

## *ILLUMINANCE CRITERIA (ODOT TEM TABLE 1197-4)*

AVERAGE	MINIMUM	UNIFORMITY (AVG/MIN)
0.9	0.3	3.0:1

## **SUMMARY OF ROADWAY PHOTOMETRICS I-90 MAINLINE AND B RAMPS**

SEGMENT	AVERAGE	MINIMUM	UNIFORMITY (AVG/MIN)	UNIFORMITY (MAX/MIN)
PR. I-90 E. 9TH TO E. 14TH	1.1	0.4	2.8:1	8.8:1
PR. I-90 E. 14TH TO E. 22ND	0.9	0.3	3.0:1	6.7:1
PR. I-90 UNDER E. 22ND	1.0	0.3	3.3:1	10.3:1
PR. I-90 E. 22ND TO CARNEGIE	1.2	0.5	2.4:1	4.0:1
PR. I-90 UNDER CARNEGIE	1.0	0.4	2.5:1	12.5:1
PR. I-90 CARNEGIE TO PROSPECT	0.9	0.4	2.3:1	5.0:1
PR. RAMP IB5 I-90 EB TO E. 9TH	1.0	0.5	2.0:1	2.8:1
PR. RAMP B6 I-90 EB TO E. 14TH	1.0	0.3	3.3:1	4.7:1
PR. RAMP B6 E. 14TH TO E. 22ND	1.0	0.4	2.5:1	4.0:1
PR. RAMP A1 I-90 GORE TO CARNEGIE	1.0	0.6	1.7:1	2.7:1
PR. RAMP 4	0.9	0.3	3.0:1	5.3:1

## *LEGEND*

## *PROPOSED HIGH MAST TOWERS W/ 2, 3 OR 4 LED LUMINAIRES (SYMMETRIC)*

*LOW MAST POLE  
W/ 1 LED LUMINAIRE  
(SYMMETRIC)*

*LOW MAST POLE  
W/ 1 LED LUMINAIRE  
(ASYMMETRIC)*

## *PROPOSED UNDERPASS LED LUMINAIRE*

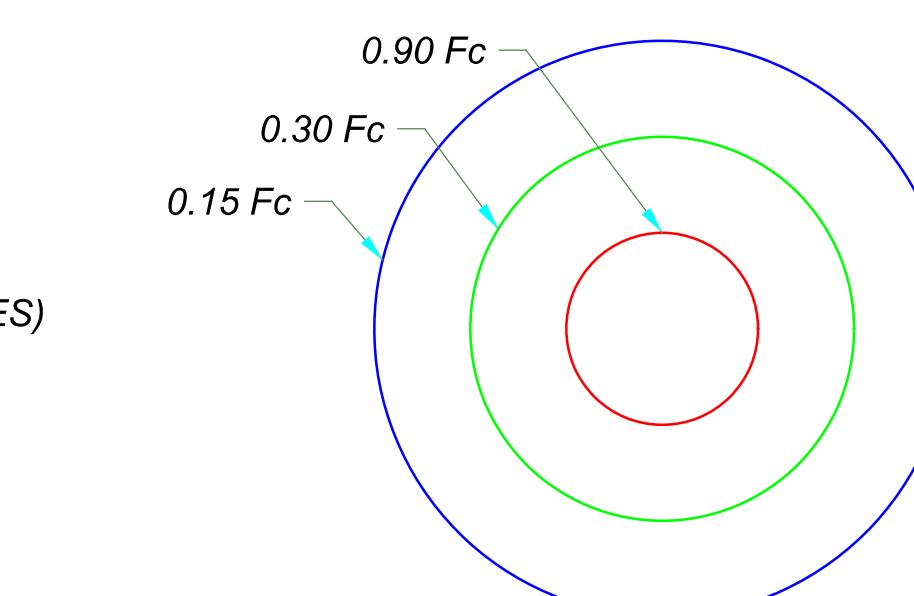
## ***EXISTING HIGH MAST TOWERS TO REMAIN***

LED LIGHT FIXTURE

**HOLOPHANE HMLED4 (FOR FREEWAY/RAMPS)  
PERFORMANCE PACKAGE 3 - 3000K CCT  
IES DISTRIBUTION: AREA WIDE  
SYSTEM WATTAGE: 429 Watts  
LUMENS PER FIXTURE: 63,221  
INPUT OPERATING CURRENT: 0.90 Amps (480V)  
LIGHT LOSS FACTOR: 0.85  
LOW MAST MOUNTING HEIGHT: 50 FT  
HIGH MAST MOUNTING HEIGHT: VARIES**

**HOLOPHANE WALLPACK LED (FOR BRIDGE UNDERPASSE  
PERFORMANCE PACKAGE 10C1000 - 3000 SERIES CCT  
IES DISTRIBUTION: TYPE 3 SHORT  
SYSTEM WATTAGE: 28 Watts  
LUMENS PER FIXTURE: 3,206  
INPUT OPERATING CURRENT: 0.06 Amps (480V)  
LIGHT LOSS FACTOR: 0.86  
WALL PACK MOUNTING HEIGHT: VARIES**

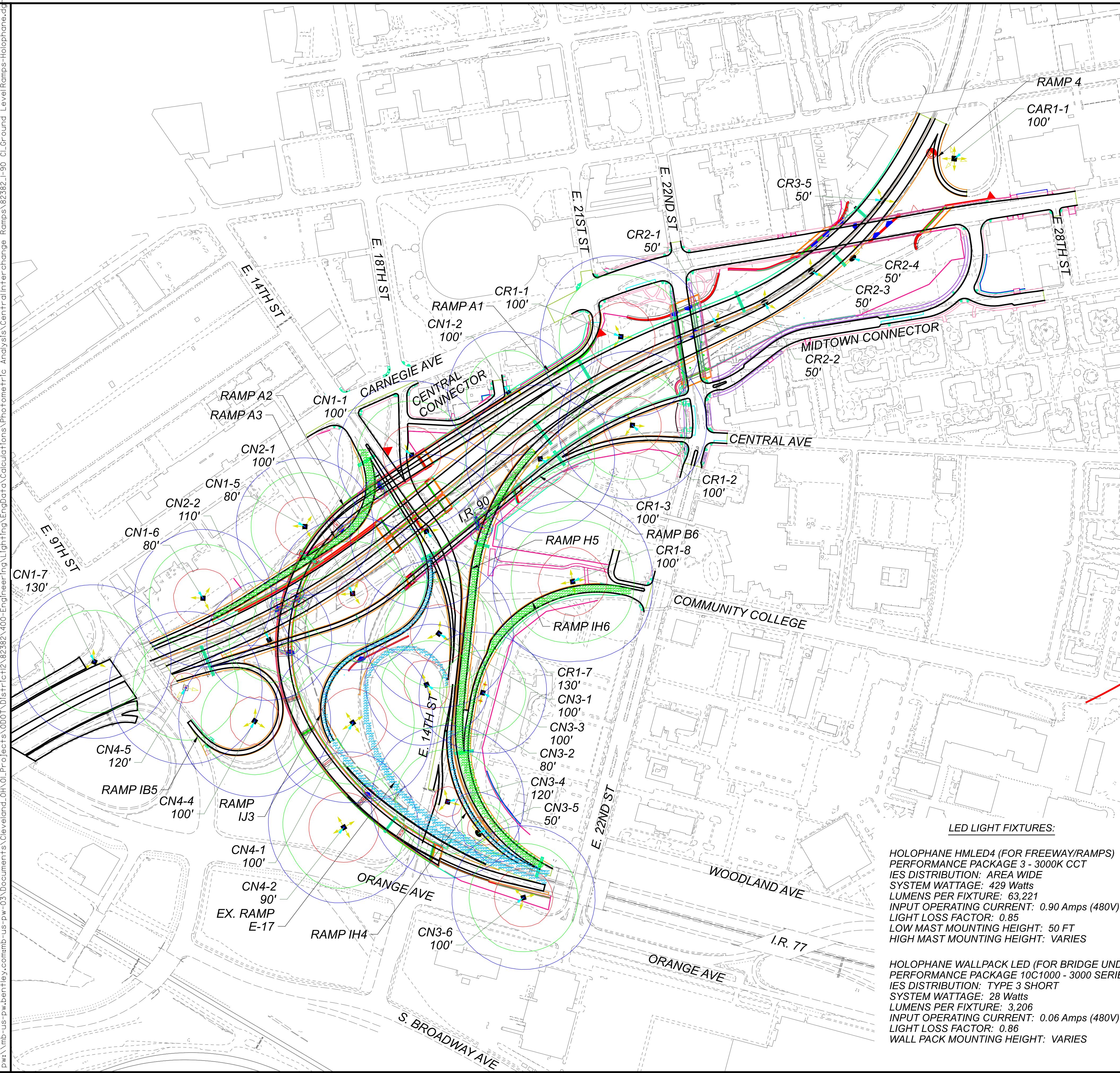
## *TYPICAL CONTOUR VALUES*



DESIGN AGENCY	
<b>Michael Baker</b>	
INTERNATIONAL	
DESIGNER	JLD
REVIEWER	
SM	4/24/24
PROJECT ID	82382
SHEET	TOTAL
1	10

CUY-90-16.28

MODEL: Photometric Exhibit Sheet PAPER SIZE: 34x22 (In.) DATE: 4/22/2024 TIME: 10:03:45 PM USER: Michael.Benroth DW: V:\mb\us-pw\bentley\commo-us-pw\33\Documents\Cleveland\_OH\Projects\000T\District1\2\82382\400\Engineering\Lighting\EngData\Calculations\Photometric Analysis\CentralInterchange Ramps\82382\_I-90\_Cl\_Ground Level Ramps-Holophane.dwg



## ILLUMINANCE CRITERIA (ODOT TEM TABLE 1197-4)

AVERAGE	MINIMUM	UNIFORMITY (AVG/MIN)
0.9	0.3	3.0:1

**EXHIBIT G: CCG3A PHOTOMETRIC ANALYSIS  
I-90 / I-77 INTERCHANGE - GROUND LEVEL RAMPS (HOLOPHANE)**

HORIZONTAL SCALE IN FEET  
0 100 200 400

SUMMARY OF ROADWAY PHOTOMETRICS  
CENTRAL INTERCHANGE GROUND LEVEL RAMPS

SEGMENT	AVERAGE	MINIMUM	UNIFORMITY (AVG/MIN)	UNIFORMITY (MAX/MIN)
EX. RAMP E-17 I-77 NB TO E. 14TH SB	1.1	0.6	1.8:1	3.5:1
PR. HYBRID RAMP H5 I-77 NB TO I-90 EB	0.9	0.3	3.0:1	6.7:1
PR. RAMP IH4 I-77 NB TO E. 14TH NB	1.1	0.5	2.2:1	4.6:1
PR. RAMP IH6 I-77 NB TO COMMUNITY COLLEGE	1.0	0.4	2.5:1	4.8:1
PR. RAMP IJ3 E. 14TH SB TO I-77 SB	0.9	0.4	2.3:1	4.3:1
PR. RAMPA3 E. 14TH SB TO I-90 WB	0.9	0.3	3.0:1	8.0:1

