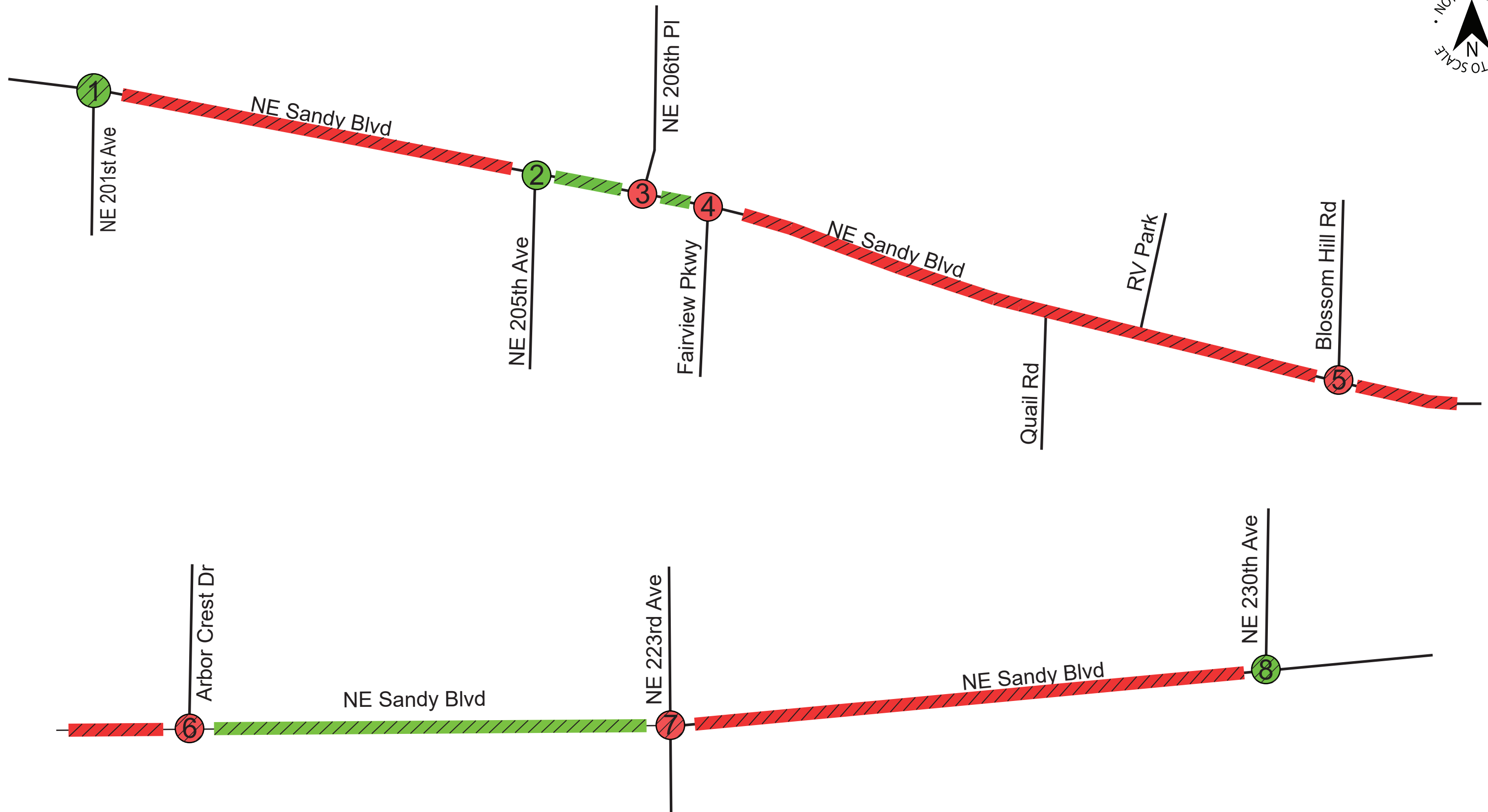
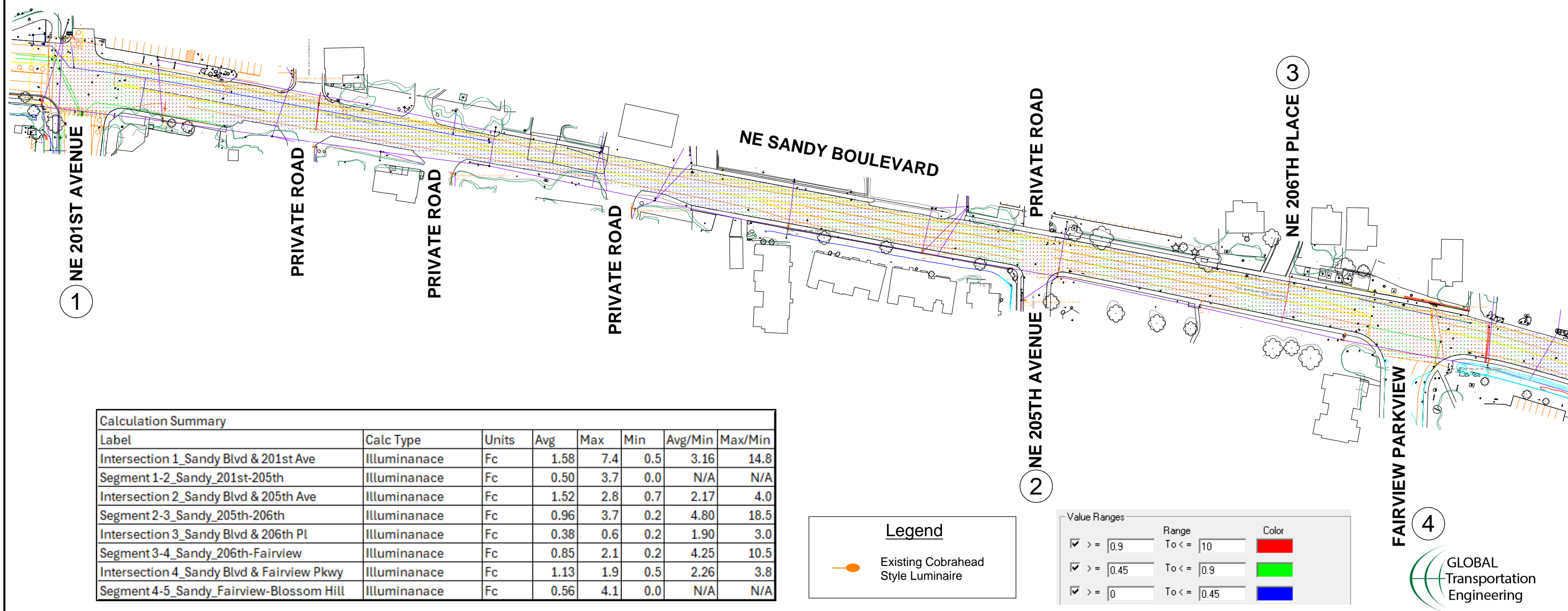
