

# MEMO

**TO** : Emily Pelleja, P.Eng.

**FROM** : Martin Scott, P.Eng.

**DATE** : September 24, 2019

**SUBJECT** : City of Mississauga Burnhamthorpe Road EA – Illumination Plan

## 1. Proposed Illumination Design

The purpose of this study is to analyse the impact of the roadway lighting system due to the Burnhamthorpe Road widening project. At the beginning of the illumination study, the existing illumination condition will be described to provide the background knowledge of the system on the site at present. Based on the proposed road widening plan, the lighting standards which are in conflict with the new construction will be removed. As the road will add two additional lanes in the future, the illumination system at present would not provide enough illumination to the road, especially on the south side of the road as the lighting level is below the guideline's recommendation. A new illumination system is required. In this study, two illumination plans are proposed and analysed for consideration prior to proceeding with the detailed design.

### 1.1. Existing Illumination Condition

The existing lighting condition along Burnhamthorpe Road has luminaires along the north side of the road from Loyalist Drive to Ridgeway Drive. Burnhamthorpe Road west of Ridgeway Drive to Ninth Line is not illuminated, however, the bridge section over Highway 403 is illuminated by the highmast lighting along Highway 403.

The luminaires are mounted on the hydro poles at 14.0m height with arm length 2.4m, and the attachment is below the secondary line. The hydro pole spacing is around 40 to 55 metres. From the proposed road design layout, most of the hydro poles will remain in place in the future. The LED fixtures CNX-LRL3-P1-2M-42-120-L-CTR-GRY have been installed by the City along the road, and the wattage of the fixture is 262W. Six free standing lighting poles are in place on the south side of the road within the study area. Three are west of the Burnhamthorpe Road and Ridgeway Drive Intersection, one is at the southwest quadrant of the intersection, and the other two with 80m spacing towards Ninth Line along the road. The other three are east of the intersection, one is at the southeast quadrant of the intersection, and the other two with 80m spacing towards Colonial Drive.

Three intersections along Burnhamthorpe Road are illuminated within the study area, the Loyalist Drive intersection, the Colonial Drive intersection, and the Ridgeway Drive intersection.

For the Loyalist Drive intersection, on the north side, the luminaires along Burnhamthorpe Road are mounted on the hydro pole, which are the same as the other luminaires along the road. One free-standing lighting pole equipped with a luminaire is on the northwest quadrum, and the arm reaches out to Loyalist Drive. This lighting standard is the same as the others along Loyalist Drive.



South of the intersection there are three luminaires mounted on traffic signal poles. One is on southwest quadrant combined with a pedestrian signal head, and the arm reaches out to Burnhamthorpe Road. The other two are on the southeast quadrant. One is mounted on eastbound secondary head pole, and the arm reaches out to Burnhamthorpe Road. The other one mounted on southbound secondary head pole, and the arm reaches out to Loyalist Drive. The luminaire mounting height is 11.5m. The luminaire catalogue number is CNX-LRL4-P1-2M-42-044-1050-L-CTR-GRY.

For the Colonial Drive intersection, on the north side, the luminaires along Burnhamthorpe Road are mounted on the hydro poles. One luminaire in the northwest quadrant is mounted on northbound secondary head pole, and the arm reaches out to Colonial Drive. On the south side of the intersection, one luminaire on the southeast quadrant is mounted on the southbound secondary head pole, and the arm reaches out to Colonial Drive. The luminaires mounting height on the traffic signal poles are 11.5m with the arm length 2.4m. The luminaire catalogue number is CNX-LRL3-P1-3M-42-120-L-CTR-GRY & CNX-LRL3-P1-3M-42-100-L-CTR-GRY.

For the Ridgeway Drive intersection, on the northeast quadrant, one luminaire is mounted on eastbound secondary head pole, and the arm reaches out to Burnhamthorpe Road, and the other one is mounted on the northbound primary head pole, and the arm reaches out to Ridgeway Drive. In the northwest quadrant, one luminaire is mounted on northbound secondary head pole with the arm reaching out to Burnhamthorpe Road, and the other free-standing pole with the luminaire reaches out to Ridgeway Drive is the same as the other lighting standards along Ridgeway Drive. On the south side of the intersection, the two lighting standards along Burnhamthorpe Road have already been described with the other luminaires on the road. Two other free-standing lighting standards with luminaries reaching out to Ridgeway Drive are the same as the other ones on the road.

## 1.2. Lighting Recommendations and Background Knowledge

The study used the RP-8-14 Roadway Lighting Guide and the TAC: Guide for the Design of Roadway Lighting Volume 1, Fundamentals and Volume 2: Design as the reference guidelines. The following are the salient points from those guidelines.

### 1.2.1. Horizontal Illuminance Level for Roadway Lighting

The values in Figure 1: Recommended Horizontal Illuminance Level for Roadway Lighting (From RP-8) are the recommended minimum average maintained illuminance levels for fully-lighted roadways based on road classification and pavement types. Horizontal Illuminance on the crosswalk, if the roadway is continuously lighted, must meet or exceed the recommended levels defined in Figure 1.



Road and Pedestrian Conflict Area		Pavement Classification (Minimum Maintained Average Values)			Uniformity Ratio $E_{avg}/E_{min}$	Veiling Luminance Ratio $L_{vmax}/L_{avg}$
Road	Pedestrian Conflict Area	R1 lux/fc	R2 & R3 lux/fc	R4 lux/fc		
<b>Freeway Class A</b>		6.0/0.6	9.0/0.9	8.0/0.8	3.0	0.3
<b>Freeway Class B</b>		4.0/0.4	6.0/0.6	5.0/0.5	3.0	0.3
<b>Expressway</b>	High	10.0/1.0	14.0/1.4	13.0/1.3	3.0	0.3
	Medium	8.0/0.8	12.0/1.2	10.0/1.0	3.0	0.3
	Low	6.0/0.6	9.0/0.9	8.0/0.8	3.0	0.3
<b>Major</b>	High	12.0/1.2	17.0/1.7	15.0/1.5	3.0	0.3
	Medium	9.0/0.9	13.0/1.3	11.0/1.1	3.0	0.3
	Low	6.0/0.6	9.0/0.9	8.0/0.8	3.0	0.3
<b>Collector</b>	High	8.0/0.8	12.0/1.2	10.0/1.0	4.0	0.4
	Medium	6.0/0.6	9.0/0.9	8.0/0.8	4.0	0.4
	Low	4.0/0.4	6.0/0.6	5.0/0.5	4.0	0.4
<b>Local</b>	High	6.0/0.6	9.0/0.9	8.0/0.8	6.0	0.4
	Medium	5.0/0.5	7.0/0.7	6.0/0.6	6.0	0.4
	Low	3.0/0.3	4.0/0.4	4.0/0.4	6.0	0.4

Figure 1: Recommended Horizontal Illuminance Level for Roadway Lighting (From RP-8)

Burnhamthorpe Road is a Major/Arterial road with pedestrian activity level medium. The pavement type is R3. According to the values in Figure 1 in RP-8 and TAC:

- Recommended average illumination level:  $E_{avg}=13$  Lux
- Uniformity Ratio:  $E_{avg}/E_{min} \leq 3$
- Veiling luminance ratio:  $L_{vmax}/L_{avg} \leq 0.3$ .