## LEGEND

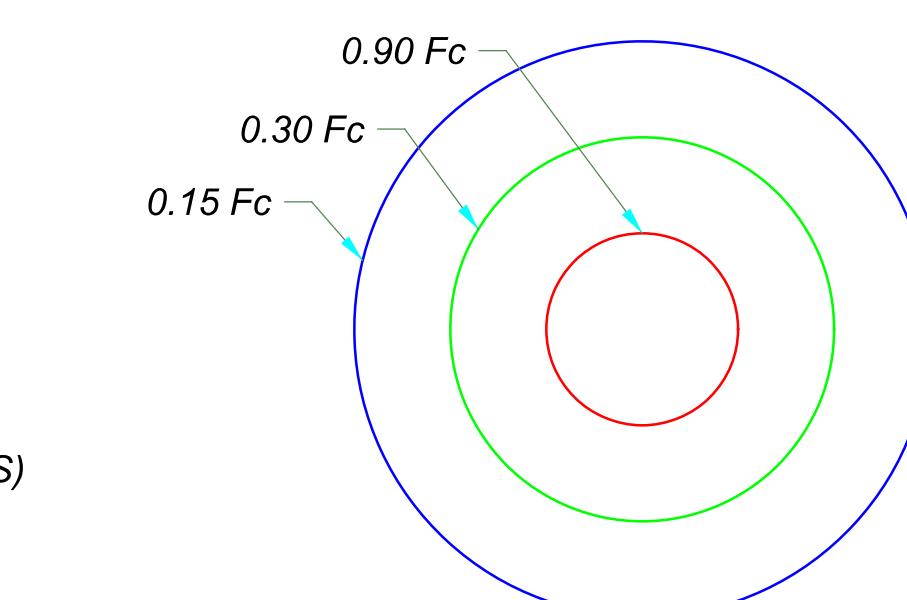
- PROPOSED HIGH MAST TOWERS W/ 2, 3 OR 4 LED LUMINAIRES (SYMMETRIC)
- LOW MAST POLE W/ 1 LED LUMINAIRE (SYMMETRIC)
- LOW MAST POLE W/ 1 LED LUMINAIRE (ASYMMETRIC)
- PROPOSED UNDERPASS LED LUMINAIRE
- EXISTING HIGH MAST TOWERS TO REMAIN

## LED LIGHT FIXTURES:

HOLOPHANE HMLED4 (FOR FREEWAY/RAMPS)  
PERFORMANCE PACKAGE 3 - 3000 CCT  
IES DISTRIBUTION: AREA WIDE  
SYSTEM WATTAGE: 429 Watts  
LUMENS PER FIXTURE: 63,221  
INPUT OPERATING CURRENT: 0.90 Amps (480V)  
LIGHT LOSS FACTOR: 0.85  
LOW MAST MOUNTING HEIGHT: 50 FT  
HIGH MAST MOUNTING HEIGHT: VARIES

HOLOPHANE WALLPACK LED (FOR BRIDGE UNDERPASSES)  
PERFORMANCE PACKAGE 10C1000 - 3000 SERIES CCT  
IES DISTRIBUTION: TYPE 3 SHORT  
SYSTEM WATTAGE: 28 Watts  
LUMENS PER FIXTURE: 3,206  
INPUT OPERATING CURRENT: 0.06 Amps (480V)  
LIGHT LOSS FACTOR: 0.86  
WALL PACK MOUNTING HEIGHT: VARIES

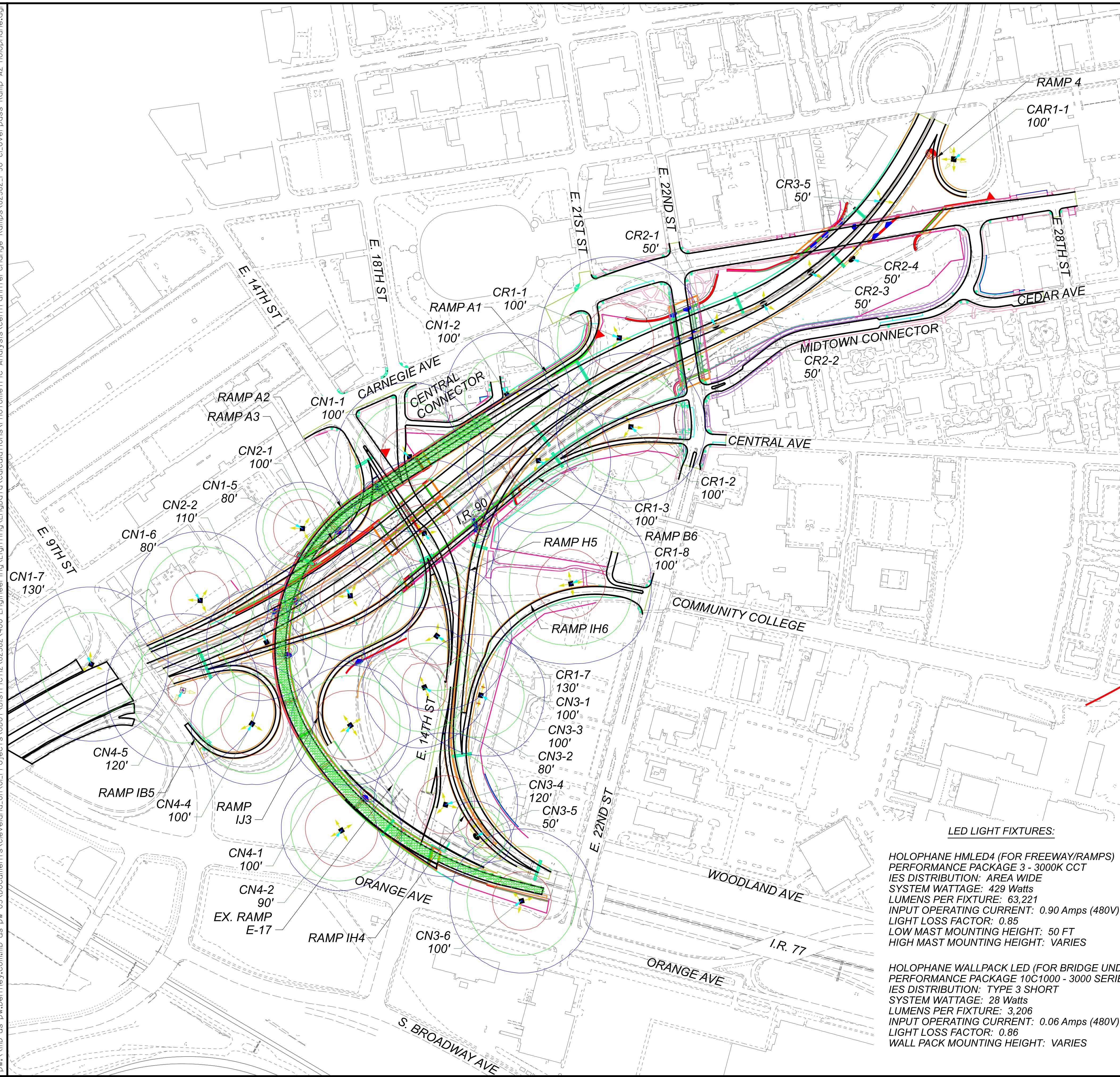
## TYPICAL CONTOUR VALUES



DESIGN AGENCY  
**Michael Baker International**  
DESIGNER JLD  
REVIEWER SM 4/24/24  
PROJECT ID 82382  
SHEET TOTAL 2 10

CUY-90-16.28

MODEL: Photometric Exhibit Sheet PAPER SIZE: 34x22 (In.) DATE: 4/22/2024 TIME: 4:00:07 PM USER: Michael.Benroth DW: V:\mb\bw\bentley\commo-us-pw\33\Documents\Cleveland\_OH\Projects\000T\District2\82382\400\Engineering\Lighting\EngData\Calculations\Photometric Analysis\CentralInterchange\_Ramps\82382\_I-90\_Cloverpass\_Ramp\_A2-Holophane.dwg



## ILLUMINANCE CRITERIA (ODOT TEM TABLE 1197-4)

AVERAGE	MINIMUM	UNIFORMITY (AVG/MIN)
0.9	0.3	3.0:1

SUMMARY OF ROADWAY PHOTOMETRICS  
CENTRAL INTERCHANGE OVERPASS RAMP A2

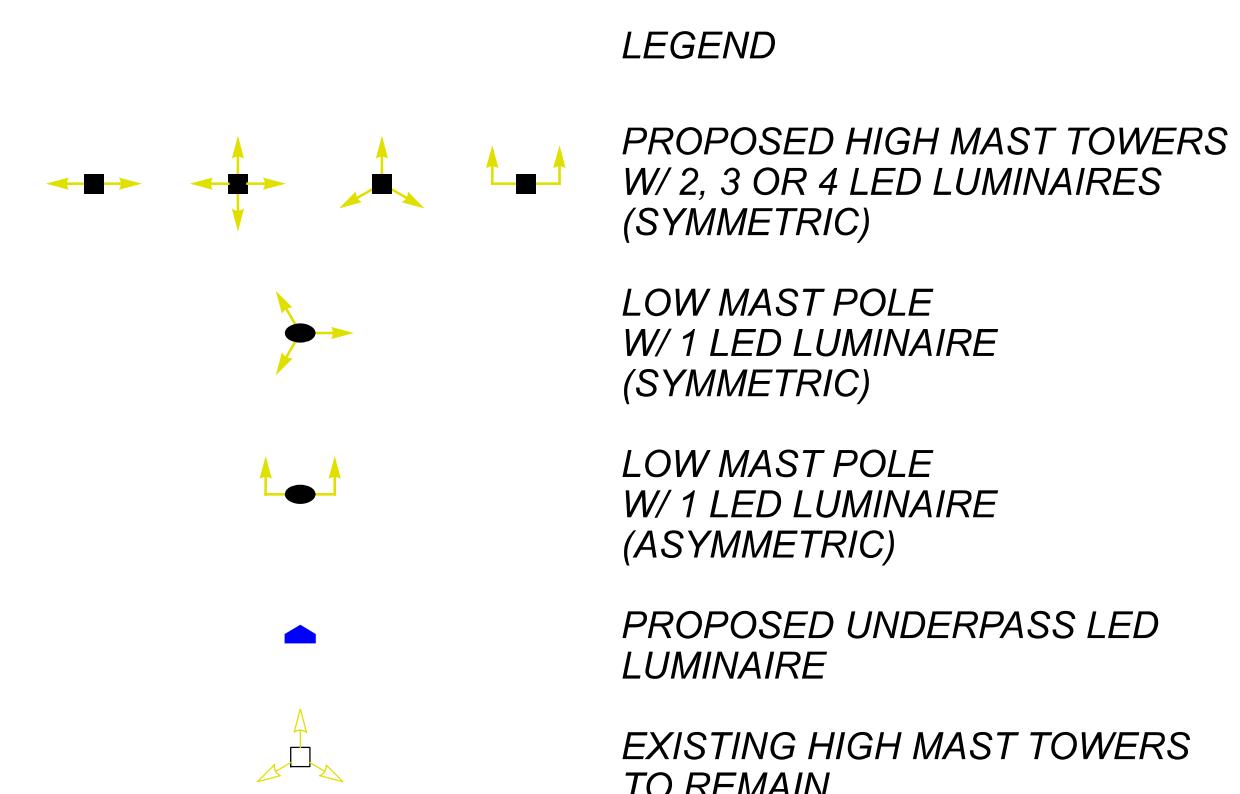
SEGMENT	AVERAGE	MINIMUM	UNIFORMITY (AVG/MIN)	UNIFORMITY (MAX/MIN)
PR. RAMP A2 I-90 WB TO I-77 SB	0.9	0.3	3.0:1	13.0:1