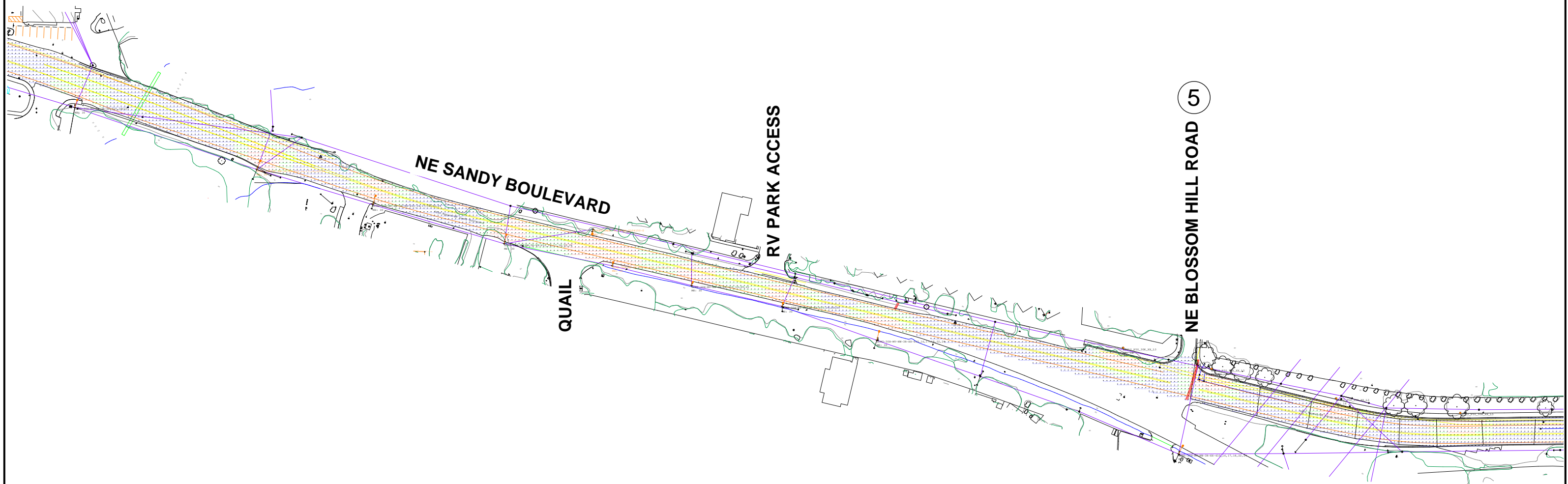