### 1.2.2. Horizontal Illuminance Level for Intersections

The values included in Figure 2: Recommended Horizontal Illuminance Level for Full Intersection Lighting (from TAC) are the recommended minimum average maintained illuminance levels for fully-lighted intersections based on road classifications and pedestrian volumes. The table is based on an R2/R3 pavement type.

Roadway Classification	Average Maintained Illuminance at Pavement by Pedestrian Conflict (lux)			Average-to-Minimum Uniformity Ratio
	High	Medium	Low	
Arterial/Arterial	34.0	26.0	18.0	3.0
Arterial/Collector	29.0	22.0	15.0	3.0
Arterial/Local	26.0	20.0	13.0	3.0
Expressway-Highway/Arterial	31.0	25.0	18.0	3.0
Expressway-Highway/Expressway-Highway/	28.0	24.0	18.0	3.0
Expressway-Highway/Collector	26.0	21.0	15.0	3.0
Expressway-Highway/Local	23.0	19.0	13.0	3.0
Collector/Collector	24.0	18.0	12.0	4.0
Collector/Local	21.0	16.0	10.0	4.0
Local/Local	18.0	14.0	8.0	6.0

Figure 2: Recommended Horizontal Illuminance Level for Full Intersection Lighting (From TAC)

The Burnhamthorpe Road is Major/ Arterial road with medium pedestrian activity level. The Loyalist Drive, Colonial Drive and Ridgeway Drive are minor collector roads with pedestrian activity level medium. The classification of the three intersections are the same, which is Arterial/Collector with medium pedestrian activity level. According to the values in Figure 2 in RP-8 and TAC:

- Recommended average illumination level is  $E_{avg} = 22$  Lux
- Uniformity ratio  $E_{avg}/E_{min} \leq 3$ .

### 1.2.3. Horizontal Illuminance Level for Walkways

Maintained Illuminance Values for Walkways			
	$E_{avg}$ (lux/fc)	$E_{Vmin}$ (lux/fc)	$E_{avg}/E_{min}^*$
Pedestrian Areas	5.0/0.5	2.0/0.2	4.0

$E_{avg}$  - minimum maintained average horizontal illuminance at pavement

$E_{min}$  - minimum horizontal illuminance at pavement

$E_{Vmin}$  - minimum vertical illuminance at 1.5m above pavement

\*Horizontal only

Figure 3: Recommended Values for Medium Pedestrian Conflict Area



The values included in Figure 3: Recommended Values for Medium Pedestrian Conflict Area (from RP-8) are the recommended minimum average maintained illuminance levels for walkways based on pedestrian volumes. The table is based on an R2/R3 pavement type.

### 1.3. Illumination Plan 'A'

Two illumination plans are proposed to the City for consideration. The Plan 'A' approach tries to keep as much of the existing luminaires and poles as possible. In this case, fewer new LED luminaires will be replaced, and less construction work will be required for upgrading the lighting system. The following describes the proposed upgrades based on the existing condition.

#### 1.3.1. Illumination Upgrades

On the north side of the Burnhamthorpe Road from Loyalist Drive to Ridgeway Drive, all the luminaires mounted on the hydro pole will remain the same. On the south side of the Burnhamthorpe Road, new lighting standards will be required. The existing free-standing lighting standards 80m east of the Ridgeway Drive intersection and 160m east of the intersection will be removed. The new lighting standards on the south will be staggered distributed according to the hydro pole location on the north side, and the layout is in the Appendix Illumination Report Plan 'A'. The pole spacing is round 50m, and the luminaire mounting height is 14m. The proposed LED luminaires list is in the Appendix: Illumination Report Plan 'A'. The existing free-standing lighting standard 80m west of the Ridgeway Drive intersection will be kept in place. On Burnhamthorpe Road west of Ridgeway Drive to the Hwy.403 over bridge, the new free-standing lighting standards will be required and staggered distributed along the road.

At Loyalist Drive intersection, all the luminaire will remain the same. From the proposed road design plan, the intersection geometry will have minor change. Here we assume the traffic signal poles with the luminaires attached will remain in the same place, and existing luminaires won't be touched or will be relocated to the new traffic signal poles nearly the same place.

At Colonial Drive intersection, the luminaires attached to the hydro poles will remain the same. The traffic signal poles with the luminaires attached are in the way of construction. New signal poles and luminaires will be required. On the north side, the luminaire will be attached to the new NB secondary head pole. On the south side, one luminaire will be attached to the new SB secondary head pole, and another one will be attached to the new WB secondary head pole. Please find the pole location at the Appendix: Illumination Report Plan 'A'.

At Ridgeway intersection, the two free-standing lighting standards long the south side of Burnhamthorpe Road will remain in place. Due to the road widening, traffic signals will be reconstructed. The proposed luminaires direction is the same as the direction in place, but the poles location will be different. The traffic signal designer will design the new traffic signal poles location in the detail design stage and decide which signal pole will combine with the luminaires. The illumination evaluation result proposed in this study at this intersection may vary due to the change of the pole location.

#### 1.3.2. Plan 'A' Study Result

According to RP-8 and TAC guidelines, the illumination recommendations are:

- Recommended average illumination level: Eavg=13 Lux

- Uniformity Ratio: Eavg/Emin <=3
- Veiling luminance ratio: Lvmax/Lavg <= 0.3.

Here are the results from the Appendix: Illumination Report Plan 'A'.