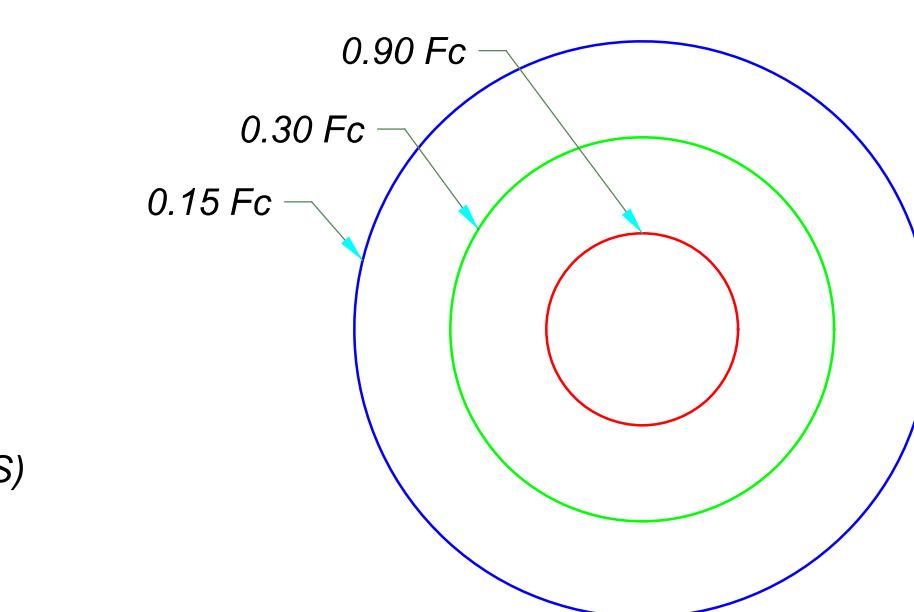
HORIZONTAL SCALE IN FEET  
0 100 200 400

EXHIBIT G: CCG3A PHOTOMETRIC ANALYSIS  
I-90 / I-77 INTERCHANGE - OVERPASS RAMP A2 (HOLOPHANE)

DESIGN AGENCY  
**Michael Baker**  
INTERNATIONAL  
DESIGNER  
JLD  
REVIEWER  
SM 4/24/24  
PROJECT ID  
82382  
SHEET TOTAL  
3 10

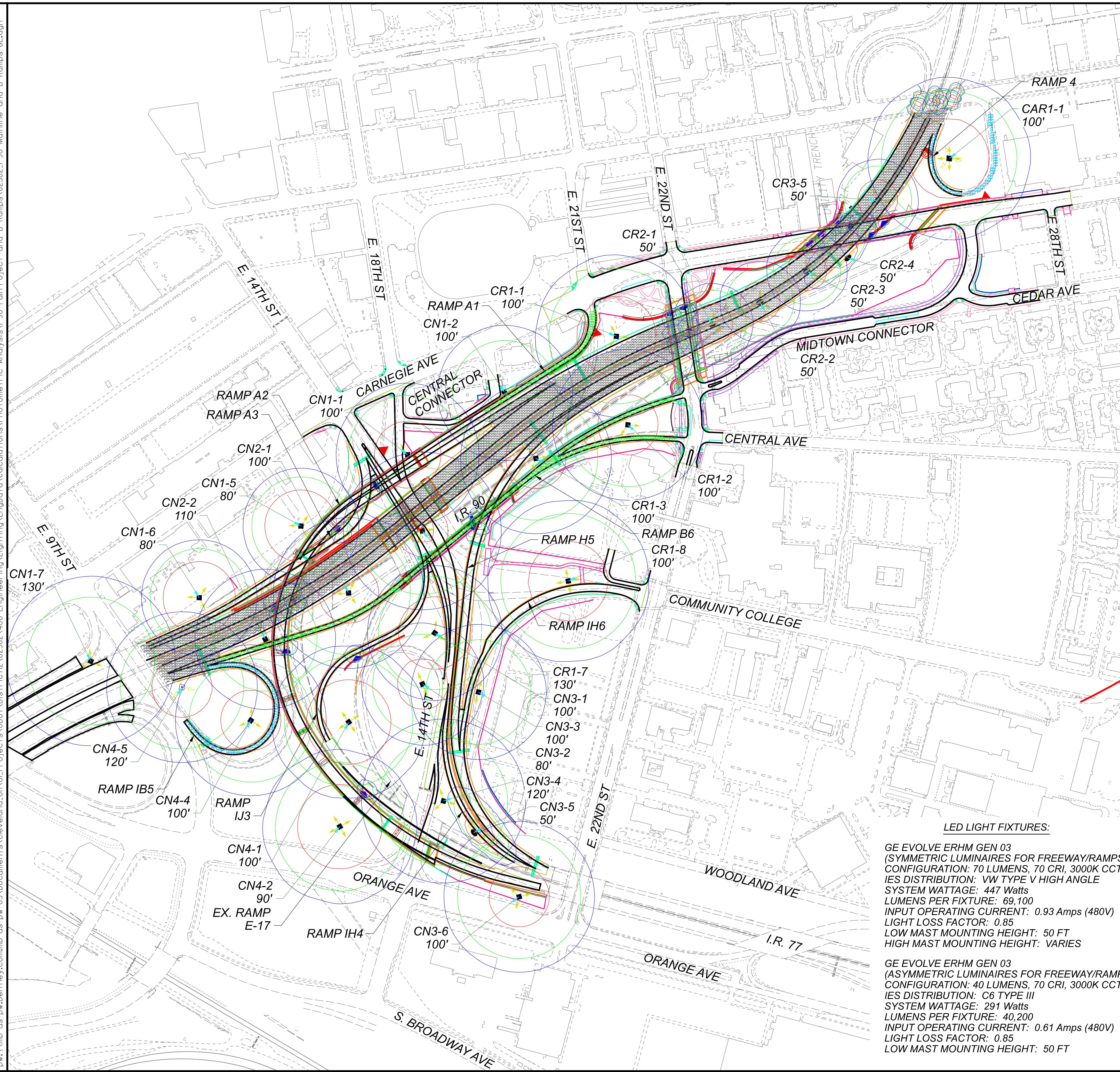


## TYPICAL CONTOUR VALUES



CUY-90-16.28

MODEL: Photometric Exhibit Sheet PAPER SIZE: 34x22 (In.) DATE: 4/22/2024 TIME: 3:40:02 PM USER: Michael.Benroth DWL:\nmb-psw\benbier\commo-us-psw-3\Documents\Cleveland\_OHOL\Projects\0007-District102\82382\400-Engineering\Lighting\EngData\Calculations\Photometric Analysis\I-90 Full Project and B Ramps\82382-I-90 Mainline and B Ramps-GE.Eogn



## ILLUMINANCE CRITERIA (ODOT TEM TABLE 1197-4)

AVERAGE	MINIMUM	UNIFORMITY (AVG/MIN)
0.9	0.3	3.0:1

SUMMARY OF ROADWAY PHOTOMETRICS  
I-90 MAINLINE AND B RAMPS

SEGMENT	AVERAGE	MINIMUM	UNIFORMITY (AVG/MIN)	UNIFORMITY (MAX/MIN)
PR. I-90 E. 9TH TO E. 14TH	1.2	0.5	2.4:1	6.0:1
PR. I-90 E. 14TH TO E. 22ND	1.1	0.3	3.7:1	6.3:1
PR. I-90 UNDER E. 22ND	1.3	0.4	3.3:1	8.5:1
PR. I-90 E. 22ND TO CARNEGIE	1.4	0.7	2.0:1	3.6:1
PR. I-90 UNDER CARNEGIE	1.1	0.6	1.8:1	3.0:1
PR. I-90 CARNEGIE TO PROSPECT	1.1	0.6	1.8:1	3.2:1
PR. RAMP IB5 I-90 EB TO E. 9TH	1.1	0.6	1.8:1	2.3:1
PR. RAMP B6 I-90 EB TO E. 14TH	1.0	0.4	2.5:1	3.5:1
PR. RAMP B6 E. 14TH TO E. 22ND	1.1	0.5	2.2:1	3.0:1
PR. RAMP A1 I-90 GORE TO CARNEGIE	1.0	0.6	1.7:1	2.5:1
PR. RAMP 4	1.0	0.4	2.5:1	4.3:1

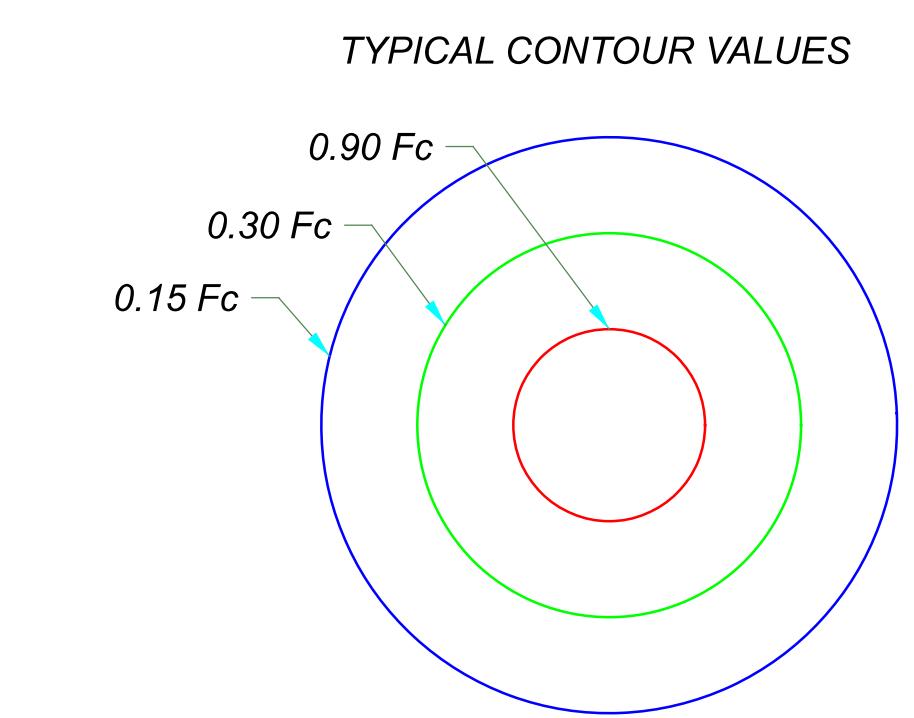
DESIGN AGENCY  
**Michael Baker International**

DESIGNER JLD  
REVIEWER SM 4/24/24  
PROJECT ID 82382  
SHEET 4 TOTAL 10

EXHIBIT G: CCG3A PHOTOMETRIC ANALYSIS  
I-90 MAINLINE AND B RAMPS (GE EVOLVE)

HORIZONTAL SCALE IN FEET  
0 100 200 400

- LEGEND
- PROPOSED HIGH MAST TOWERS W/ 2, 3 OR 4 LED LUMINAIRES (SYMMETRIC)
  - LOW MAST POLE W/ 1 LED LUMINAIRE (SYMMETRIC)
  - LOW MAST POLE W/ 1 LED LUMINAIRE (ASYMMETRIC)
  - PROPOSED UNDERPASS LED LUMINAIRE
  - EXISTING HIGH MAST TOWERS TO REMAIN