Figure 4:
Existing Light Levels &
Uniformity Map



**FIGURE 5-1: EXISTING LIGHTING RESULTS
(NE SANDY BOULEVARD, 201ST AVENUE TO EAST OF FAIRVIEW
PARKWAY)**



Calculation Summary							
Label	Calc Type	Units	Avg	Max	Min	Avg/Min	Max/Min
Segment 4-5_Sandy_Fairview-Blossom Hill	Illuminace	Fc	0.56	4.1	0.0	N/A	N/A
Intersection 5_Sandy Blvd & Blossom Hill Rd	Illuminace	Fc	0.73	4.4	0.1	7.30	44.0
Segment 5-6_Sandy_Blossom Hill-Arbor Crest	Illuminace	Fc	0.48	4.4	0.0	N/A	N/A

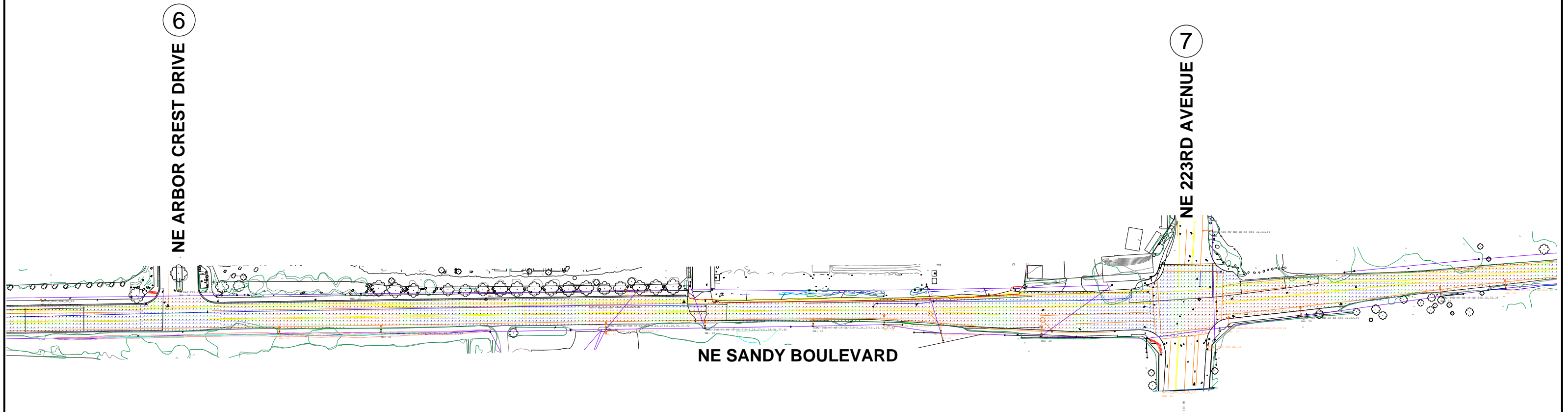
Legend

- Existing Cobrahead Style Luminaire
- Existing Ornamental Post-Top Style Luminaire

Value Ranges		
	Range	Color
<input checked="" type="checkbox"/> >= 0.9	To <= 10	Red
<input checked="" type="checkbox"/> >= 0.45	To <= 0.9	Green
<input checked="" type="checkbox"/> >= 0	To <= 0.45	Blue





FIGURE 5-2: EXISTING LIGHTING RESULTS
(NE SANDY BOULEVARD, EAST OF FAIRVIEW PARKWAY TO
EAST OF BLOSSOM HILL ROAD)






Calculation Summary							
Label	Calc Type	Units	Avg	Max	Min	Avg/Min	Max/Min
Segment 5-6_Sandy Blossom Hill-Arbor Crest	Illuminance	Fc	0.48	4.4	0.0	N/A	N/A
Intersection 6_Sandy Blvd & Arbor Crest Dr	Illuminance	Fc	0.66	4.1	0.1	6.60	41.0
Segment 6-7_Sandy Arbor Crest-223rd	Illuminance	Fc	0.92	4.9	0.1	9.20	49.0
Intersection 7_Sandy Blvd & 223rd Ave	Illuminance	Fc	0.80	3.2	0.1	8.00	32.0
Segment 7-8_Sandy 223rd-230th	Illuminance	Fc	0.62	2.5	0.0	N/A	N/A