Calculation Summary											
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min	Meter Type	LVRatio	RTable	
Burnhamthorpe Rd & Colonial Dr	Illuminance	Lux	23.69	45.0	12.2	1.94	3.69	Horizontal	N.A.	N.A.	
Burnhamthorpe Rd & Loyalist Dr	Illuminance	Lux	23.32	41.9	11.5	2.03	3.64	Horizontal	N.A.	N.A.	
Burnhamthorpe Rd & Ridgeway Dr	Illuminance	Lux	27.72	48.8	11.8	2.35	4.14	Horizontal	N.A.	N.A.	
Road_1_EB_Illum	Illuminance	Lux	20.15	29.1	11.7	1.72	2.49	Horizontal	N.A.	N.A.	
Road_1_EB_Luminance	Luminance	Cd/Sq.m	1.20	2.1	0.8	1.50	2.63	Horizontal	N.A.	R3	
Road_1_EB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.19	0.3	0.1	1.90	3.00	Horizontal	N.A.	R3	
Road_1_WB_Illum	Illuminance	Lux	26.83	42.3	17.5	1.53	2.42	Horizontal	N.A.	N.A.	
Road_1_WB_Luminance	Luminance	Cd/Sq.m	1.63	2.1	1.4	1.16	1.50	Horizontal	N.A.	R3	
Road_1_WB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.22	0.3	0.1	2.20	3.00	Horizontal	N.A.	R3	
Road_2_EB_Illum	Illuminance	Lux	21.13	29.2	14.7	1.44	1.99	Horizontal	N.A.	N.A.	
Road_2_EB_Luminance	Luminance	Cd/Sq.m	1.66	2.2	1.4	1.19	1.57	Horizontal	N.A.	R3	
Road_2_EB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.26	0.3	0.2	1.30	1.50	Horizontal	N.A.	R3	
Road_2_WB_Illum	Illuminance	Lux	28.23	43.5	20.7	1.36	2.10	Horizontal	N.A.	N.A.	
Road_2_WB_Luminance	Luminance	Cd/Sq.m	1.64	2.0	1.4	1.17	1.43	Horizontal	N.A.	R3	
Road_2_WB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.25	0.3	0.2	1.25	1.50	Horizontal	N.A.	R3	
Road_3_EB_Illum	Illuminance	Lux	21.22	30.3	16.0	1.33	1.89	Horizontal	N.A.	N.A.	
Road_3_EB_Luminance	Luminance	Cd/Sq.m	1.78	2.2	1.4	1.27	1.57	Horizontal	N.A.	R3	
Road_3_EB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.24	0.3	0.2	1.20	1.50	Horizontal	N.A.	R3	
Road_3_WB_Illum	Illuminance	Lux	32.49	45.8	21.6	1.50	2.12	Horizontal	N.A.	N.A.	
Road_3_WB_Luminance	Luminance	Cd/Sq.m	1.89	2.7	1.4	1.35	1.93	Horizontal	N.A.	R3	
Road_3_WB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.26	0.3	0.2	1.30	1.50	Horizontal	N.A.	R3	
Road_4_EB_Illum	Illuminance	Lux	19.47	29.3	13.9	1.40	2.11	Horizontal	N.A.	N.A.	
Road_4_EB_Luminance	Luminance	Cd/Sq.m	1.25	2.1	0.8	1.56	2.63	Horizontal	N.A.	R3	
Road_4_EB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.30	0.4	0.2	1.50	2.00	Horizontal	N.A.	R3	
Road_4_WB_Illum	Illuminance	Lux	24.03	42.2	14.1	1.70	2.99	Horizontal	N.A.	N.A.	
Road_4_WB_Luminance	Luminance	Cd/Sq.m	1.58	2.2	1.2	1.32	1.83	Horizontal	N.A.	R3	
Road_4_WB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.24	0.3	0.2	1.20	1.50	Horizontal	N.A.	R3	
Road_5_EB_Illum	Illuminance	Lux	19.57	25.6	13.7	1.43	1.87	Horizontal	N.A.	N.A.	
Road_5_EB_Luminance	Luminance	Cd/Sq.m	1.63	2.7	0.9	1.81	3.00	Horizontal	N.A.	R3	
Road_5_EB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.33	0.5	0.2	1.65	2.50	Horizontal	N.A.	R3	
Road_5_WB_Illum	Illuminance	Lux	13.49	35.2	6.6	2.04	5.33	Horizontal	N.A.	N.A.	
Road_5_WB_Luminance	Luminance	Cd/Sq.m	0.91	2.1	0.6	1.52	3.50	Horizontal	N.A.	R3	
Road_5_WB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.24	0.3	0.2	1.20	1.50	Horizontal	N.A.	R3	
Road_6_EB_Illum	Illuminance	Lux	16.80	39.4	10.0	1.68	3.94	Horizontal	N.A.	N.A.	
Road_6_EB_Luminance	Luminance	Cd/Sq.m	1.32	2.4	0.8	1.65	3.00	Horizontal	N.A.	R3	
Road_6_EB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.23	0.4	0.2	1.15	2.00	Horizontal	N.A.	R3	
Road_6_WB_Illum	Illuminance	Lux	17.62	34.2	12.9	1.37	2.65	Horizontal	N.A.	N.A.	
Road_6_WB_Luminance	Luminance	Cd/Sq.m	1.33	2.1	1.0	1.33	2.10	Horizontal	N.A.	R3	
Road_6_WB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.28	0.5	0.2	1.40	2.50	Horizontal	N.A.	R3	
Road_7_EB_Illum	Illuminance	Lux	20.66	22.8	17.7	1.17	1.29	Horizontal	N.A.	N.A.	
Road_7_EB_Luminance	Luminance	Cd/Sq.m	1.60	2.3	1.2	1.33	1.92	Horizontal	N.A.	R3	
Road_7_EB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.32	0.4	0.3	1.07	1.33	Horizontal	N.A.	R3	
Road_7_WB_Illum	Illuminance	Lux	22.01	23.8	19.2	1.15	1.24	Horizontal	N.A.	N.A.	
Road_7_WB_Luminance	Luminance	Cd/Sq.m	1.57	2.0	1.4	1.12	1.43	Horizontal	N.A.	R3	
Road_7_WB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.27	0.3	0.2	1.35	1.50	Horizontal	N.A.	R3	
Sidewalk_N_1	Illuminance	Lux	23.82	38.2	13.2	1.80	2.89	Horizontal	N.A.	N.A.	
Sidewalk_N_2	Illuminance	Lux	16.00	27.0	8.2	1.95	3.29	Horizontal	N.A.	N.A.	
Sidewalk_N_3	Illuminance	Lux	19.94	37.6	8.1	2.46	4.64	Horizontal	N.A.	N.A.	
Sidewalk_N_4	Illuminance	Lux	12.57	31.4	4.2	2.99	7.48	Horizontal	N.A.	N.A.	
Sidewalk_N_5	Illuminance	Lux	16.41	29.1	9.7	1.69	3.00	Horizontal	N.A.	N.A.	
Sidewalk_S_1	Illuminance	Lux	8.84	16.0	5.1	1.73	3.14	Horizontal	N.A.	N.A.	
Sidewalk_S_2	Illuminance	Lux	8.43	20.2	1.9	4.44	10.63	Horizontal	N.A.	N.A.	
Sidewalk_S_3	Illuminance	Lux	16.86	34.0	8.5	1.98	4.00	Horizontal	N.A.	N.A.	