## LED LIGHT FIXTURES:

GE EVOLVE ERHM GEN 03  
(SYMMETRIC LUMINAIRES FOR FREEWAY/RAMPS)  
CONFIGURATION: 70 LUMENS, 70 CRI, 3000K CCT  
IES DISTRIBUTION: VW TYPE V HIGH ANGLE  
SYSTEM WATTAGE: 447 Watts  
LUMENS PER FIXTURE: 69,100  
INPUT OPERATING CURRENT: 0.93 Amps (480V)  
LIGHT LOSS FACTOR: 0.85  
LOW MAST MOUNTING HEIGHT: 50 FT  
HIGH MAST MOUNTING HEIGHT: VARIES

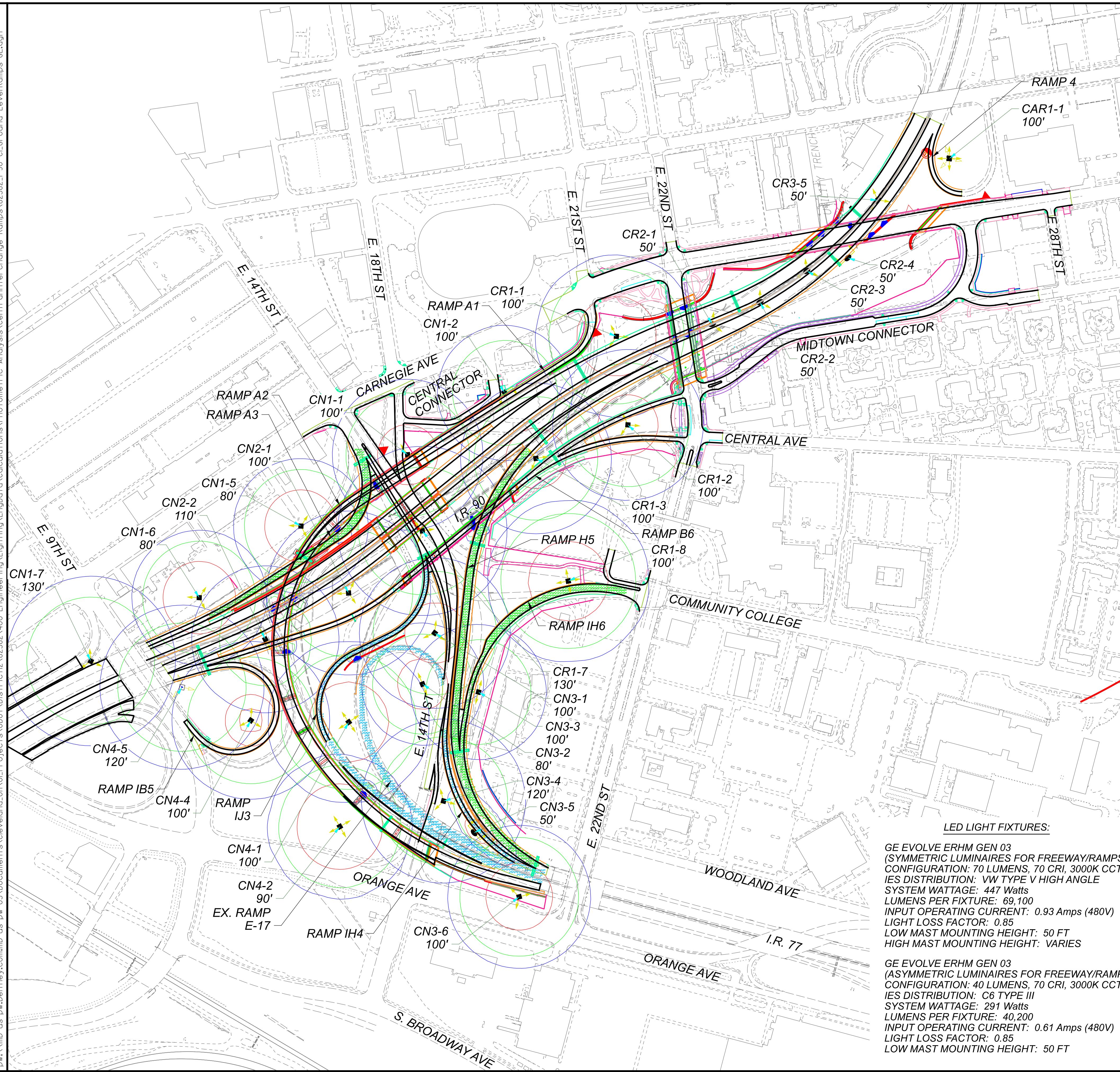
GE EVOLVE ERHM GEN 03  
(ASYMMETRIC LUMINAIRES FOR FREEWAY/RAMPS)  
CONFIGURATION: 40 LUMENS, 70 CRI, 3000K CCT  
IES DISTRIBUTION: C6 TYPE III  
SYSTEM WATTAGE: 291 Watts  
LUMENS PER FIXTURE: 40,200  
INPUT OPERATING CURRENT: 0.61 Amps (480V)  
LIGHT LOSS FACTOR: 0.85  
LOW MAST MOUNTING HEIGHT: 50 FT

LED LIGHT FIXTURES (CONTINUED):  
GE EVOLVE EWAS A SERIES LED WALL PACK  
(FOR BRIDGE UNDERPASSES)  
CONFIGURATION: B3, 70 CRI, 3000K CCT  
IES DISTRIBUTION: TYPE 3  
SYSTEM WATTAGE: 38 Watts  
LUMENS PER FIXTURE: 4,900  
INPUT OPERATING CURRENT: 0.08 Amps (480V)  
LIGHT LOSS FACTOR: 0.85  
WALL PACK MOUNTING HEIGHT: VARIES

CUY-90-16.28

MODEL: Photometric Exhibit Sheet PAPER SIZE: 34x22 (In.) DATE: 4/22/2024 TIME: 10:23:44 PM USER: MichaelBennoth

DWG: Vmb-us-pw-bentley/commo-us-pw-03/Documents/Cleveland\_OHOL/Projects/000T-District102/82382/400-Engineering/Lighting/EngData/Calculations/Photometric Analysis/CentralInterchange\_Ramps.v82382.l-90 Cl\_Ground Level Ramps-CE.dwg



## ILLUMINANCE CRITERIA (ODOT TEM TABLE 1197-4)

AVERAGE	MINIMUM	UNIFORMITY (AVG/MIN)
0.9	0.3	3.0:1

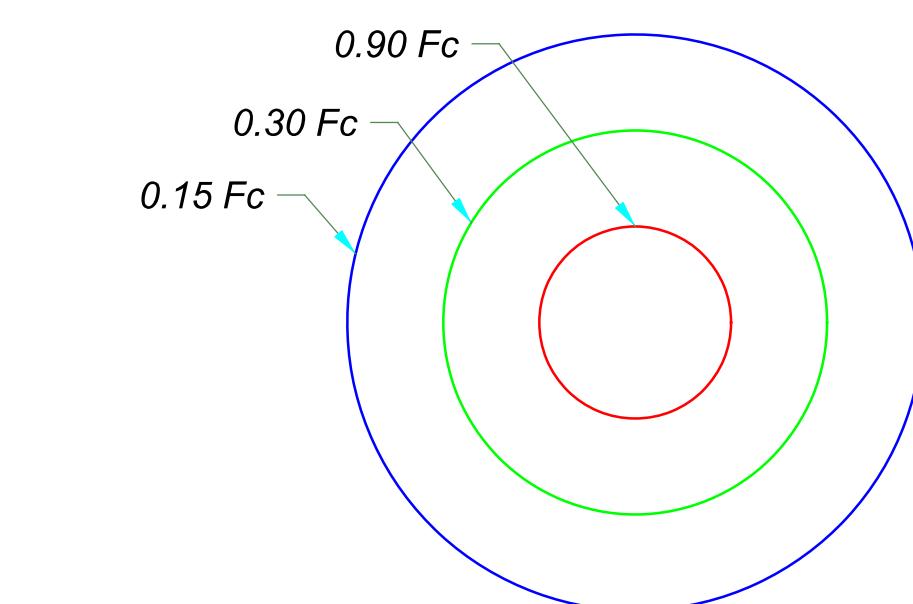
SUMMARY OF ROADWAY PHOTOMETRICS  
CENTRAL INTERCHANGE GROUND LEVEL RAMPS

SEGMENT	AVERAGE	MINIMUM	UNIFORMITY (AVG/MIN)	UNIFORMITY (MAX/MIN)
EX. RAMP E-17 I-77 NB TO E. 14TH SB	1.2	0.6	2.0:1	4.0:1
PR. HYBRID RAMP H5 I-77 NB TO I-90 EB	1.1	0.4	2.8:1	5.0:1
PR. RAMP IH4 I-77 NB TO E. 14TH NB	1.3	0.6	2.2:1	5.5:1
PR. RAMP IH6 I-77 NB TO COMMUNITY COLLEGE	1.1	0.5	2.2:1	3.4:1
PR. RAMP IJ3 E. 14TH SB TO I-77 SB	1.0	0.4	2.5:1	4.3:1
PR. RAMP A3 E. 14TH SB TO I-90 WB	1.1	0.4	2.8:1	7.0:1

## LEGEND

- PROPOSED HIGH MAST TOWERS W/ 2, 3 OR 4 LED LUMINAIRES (SYMMETRIC)
- LOW MAST POLE W/ 1 LED LUMINAIRE (SYMMETRIC)
- LOW MAST POLE W/ 1 LED LUMINAIRE (ASYMMETRIC)
- PROPOSED UNDERPASS LED LUMINAIRE
- EXISTING HIGH MAST TOWERS TO REMAIN

## TYPICAL CONTOUR VALUES



## LED LIGHT FIXTURES:

GE EVOLVE ERHM GEN 03  
(SYMMETRIC LUMINAIRES FOR FREEWAY/RAMPS)  
CONFIGURATION: 70 LUMENS, 70 CRI, 3000K CCT  
IES DISTRIBUTION: VW TYPE V HIGH ANGLE  
SYSTEM WATTAGE: 447 Watts  
LUMENS PER FIXTURE: 69,100  
INPUT OPERATING CURRENT: 0.93 Amps (480V)  
LIGHT LOSS FACTOR: 0.85  
LOW MAST MOUNTING HEIGHT: 50 FT  
HIGH MAST MOUNTING HEIGHT: VARIES

GE EVOLVE ERHM GEN 03  
(ASYMMETRIC LUMINAIRES FOR FREEWAY/RAMPS)  
CONFIGURATION: 40 LUMENS, 70 CRI, 3000K CCT  
IES DISTRIBUTION: C6 TYPE III  
SYSTEM WATTAGE: 291 Watts  
LUMENS PER FIXTURE: 40,200  
INPUT OPERATING CURRENT: 0.61 Amps (480V)  
LIGHT LOSS FACTOR: 0.85  
LOW MAST MOUNTING HEIGHT: 50 FT