Legend

 Existing Cobrahead Style Luminaire

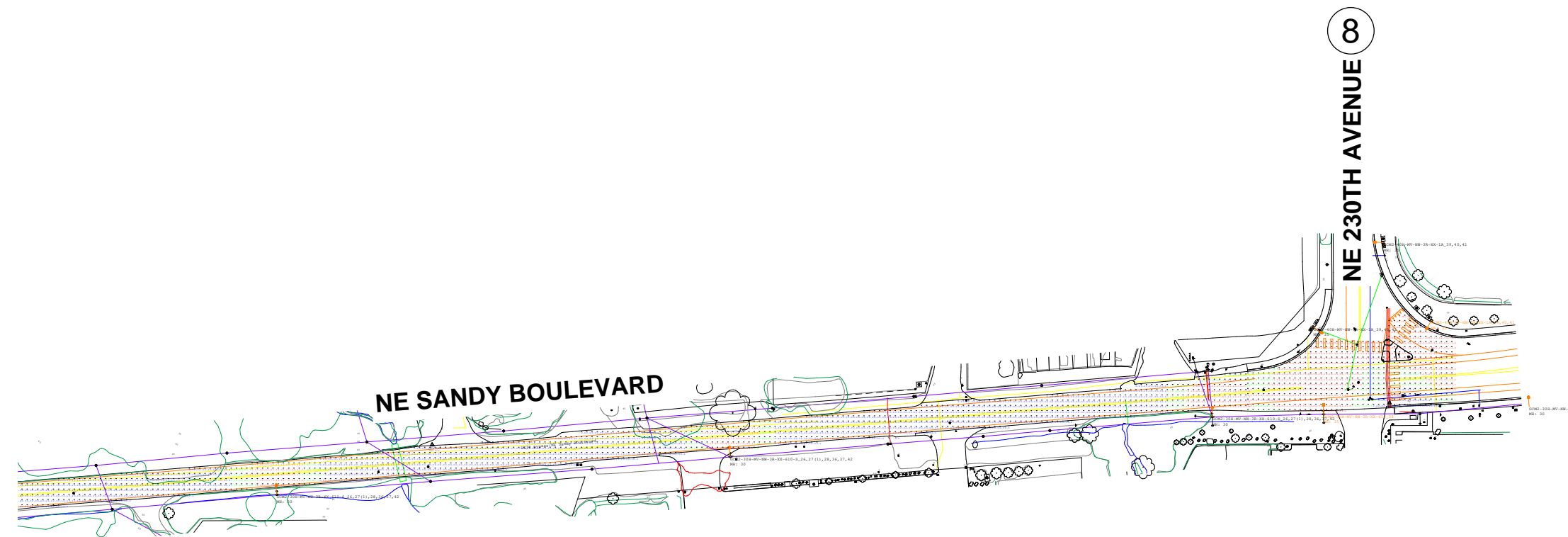
 Existing Ornamental Post-Top Style Luminaire

Value Ranges

	Range	Color
<input checked="" type="checkbox"/> >= 0.9 To <= 10		
<input checked="" type="checkbox"/> >= 0.45 To <= 0.9		
<input checked="" type="checkbox"/> >= 0 To <= 0.45		




**FIGURE 5-3: EXISTING LIGHTING RESULTS
(NE SANDY BOULEVARD, EAST OF BLOSSOM HILL ROAD TO
EAST OF 223RD AVENUE)**






Calculation Summary							
Label	Calc Type	Units	Avg	Max	Min	Avg/Min	Max/Min
Segment 7-8_Sandy_223rd-230th	Illuminance	Fc	0.62	2.5	0.0	N/A	N/A
Intersection 8_Sandy Blvd & 230th Ave	Illuminance	Fc	1.36	3.0	0.3	4.53	10.0

Legend

 Existing Cobrahead
Style Luminaire

Value Ranges

	Range	Color
<input checked="" type="checkbox"/> >= 0.9 To <= 10		
<input checked="" type="checkbox"/> >= 0.45 To <= 0.9		
<input checked="" type="checkbox"/> >= 0 To <= 0.45		



**FIGURE 5-4: EXISTING LIGHTING RESULTS
(NE SANDY BOULEVARD, EAST OF 223RD AVENUE TO 230TH AVENUE)**