Figure 4: Illumination Calculation Result for Plan 'A'

The calculation result shows the lighting level in different zones are much higher than the recommended level Eavg=13 Lux. Most of the zones are more than 20 Lux. The illumination level on the WB is much higher than the recommended level in the guideline. The light source of the westbound is from the existing luminaires on the hydro poles. To meet the recommended uniformity from the guidelines, the road should be lighted evenly, so the proposed luminaires should match the existing luminaire's lighting distribution. As a result, the overall illumination level is much higher than the recommendation. It is suggested the average illumination level shouldn't exceed 40% of the recommended level, which should be less than 18 Lux.

The existing luminaires in place are CNX-LRL3-P1-2M-42-120-L-CTR-GRY with the power consumption 262W. This type of luminaire is discontinued. The proposed new LED luminaire CNX-LRL4-P1-2M-42-044-L-1050 power consumption is 155W. The CNX-LRL4-P1-3M-42-044-L-1050 is 156W, CNX-LRL4-P1-2MB-40-044-L-1500 is 215W, and CNX-LRL4-P1-2M-42-048-L-1500 is 232W.



For the three intersections, according to RP-8 and TAC guidelines, the illumination recommendations are:

- Recommended average illumination level is  $E_{avg} = 22$  Lux
- Uniformity ratio  $E_{avg}/E_{min} \leq 3$ .

The horizontal illumination level at the three intersection meets the guideline requirement.

The horizontal illumination level in each zone on the sidewalk is much higher than the recommended value from the guideline. The uniformity value meets the guideline requirement.

The total power consumption for the whole study area is 28,787 Watt.

### **1.3.3. Plan 'A' Conclusion**

The advantage of plan 'A' is maximizing the utilization of the existing luminaires, so it is cost-effective for construction. The new LED luminaires are more energy efficient. By using the existing LED luminaires, the total wattage consumption for the study area is much higher than the Plan 'B'.

## **1.4. Illumination Plan 'B'**

The Plan 'B' approach will replace all the luminaires into new ones.

### **1.4.1. Illumination Upgrades**

For the Plan 'B' approach, the proposed lighting standards will have the same poles, arms, mounting height, and the same location as Plan 'A'. The existing LED luminaires removed in Plan 'B' will be salvaged to the City, and new LED luminaires will be installed. The existing arms could be reused, and the existing lighting poles will be reused is the same as Plan 'A'.

### **1.4.2. Plan 'A' Study Result**

According to RP-8 and TAC guidelines, the illumination recommendations are:

- Recommended average illumination level:  $E_{avg}=13$  Lux
- Uniformity Ratio:  $E_{avg}/E_{min} \leq 3$
- Veiling luminance ratio:  $L_{vmax}/L_{avg} \leq 0.3$ .

Calculation Summary										
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min	Meter Type	LVRatio	RTable
Burnhamthorpe Rd & Colonial Dr	Illuminance	Lux	23.83	30.8	7.6	3.14	4.05	Horizontal	N.A.	N.A.
Burnhamthorpe Rd & Loyalist Dr	Illuminance	Lux	25.92	37.5	10.0	2.59	3.75	Horizontal	N.A.	N.A.
Burnhamthorpe Rd & Ridgeway Dr	Illuminance	Lux	24.70	55.8	9.1	2.71	6.13	Horizontal	N.A.	N.A.
Road_1_EB_Illum	Illuminance	Lux	18.30	32.6	8.4	2.18	3.88	Horizontal	N.A.	N.A.
Road_1_EB_Luminance	Luminance	Cd/Sq.m	1.43	3.0	0.9	1.59	3.33	Horizontal	N.A.	R3
Road_1_EB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.22	0.3	0.1	2.20	3.00	Horizontal	N.A.	R3
Road_1_WB_Illum	Illuminance	Lux	18.37	20.9	13.8	1.33	1.51	Horizontal	N.A.	N.A.
Road_1_WB_Luminance	Luminance	Cd/Sq.m	1.54	2.1	1.1	1.40	1.91	Horizontal	N.A.	R3
Road_1_WB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.28	0.4	0.2	1.40	2.00	Horizontal	N.A.	R3
Road_2_EB_Illum	Illuminance	Lux	14.82	18.0	10.3	1.44	1.75	Horizontal	N.A.	N.A.
Road_2_EB_Luminance	Luminance	Cd/Sq.m	1.39	1.8	1.2	1.16	1.50	Horizontal	N.A.	R3
Road_2_EB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.23	0.3	0.2	1.15	1.50	Horizontal	N.A.	R3
Road_2_WB_Illum	Illuminance	Lux	16.55	17.7	14.3	1.16	1.24	Horizontal	N.A.	N.A.
Road_2_WB_Luminance	Luminance	Cd/Sq.m	1.25	1.5	1.1	1.14	1.36	Horizontal	N.A.	R3
Road_2_WB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.28	0.3	0.2	1.40	1.50	Horizontal	N.A.	R3
Road_3_EB_Illum	Illuminance	Lux	18.59	22.2	13.7	1.36	1.62	Horizontal	N.A.	N.A.
Road_3_EB_Luminance	Luminance	Cd/Sq.m	1.61	1.9	1.4	1.15	1.36	Horizontal	N.A.	R3
Road_3_EB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.30	0.6	0.2	1.50	3.00	Horizontal	N.A.	R3
Road_3_WB_Illum	Illuminance	Lux	17.87	20.9	13.0	1.37	1.61	Horizontal	N.A.	N.A.
Road_3_WB_Luminance	Luminance	Cd/Sq.m	1.50	1.9	1.3	1.15	1.46	Horizontal	N.A.	R3
Road_3_WB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.30	0.3	0.3	1.00	1.00	Horizontal	N.A.	R3
Road_4_EB_Illum	Illuminance	Lux	18.43	23.3	11.1	1.66	2.10	Horizontal	N.A.	N.A.
Road_4_EB_Luminance	Luminance	Cd/Sq.m	1.61	3.0	1.2	1.34	2.50	Horizontal	N.A.	R3
Road_4_EB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.28	0.3	0.2	1.40	1.50	Horizontal	N.A.	R3
Road_4_WB_Illum	Illuminance	Lux	17.61	22.0	11.9	1.48	1.85	Horizontal	N.A.	N.A.
Road_4_WB_Luminance	Luminance	Cd/Sq.m	1.58	2.3	1.1	1.44	2.09	Horizontal	N.A.	R3
Road_4_WB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.34	0.4	0.3	1.13	1.33	Horizontal	N.A.	R3
Road_5_EB_Illum	Illuminance	Lux	15.29	19.7	10.9	1.40	1.81	Horizontal	N.A.	N.A.
Road_5_EB_Luminance	Luminance	Cd/Sq.m	1.34	2.1	0.9	1.49	2.33	Horizontal	N.A.	R3
Road_5_EB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.27	0.4	0.2	1.35	2.00	Horizontal	N.A.	R3
Road_5_WB_Illum	Illuminance	Lux	13.04	27.2	6.7	1.95	4.06	Horizontal	N.A.	N.A.
Road_5_WB_Luminance	Luminance	Cd/Sq.m	0.90	2.2	0.4	2.25	5.50	Horizontal	N.A.	R3
Road_5_WB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.31	0.5	0.2	1.55	2.50	Horizontal	N.A.	R3
Road_6_EB_Illum	Illuminance	Lux	14.72	19.2	10.4	1.42	1.85	Horizontal	N.A.	N.A.
Road_6_EB_Luminance	Luminance	Cd/Sq.m	1.12	2.0	0.8	1.40	2.50	Horizontal	N.A.	R3
Road_6_EB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.27	0.4	0.2	1.35	2.00	Horizontal	N.A.	R3
Road_6_WB_Illum	Illuminance	Lux	17.28	27.9	13.3	1.30	2.10	Horizontal	N.A.	N.A.
Road_6_WB_Luminance	Luminance	Cd/Sq.m	1.55	2.3	1.1	1.41	2.09	Horizontal	N.A.	R3
Road_6_WB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.20	0.4	0.1	1.00	4.00	Horizontal	N.A.	R3
Road_7_EB_Illum	Illuminance	Lux	14.89	18.0	10.7	1.39	1.68	Horizontal	N.A.	N.A.
Road_7_EB_Luminance	Luminance	Cd/Sq.m	1.37	1.8	1.1	1.25	1.64	Horizontal	N.A.	R3
Road_7_EB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.28	0.3	0.2	1.40	1.50	Horizontal	N.A.	R3
Road_7_WB_Illum	Illuminance	Lux	16.79	19.7	13.0	1.29	1.52	Horizontal	N.A.	N.A.
Road_7_WB_Luminance	Luminance	Cd/Sq.m	1.33	1.5	1.2	1.11	1.25	Horizontal	N.A.	R3
Road_7_WB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.20	0.3	0.2	1.00	1.50	Horizontal	N.A.	R3
Sidewalk_N_1	Illuminance	Lux	12.46	20.1	7.6	1.64	2.64	Horizontal	N.A.	N.A.
Sidewalk_N_2	Illuminance	Lux	7.06	14.2	3.0	2.35	4.73	Horizontal	N.A.	N.A.
Sidewalk_N_3	Illuminance	Lux	16.31	39.5	7.0	2.33	5.64	Horizontal	N.A.	N.A.
Sidewalk_N_4	Illuminance	Lux	9.18	34.3	3.1	2.96	11.06	Horizontal	N.A.	N.A.
Sidewalk_N_5	Illuminance	Lux	12.11	25.3	6.2	1.95	4.08	Horizontal	N.A.	N.A.
Sidewalk_S_1	Illuminance	Lux	5.92	19.4	1.8	3.29	10.78	Horizontal	N.A.	N.A.
Sidewalk_S_2	Illuminance	Lux	5.51	18.7	1.6	3.44	11.69	Horizontal	N.A.	N.A.
Sidewalk_S_3	Illuminance	Lux	11.47	18.5	5.3	2.16	3.49	Horizontal	N.A.	N.A.