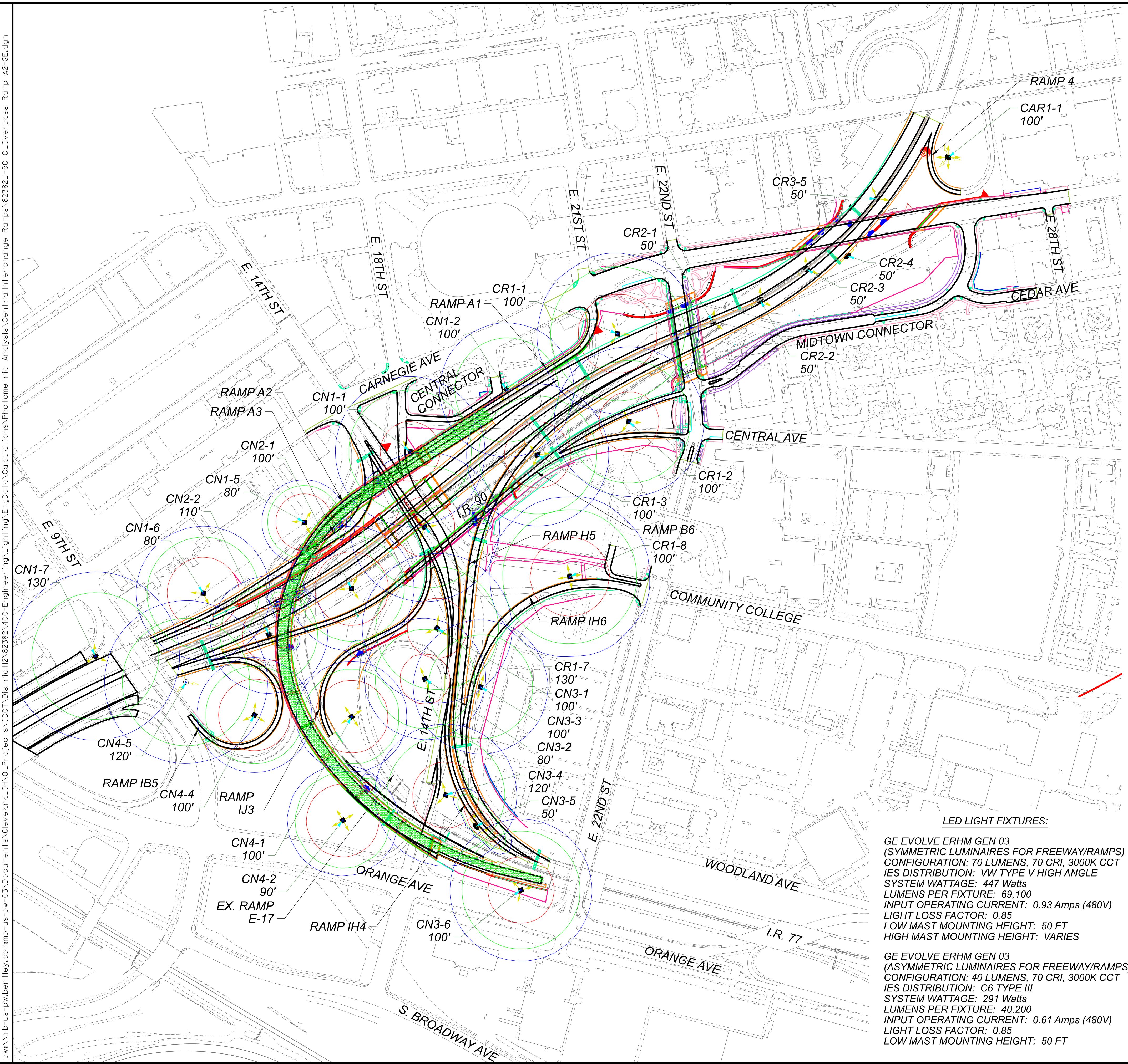
## LED LIGHT FIXTURES (CONTINUED):

GE EVOLVE EWAS A SERIES LED WALL PACK (FOR BRIDGE UNDERPASSES)  
CONFIGURATION: B3, 70 CRI, 3000K CCT  
IES DISTRIBUTION: TYPE 3  
SYSTEM WATTAGE: 38 Watts  
LUMENS PER FIXTURE: 4,900  
INPUT OPERATING CURRENT: 0.08 Amps (480V)  
LIGHT LOSS FACTOR: 0.85  
WALL PACK MOUNTING HEIGHT: VARIES

DESIGN AGENCY  
**Michael Baker**  
INTERNATIONAL  
DESIGNER  
**JLD**  
REVIEWER  
**SM** 4/24/24  
PROJECT ID  
82382  
SHEET TOTAL  
5 10

EXHIBIT G: CCG3A PHOTOMETRIC ANALYSIS  
I-90 / I-77 INTERCHANGE - GROUND LEVEL RAMPS (GE EVOLVE)

HORIZONTAL SCALE IN FEET  
0 100 200 400



## *ILLUMINANCE CRITERIA (ODOT TEM TABLE 1197-4)*

AVERAGE	MINIMUM	UNIFORMITY (AVG/MIN)
0.9	0.3	3.0:1

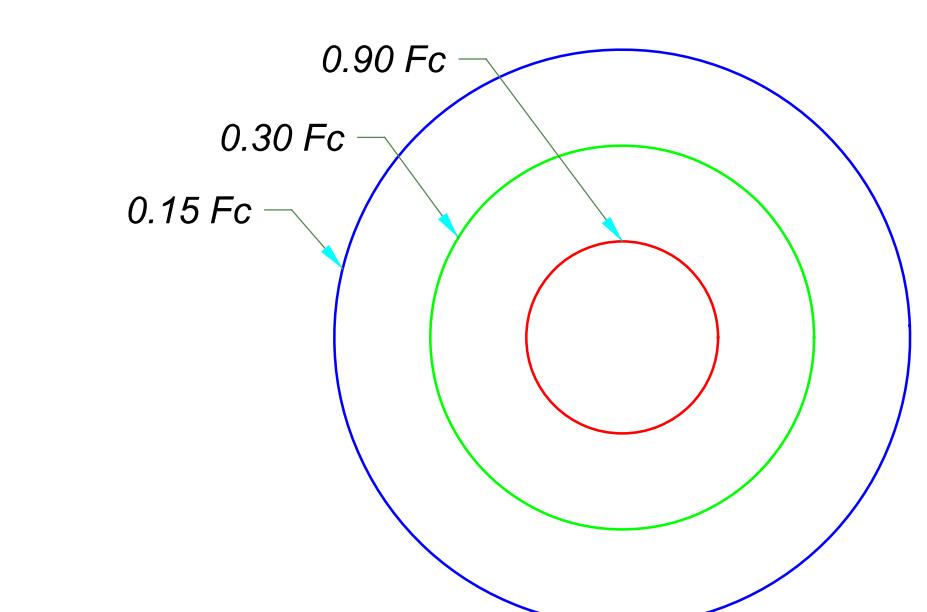
# **SUMMARY OF ROADWAY PHOTOMETRICS CENTRAL INTERCHANGE OVERPASS RAMP A2**

SEGMENT	AVERAGE	MINIMUM	UNIFORMITY (AVG/MIN)	UNIFORMITY (MAX/MIN)
PR. RAMP A2 I-90 WB TO I-77 SB	1.0	0.3	3.3:1	17.3:1

## *LEGEND*

- PROPOSED HIGH MAST TOWERS  
W/ 2, 3 OR 4 LED LUMINAIRES  
(SYMMETRIC)*
  - LOW MAST POLE  
W/ 1 LED LUMINAIRE  
(SYMMETRIC)*
  - LOW MAST POLE  
W/ 1 LED LUMINAIRE  
(ASYMMETRIC)*
  - PROPOSED UNDERPASS LED  
LUMINAIRE*
  - EXISTING HIGH MAST TOWERS  
TO REMAIN*

#### TYPICAL CONTOUR VALUES



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**GE EVOLVE ERHM GEN 03**  
**(SYMMETRIC LUMINAIRES FOR FREEWAY/RAMPS)**  
**CONFIGURATION: 70 LUMENS, 70 CRI, 3000K CCT**  
**IES DISTRIBUTION: VW TYPE V HIGH ANGLE**  
**SYSTEM WATTAGE: 447 Watts**  
**LUMENS PER FIXTURE: 69,100**  
**INPUT OPERATING CURRENT: 0.93 Amps (480V)**  
**LIGHT LOSS FACTOR: 0.85**  
**LOW MAST MOUNTING HEIGHT: 50 FT**  
**HIGH MAST MOUNTING HEIGHT: VARIES**

*GE EVOLVE ERHM GEN 03  
(ASYMMETRIC LUMINAIRES FOR FREEWAY/RAMPS)  
CONFIGURATION: 40 LUMENS, 70 CRI, 3000K CCT  
IES DISTRIBUTION: C6 TYPE III  
SYSTEM WATTAGE: 291 Watts  
LUMENS PER FIXTURE: 40,200  
INPUT OPERATING CURRENT: 0.61 Amps (480V)  
LIGHT LOSS FACTOR: 0.85  
LOW MAST MOUNTING HEIGHT: 50 FT*

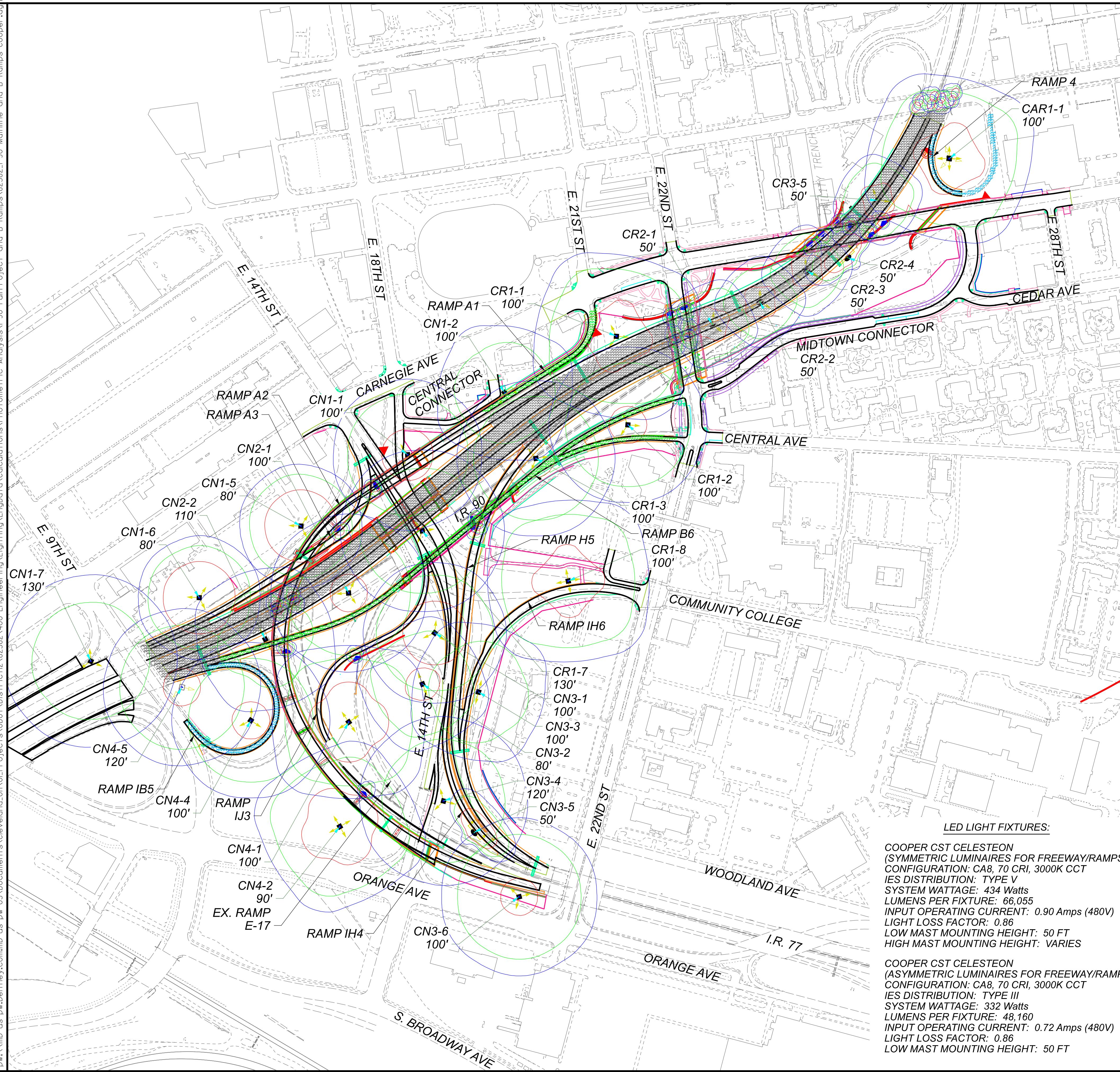
**LED LIGHT FIXTURES (CONTINUED):**

E EVOLVE EWAS A SERIES LED WALL PACK  
OR BRIDGE UNDERPASSES)  
NFIGURATION: B3, 70 CRI, 3000K CCT  
S DISTRIBUTION: TYPE 3  
YSTEM WATTAGE: 38 Watts  
MENS PER FIXTURE: 4,900  
PUT OPERATING CURRENT: 0.08 Amps (480V)  
GHT LOSS FACTOR: 0.85  
ALL PACK MOUNTING HEIGHT: VARIES