Figure 5: Illumination Calculation Result for Plan 'B'

The proposed luminaires list is in the Appendix: Illumination Report Plan 'B'. The average illumination level and the uniformity on the road meets the guideline's recommendation in every calculation zone.

For the three intersections, according to RP-8 and TAC guidelines, the illumination recommendations are:

- Recommended average illumination level is Eavg = 22 Lux
- Uniformity ratio Eavg/Emin <= 3.

The horizontal illumination level and uniformity at the three intersection meets the guideline requirement.

The total power consumption for the study area is 8,773 Watt.

The horizontal illumination level on the sidewalk is much higher than the recommended value in every zone. The uniformity value meets the guideline requirement.



### 1.4.3. Plan 'B' Conclusion

The advantage of the Plan 'B' is the power consumption. The City needs to replace all the LED luminaires in the study area. All the existing LED luminaires will be salvaged to the City.

# Burnhamthorpe Road Class EA

## Photometric Report

Plan 'A'

City of Mississauga

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Patrick Lambert, P.Eng  
PEO : 100201924



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Burnhamthorpe Road Class EA
Ref. Number : B000856
Prepared by : Yan Jiang
File : B000856 Burnhamthorpe Road_Plan 'A'.AGI

Client :



Date : 4/3/2019
AGI32 Version 19.4.15
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## PHOTOMETRIC REQUIREMENTS

### Burnhamthorpe Road

Street Identification	:	Major/ Arterial
Sector	:	Urban
Pedestrian Conflict Identification	:	Medium
Avg. Maintained Luminance	- Lavg	- 0.9 cd/m <sup>2</sup>
Uniformity	- Lavg/Lmin	- 3.0
Uniformity	- Lmax/Lmin	- 6.0
Veiling Luminance Ratio	- Lvmax/Lavg	- 0.3
Avg. Maintained Illuminance	- Eavg	- 13 Lux
Uniformity	- Eavg/Emin	- 3

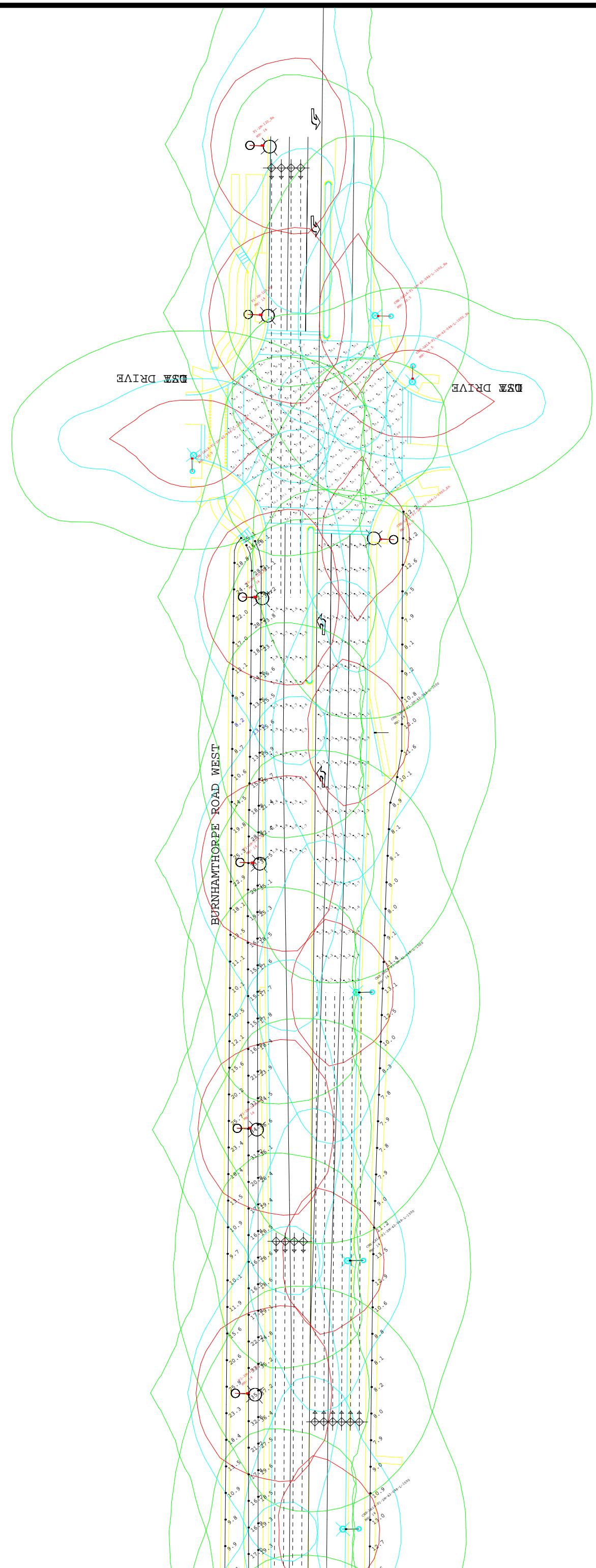
### Sidewalk / Bikeway

Sector	:	Urban
Pedestrian Conflict Identification	:	Medium
Avg. Maintained Horizontal Illuminance	- Ehavg	: 5.0 Lux
Uniformity	- Ehavg/Ehmin	: 4.0
Avg. Maintained Vertical Illuminance	- Evavg	: 2.0 Lux

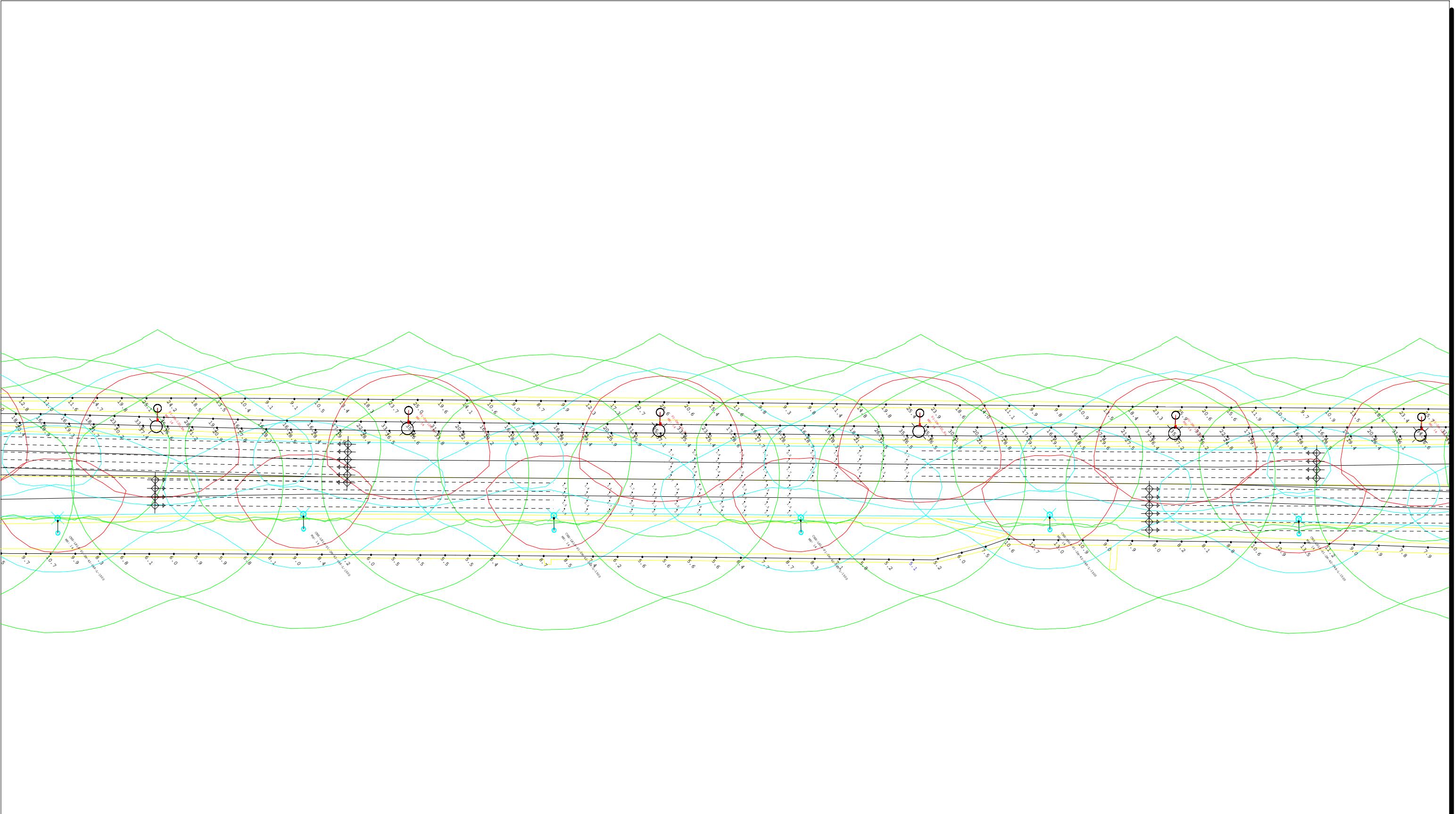
### Intersections

Side Road Identification	:	Collector
Sector	:	Urban
Pedestrian Conflict Identification	:	Medium
Avg. Maintained Illuminance	- Eavg	- 22 Lux
Uniformity	- Eavg/Emin	- 3