DESIGN AGENCY	
<b>Michael Baker</b>	
INTERNATIONAL	
DESIGNER	
JLD	
REVIEWER	
SM	4/24/24
PROJECT ID	
82382	
HEET	TOTAL
6	10

CUY-90-16.28

MODEL: Photometric Exhibit Sheet PAPER SIZE: 34x22 (In.) DATE: 4/22/2024 TIME: 3:52:01PM USER: MichaelBennetho DW: V:\mb\us-pw\bentley\commo-us-pw\33\Documents\Cleveland\_OH\Projects\82382\400-Engineering\Lighting\EngData\Calculations\Photometric Analysis\I-90 Full Project and B Ramps\82382-I-90 Mainline and B Ramps\Cooper.dwg



## ILLUMINANCE CRITERIA (ODOT TEM TABLE 1197-4)

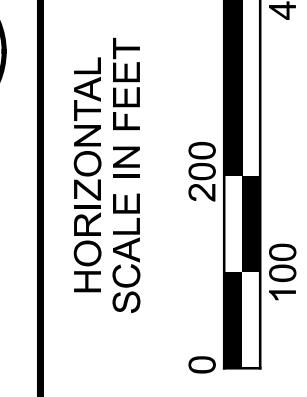
AVERAGE	MINIMUM	UNIFORMITY (AVG/MIN)
0.9	0.3	3.0:1

SUMMARY OF ROADWAY PHOTOMETRICS  
I-90 MAINLINE AND B RAMPS

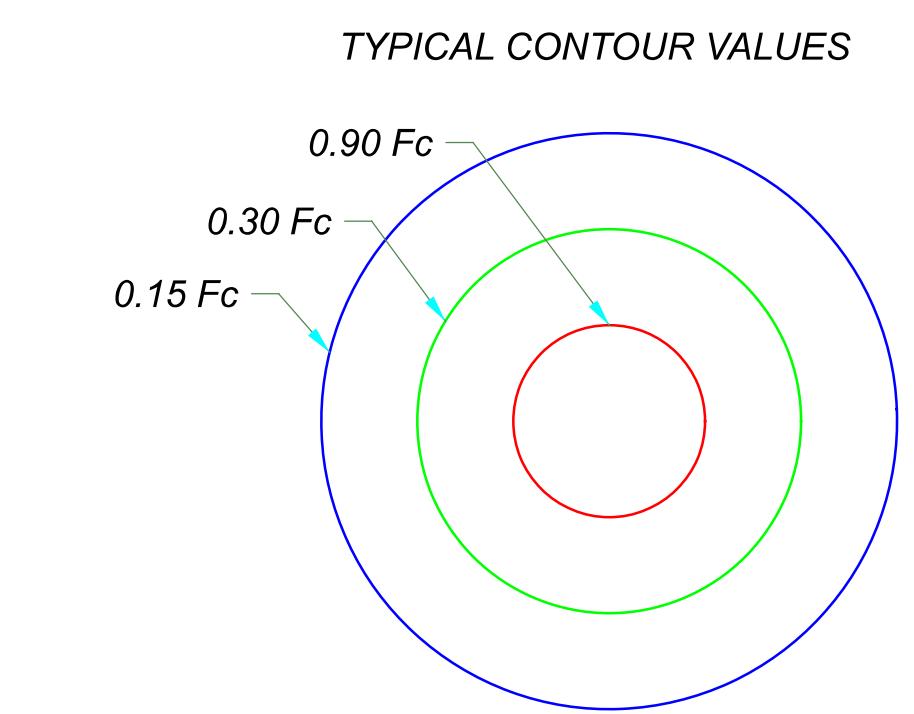
SEGMENT	AVERAGE	MINIMUM	UNIFORMITY (AVG/MIN)	UNIFORMITY (MAX/MIN)
PR. I-90 E. 9TH TO E. 14TH	1.1	0.5	2.2:1	13.0:1
PR. I-90 E. 14TH TO E. 22ND	1.0	0.4	2.5:1	4.0:1
PR. I-90 UNDER E. 22ND	1.4	0.4	3.5:1	17.8:1
PR. I-90 E. 22ND TO CARNEGIE	1.2	0.6	2.0:1	5.2:1
PR. I-90 UNDER CARNEGIE	1.4	0.6	2.3:1	9.0:1
PR. I-90 CARNEGIE TO PROSPECT	1.0	0.6	1.7:1	3.2:1
PR. RAMP IB5 I-90 EB TO E. 9TH	1.0	0.6	1.7:1	2.2:1
PR. RAMP B6 I-90 EB TO E. 14TH	1.0	0.5	2.0:1	2.4:1
PR. RAMP B6 E. 14TH TO E. 22ND	0.9	0.6	1.5:1	2.0:1
PR. RAMP A1 I-90 GORE TO CARNEGIE	0.9	0.7	1.3:1	1.7:1
PR. RAMP 4	0.9	0.5	1.8:1	2.6:1

EXHIBIT G: CCG3A PHOTOMETRIC ANALYSIS  
I-90 MAINLINE AND B RAMPS (COOPER)

DESIGN AGENCY	Michael Baker INTERNATIONAL
DESIGNER	JLD
REVIEWER	SM 4/24/24
PROJECT ID	82382
SHEET TOTAL	7 10



- LEGEND
- PROPOSED HIGH MAST TOWERS W/ 2, 3 OR 4 LED LUMINAIRES (SYMMETRIC)
  - LOW MAST POLE W/ 1 LED LUMINAIRE (SYMMETRIC)
  - LOW MAST POLE W/ 1 LED LUMINAIRE (ASYMMETRIC)
  - PROPOSED UNDERPASS LED LUMINAIRE
  - EXISTING HIGH MAST TOWERS TO REMAIN



## LED LIGHT FIXTURES (CONTINUED):

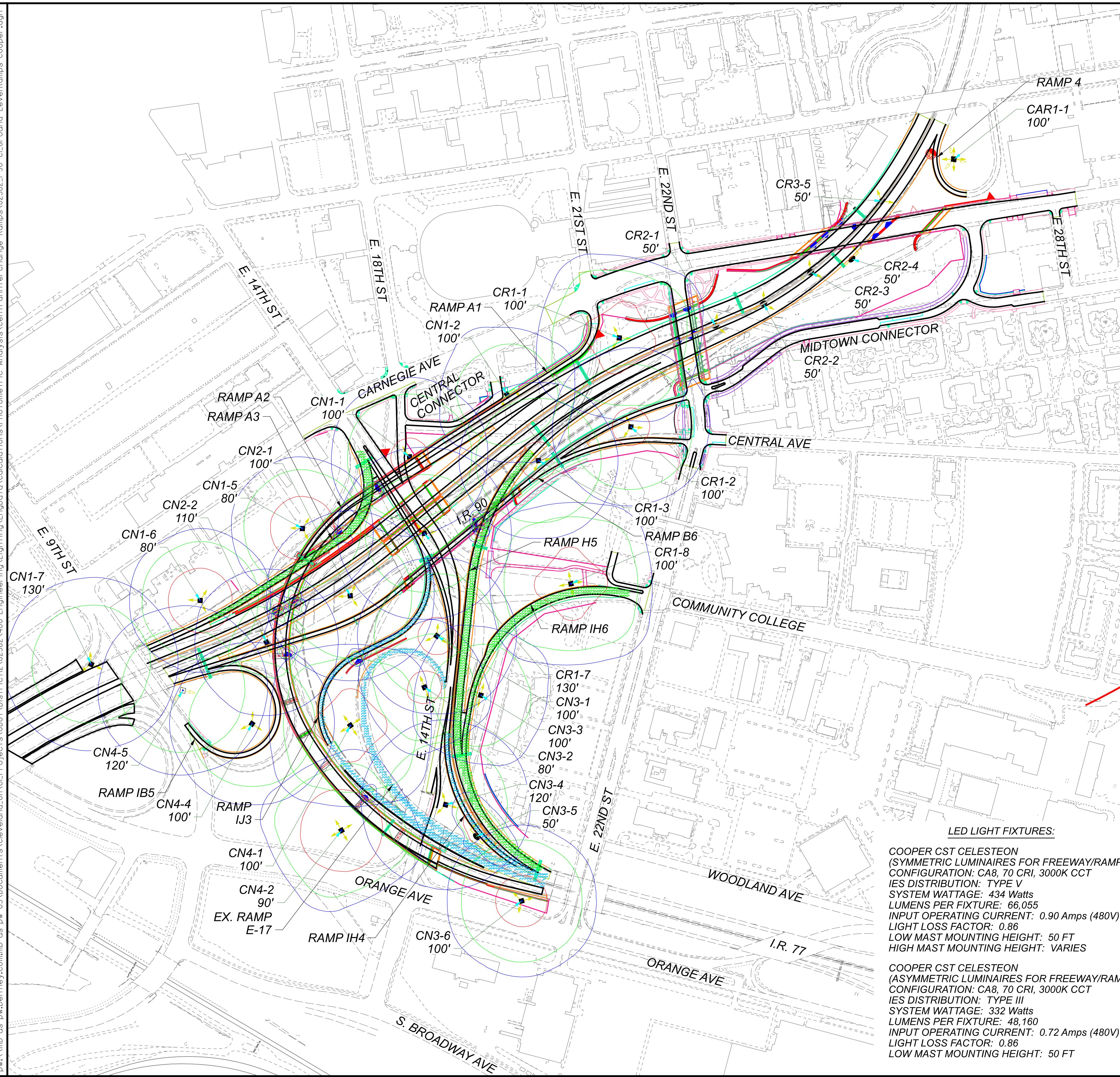
COOPER CST CELESTEON (ASYMMETRIC LUMINAIRES FOR FREEWAY/RAMPS)  
CONFIGURATION: CA8, 70 CRI, 3000K CCT  
IES DISTRIBUTION: TYPE III  
SYSTEM WATTAGE: 434 Watts  
LUMENS PER FIXTURE: 66,055  
INPUT OPERATING CURRENT: 0.90 Amps (480V)  
LIGHT LOSS FACTOR: 0.86  
LOW MAST MOUNTING HEIGHT: 50 FT  
HIGH MAST MOUNTING HEIGHT: VARIES