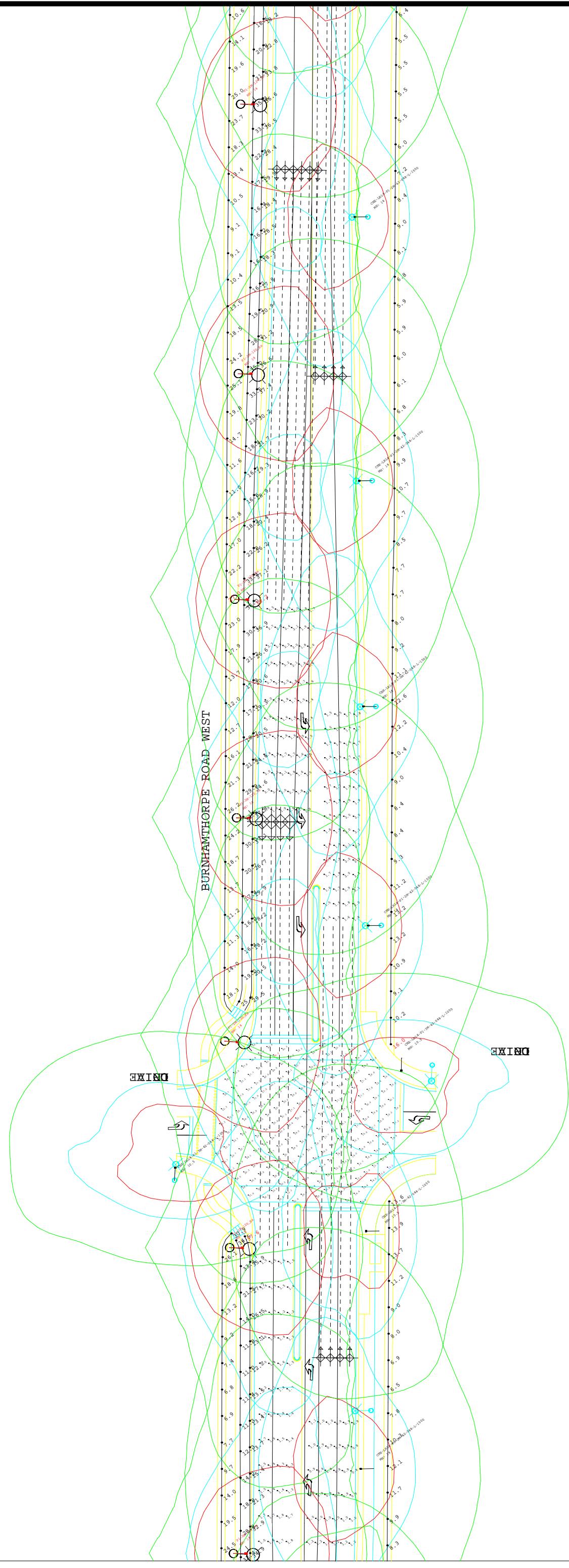
## DESIGN - PLAN VIEW



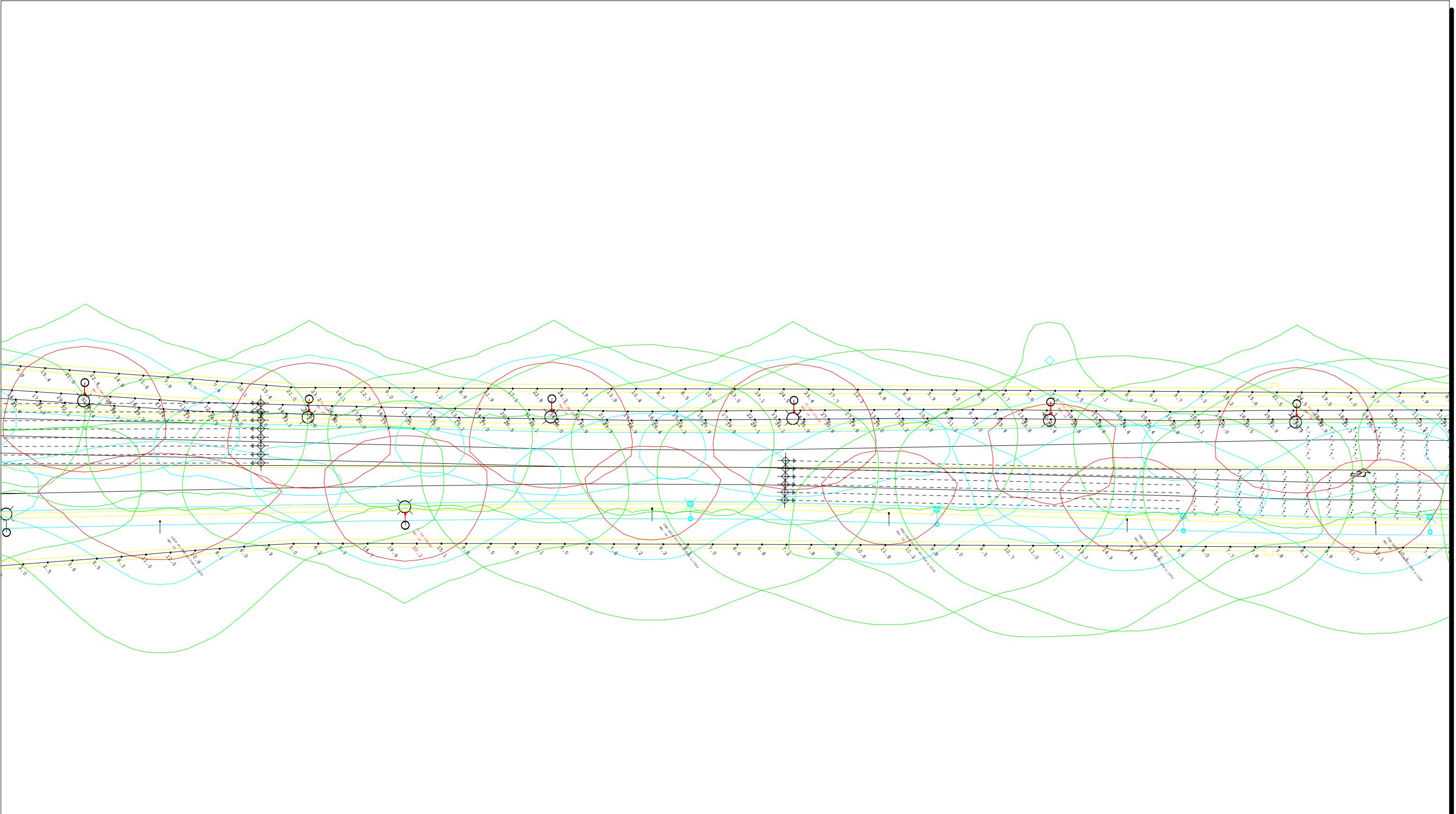
## DESIGN - PLAN VIEW



## DESIGN - PLAN VIEW



# DESIGN - PLAN VIEW



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**Burnhamthorpe Road Class EA**  
Ref. Number : B000856  
Prepared by : Yan Jiang  
File : **B000856 Burnhamthorpe Road\_Plan 'A'.AGI**

Client :