COOPER WKP WAL-PAK (FOR BRIDGE UNDERPASSES)  
CONFIGURATION: 6B, 70 CRI, 3000K CCT  
IES DISTRIBUTION: ASYMMETRIC  
SYSTEM WATTAGE: 46 Watts  
LUMENS PER FIXTURE: 5,883  
INPUT OPERATING CURRENT: 0.14 Amps (480V)  
LIGHT LOSS FACTOR: 0.85  
WALL PACK MOUNTING HEIGHT: VARIES

COOPER CST CELESTEON (SYMMETRIC LUMINAIRES FOR FREEWAY/RAMPS)  
CONFIGURATION: CA8, 70 CRI, 3000K CCT  
IES DISTRIBUTION: TYPE V  
SYSTEM WATTAGE: 434 Watts  
LUMENS PER FIXTURE: 66,055  
INPUT OPERATING CURRENT: 0.90 Amps (480V)  
LIGHT LOSS FACTOR: 0.86  
LOW MAST MOUNTING HEIGHT: 50 FT  
HIGH MAST MOUNTING HEIGHT: VARIES

COOPER CST CELESTEON (ASYMMETRIC LUMINAIRES FOR FREEWAY/RAMPS)  
CONFIGURATION: CA8, 70 CRI, 3000K CCT  
IES DISTRIBUTION: TYPE III  
SYSTEM WATTAGE: 332 Watts  
LUMENS PER FIXTURE: 48,160  
INPUT OPERATING CURRENT: 0.72 Amps (480V)  
LIGHT LOSS FACTOR: 0.86  
LOW MAST MOUNTING HEIGHT: 50 FT

CUY-90-16.28

MODEL: Photometric Exhibit Sheet PAPER SIZE: 34x22 (in.) DATE: 4/22/2024 TIME: 4:27:03 PM USER: MichaelBenoit  
DWG: Vmb-us-pw-bentley/commo-us-pw-03/Documents/Cleveland\_OHOL/Projects/000T-District1/02/82382/400-Engineering/Lighting/EngData/Calculations/Photometric Analysis/CentralInterchange\_Ramps.v82382\_i-90\_Cl\_Ground Level Ramps-Cooper.dgn

## ILLUMINANCE CRITERIA (ODOT TEM TABLE 1197-4)

AVERAGE	MINIMUM	UNIFORMITY (AVG/MIN)
0.9	0.3	3.0:1

SUMMARY OF ROADWAY PHOTOMETRICS  
CENTRAL INTERCHANGE GROUND LEVEL RAMPS

SEGMENT	AVERAGE	MINIMUM	UNIFORMITY (AVG/MIN)	UNIFORMITY (MAX/MIN)
EX. RAMP E-17 I-77 NB TO E. 14TH SB	1.1	0.7	1.6:1	2.9:1
PR. HYBRID RAMP H5 I-77 NB TO I-90 EB	1.0	0.4	2.5:1	5.3:1
PR. RAMP IH4 I-77 NB TO E. 14TH NB	1.4	0.6	2.3:1	5.7:1
PR. RAMP IH6 I-77 NB TO COMMUNITY COLLEGE	1.0	0.5	2.0:1	2.8:1
PR. RAMP IJ3 E. 14TH SB TO I-77 SB	0.9	0.4	2.3:1	5.3:1
PR. RAMP A3 E. 14TH SB TO I-90 WB	1.0	0.5	2.0:1	5.2:1

EXHIBIT G: CCG3A PHOTOMETRIC ANALYSIS  
I-90 / I-77 INTERCHANGE - GROUND LEVEL RAMPS (COOPER)

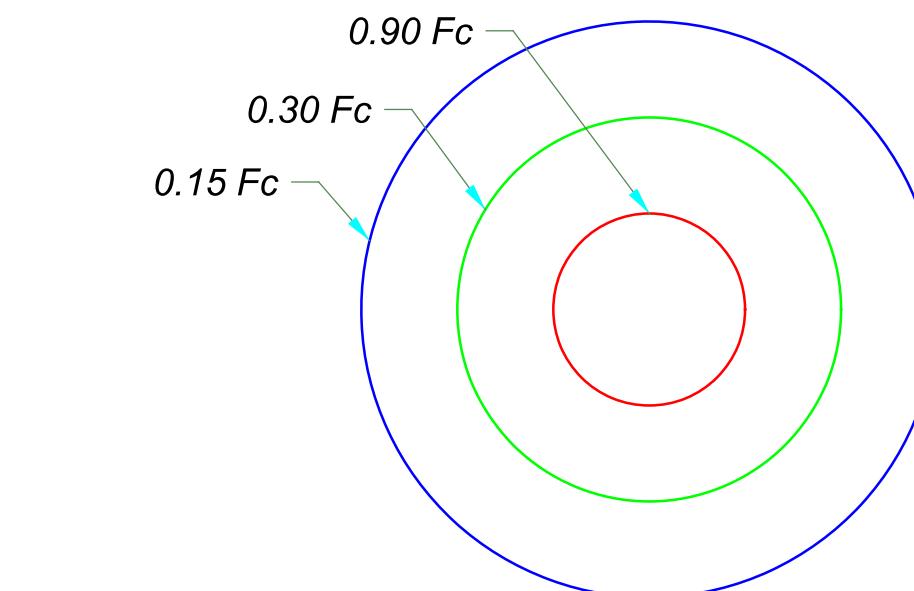
HORIZONTAL SCALE IN FEET  
 0 100 200 400

DESIGN AGENCY  
**Michael Baker**  
INTERNATIONAL  
  
DESIGNER JLD  
REVIEWER SM 4/24/24  
PROJECT ID 82382  
SHEET TOTAL 8 10

## LEGEND

- PROPOSED HIGH MAST TOWERS W/ 2, 3 OR 4 LED LUMINAIRES (SYMMETRIC)
- LOW MAST POLE W/ 1 LED LUMINAIRE (SYMMETRIC)
- LOW MAST POLE W/ 1 LED LUMINAIRE (ASYMMETRIC)
- PROPOSED UNDERPASS LED LUMINAIRE
- EXISTING HIGH MAST TOWERS TO REMAIN

## TYPICAL CONTOUR VALUES

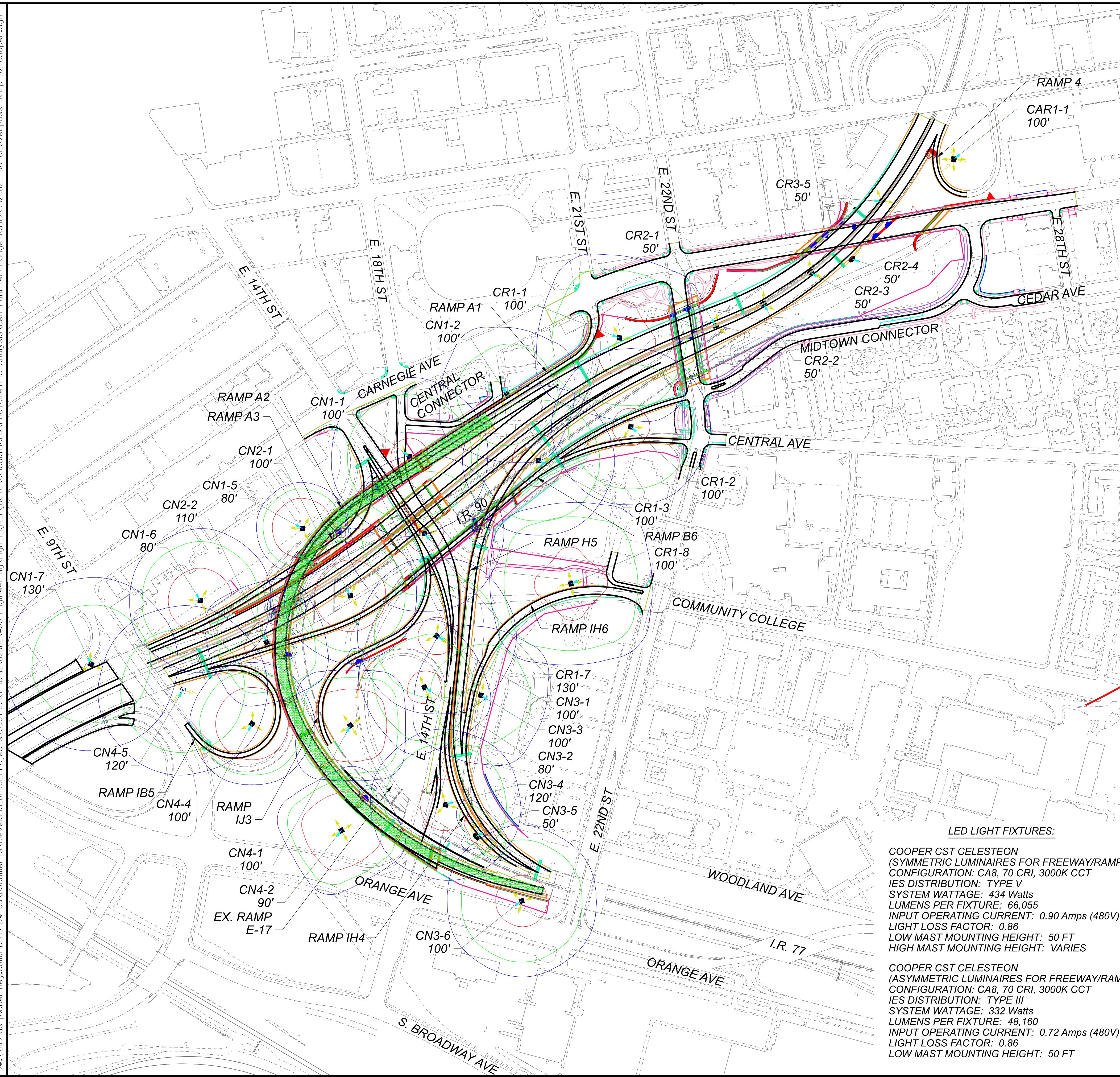


## LED LIGHT FIXTURES (CONTINUED):

**COOPER WKP WAL-PAK (FOR BRIDGE UNDERPASSES)**  
 CONFIGURATION: 6B, 70 CRI, 3000K CCT  
 IES DISTRIBUTION: ASYMMETRIC  
 SYSTEM WATTAGE: 46 Watts  
 LUMENS PER FIXTURE: 5,883  
 INPUT OPERATING CURRENT: 0.14 Amps (480V)  
 LIGHT LOSS FACTOR: 0.85  
 WALL PACK MOUNTING HEIGHT: VARIES

CUY-90-16.28

MODEL: Photometric Exhibit Sheet PAPER SIZE: 34x22 (In.) DATE: 4/22/2024 TIME: 4:38:06 PM USER: Michael.Benroth DWL: V:\mb\us-pw\bentley\commo-us-pw\33\Documents\Cleveland\_OHOL\Projects\000T\District\12\82382\400-Engineering\Lighting\EngData\Calculations\Photometric Analysis\CentralInterchange Ramps\82382\_I-90\_Cloverpass\_Ramp\_A2-Cooper.dgn



## ILLUMINANCE CRITERIA (ODOT TEM TABLE 1197-4)

AVERAGE	MINIMUM	UNIFORMITY (AVG/MIN)
0.9	0.3	3.0:1

SUMMARY OF ROADWAY PHOTOMETRICS  
CENTRAL INTERCHANGE OVERPASS RAMP A2

SEGMENT	AVERAGE	MINIMUM	UNIFORMITY (AVG/MIN)	UNIFORMITY (MAX/MIN)
PR. RAMP A2 I-90 WB TO I-77 SB	1.0	0.4	2.5:1	11.5:1

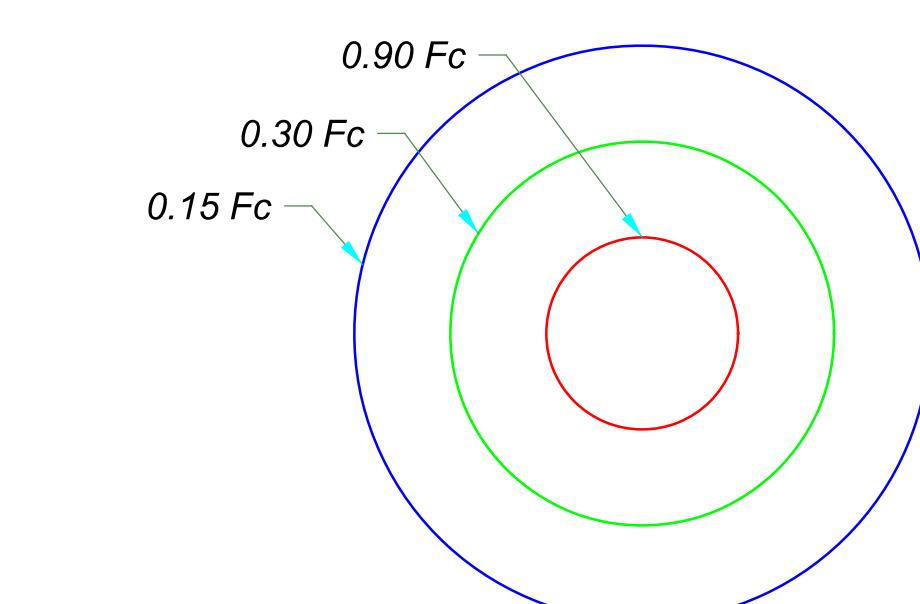
HORIZONTAL SCALE IN FEET  
0 100 200 400EXHIBIT G: CCG3A PHOTOMETRIC ANALYSIS  
I-90 / I-77 INTERCHANGE - OVERPASS RAMP A2 (COOPER)

DESIGN AGENCY  
**Michael Baker**  
INTERNATIONAL  
DESIGNER  
**JLD**  
REVIEWER  
**SM** 4/24/24  
PROJECT ID  
**82382**  
SHEET **9** TOTAL **10**

## LEGEND

- PROPOSED HIGH MAST TOWERS W/ 2, 3 OR 4 LED LUMINAIRE(S) (SYMMETRIC)
- LOW MAST POLE W/ 1 LED LUMINAIRE (SYMMETRIC)
- LOW MAST POLE W/ 1 LED LUMINAIRE (ASYMMETRIC)
- PROPOSED UNDERPASS LED LUMINAIRE
- EXISTING HIGH MAST TOWERS TO REMAIN

## TYPICAL CONTOUR VALUES



## LED LIGHT FIXTURES:

COOPER CST CELESTEON  
(SYMMETRIC LUMINAIRES FOR FREEWAY/RAMPS)  
CONFIGURATION: CA8, 70 CRI, 3000K CCT  
IES DISTRIBUTION: TYPE V  
SYSTEM WATTAGE: 434 Watts  
LUMENS PER FIXTURE: 66,055  
INPUT OPERATING CURRENT: 0.90 Amps (480V)  
LIGHT LOSS FACTOR: 0.86  
LOW MAST MOUNTING HEIGHT: 50 FT  
HIGH MAST MOUNTING HEIGHT: VARIES

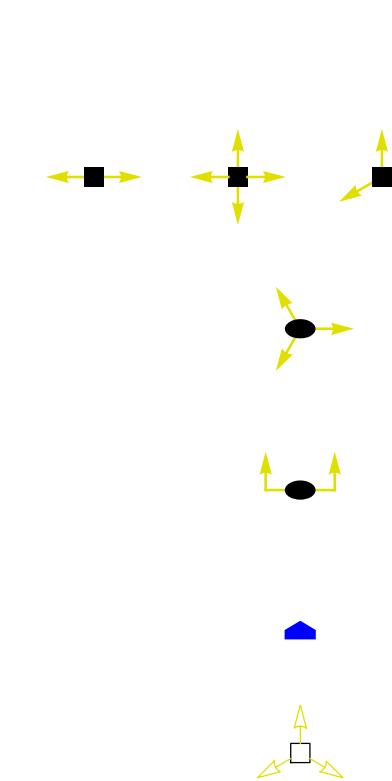
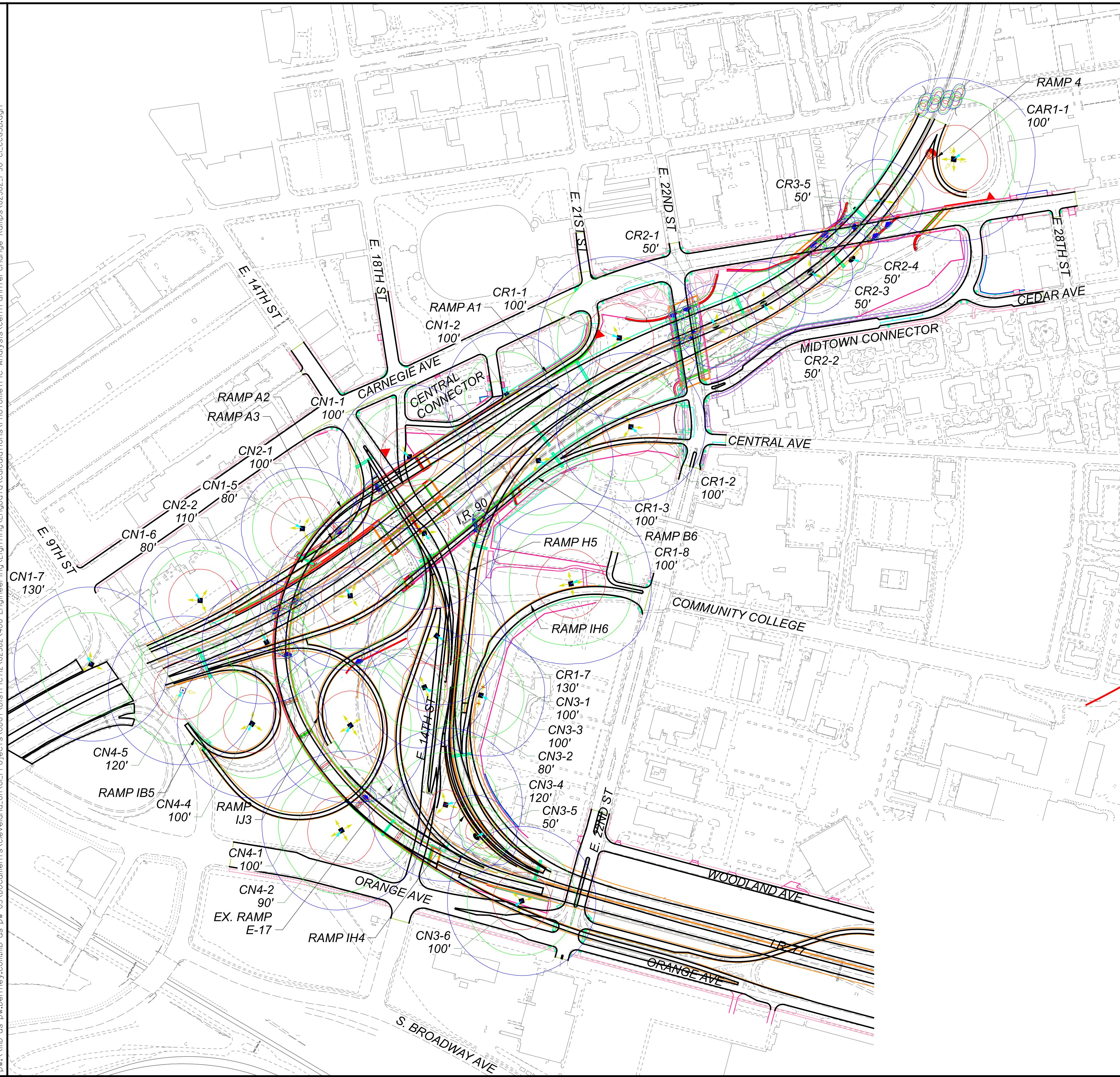
COOPER CST CELESTEON  
(ASYMMETRIC LUMINAIRES FOR FREEWAY/RAMPS)  
CONFIGURATION: CA8, 70 CRI, 3000K CCT  
IES DISTRIBUTION: TYPE III  
SYSTEM WATTAGE: 332 Watts  
LUMENS PER FIXTURE: 48,160  
INPUT OPERATING CURRENT: 0.72 Amps (480V)  
LIGHT LOSS FACTOR: 0.86  
LOW MAST MOUNTING HEIGHT: 50 FT

## LED LIGHT FIXTURES (CONTINUED):

COOPER WKP WAL-PAK (FOR BRIDGE UNDERPASSES)  
CONFIGURATION: 6B, 70 CRI, 3000K CCT  
IES DISTRIBUTION: ASYMMETRIC  
SYSTEM WATTAGE: 46 Watts  
LUMENS PER FIXTURE: 5,883  
INPUT OPERATING CURRENT: 0.14 Amps (480V)  
LIGHT LOSS FACTOR: 0.85  
WALL PACK MOUNTING HEIGHT: VARIES

CUY-90-16.28

MODEL: Photometric Exhibit Sheet PAPER SIZE: 34x22 (In.) DATE: 4/22/2024 TIME: 4:48:09 PM USER: Michael.Benroth DW: V:\mb\us-pw\bentley\commo-us-pw\33\Documents\Cleveland\_OH\Projects\0007-District\12\82382\400-Engineering\Lighting\EngData\Calculations\Photometric Analysis\CentralInterchange\_Ramps\82382\_1-90\_C1.CCG3B.dgn



## LEGEND

PROPOSED HIGH MAST TOWERS  
W/ 2, 3 OR 4 LED LUMINAIRES  
(SYMMETRIC)LOW MAST POLE  
W/ 1 LED LUMINAIRE  
(SYMMETRIC)LOW MAST POLE  
W/ 1 LED LUMINAIRE  
(ASYMMETRIC)PROPOSED UNDERPASS LED  
LUMINAIREEXISTING HIGH MAST TOWERS  
TO REMAIN

## DESIGN AGENCY

Michael Baker  
INTERNATIONAL

## DESIGNER

JLD

## REVIEWER

SM 4/24/24

## PROJECT ID

82382

## SHEET TOTAL

10 10

**EXHIBIT G: CCG3A PHOTOMETRIC ANALYSIS  
CCG3B CONFLICT CHECK**



HORIZONTAL  
SCALE IN FEET  
0 100 200 300 400