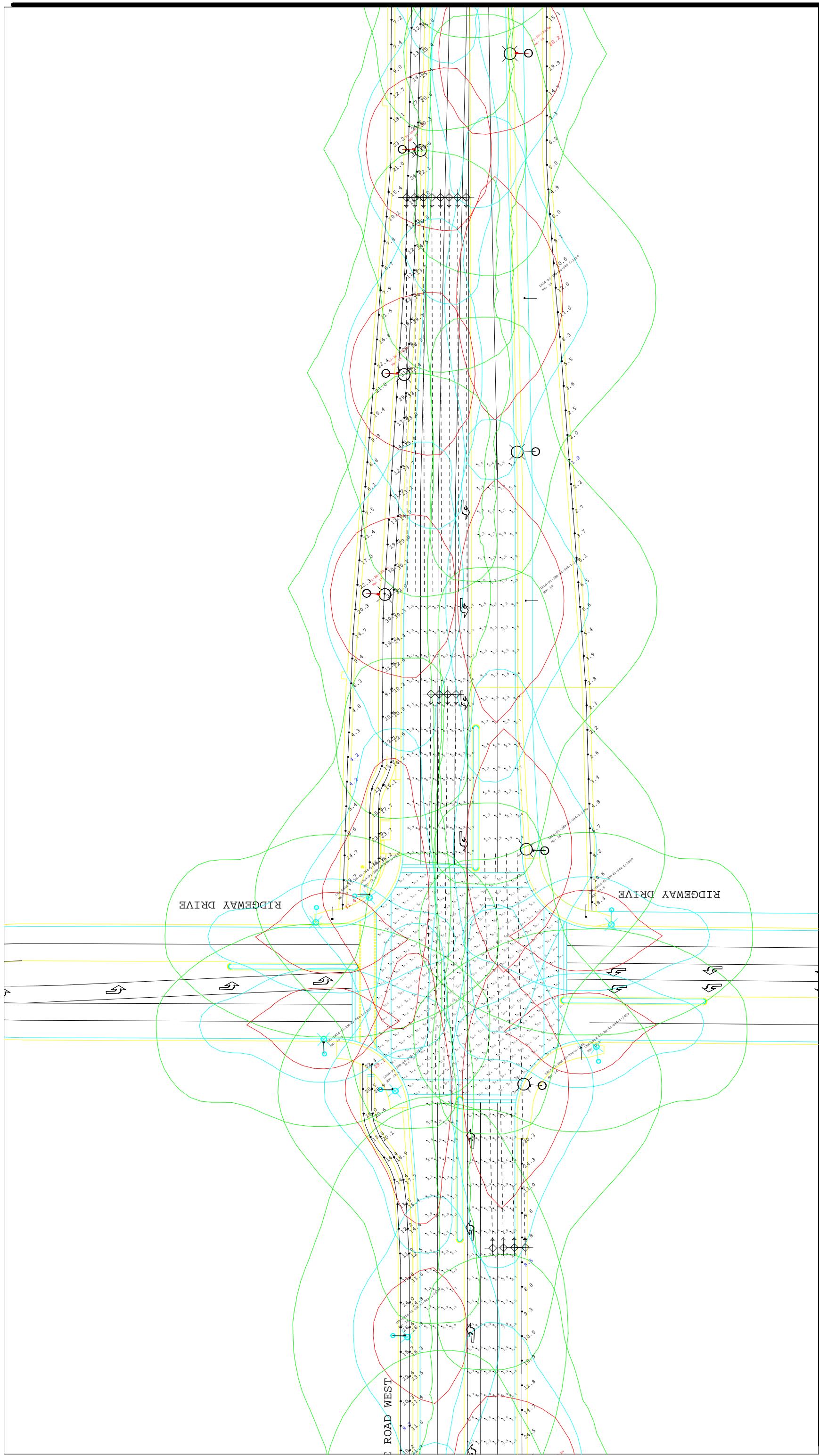
Date : 4/3/2019

AGI32 Version 19.4.15

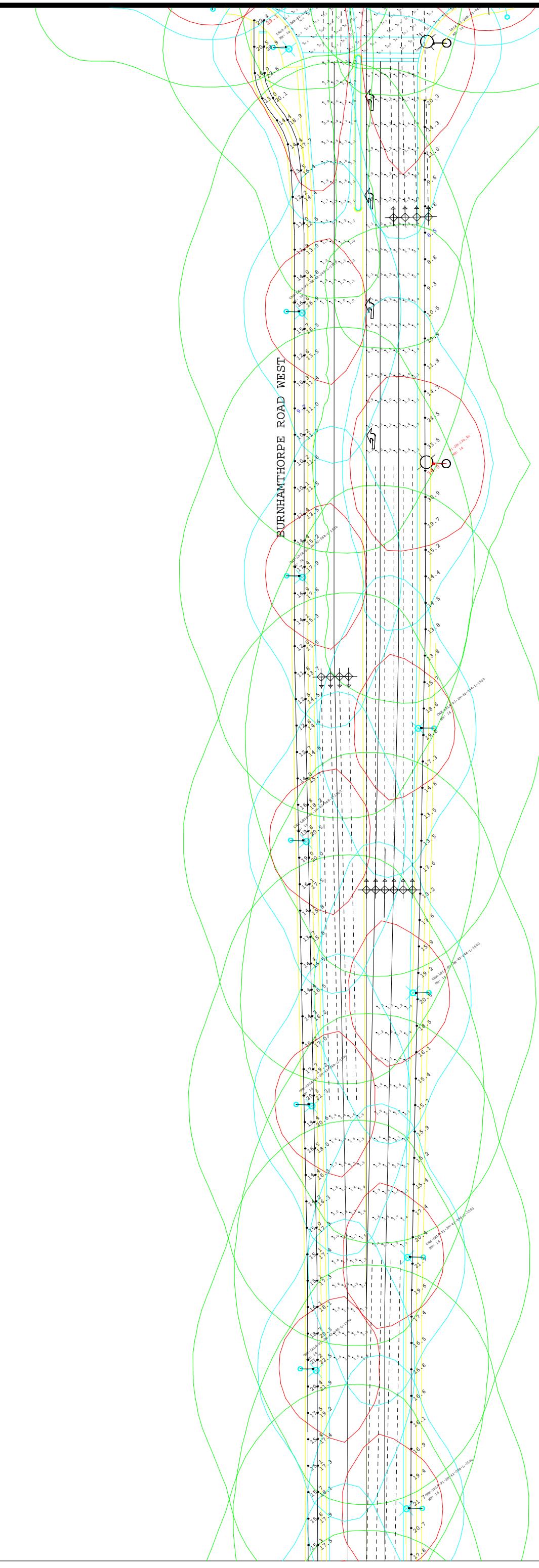
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**DISCLAIMER :**  
The calculations are carried out according to IES and TAC standards and practices. There may be significant difference between the measured values and the calculated values. This difference is due to tolerances in the calculation methods, test procedures, component performance, measurement techniques and to the site conditions, such as voltage and temperature variations. Data used to perform the calculations, room dimensions, reflectances, furniture and architectural elements affect the lighting calculations significantly. If the actual environmental conditions do not match the data, there will be significant differences between the actual values and the calculated values.

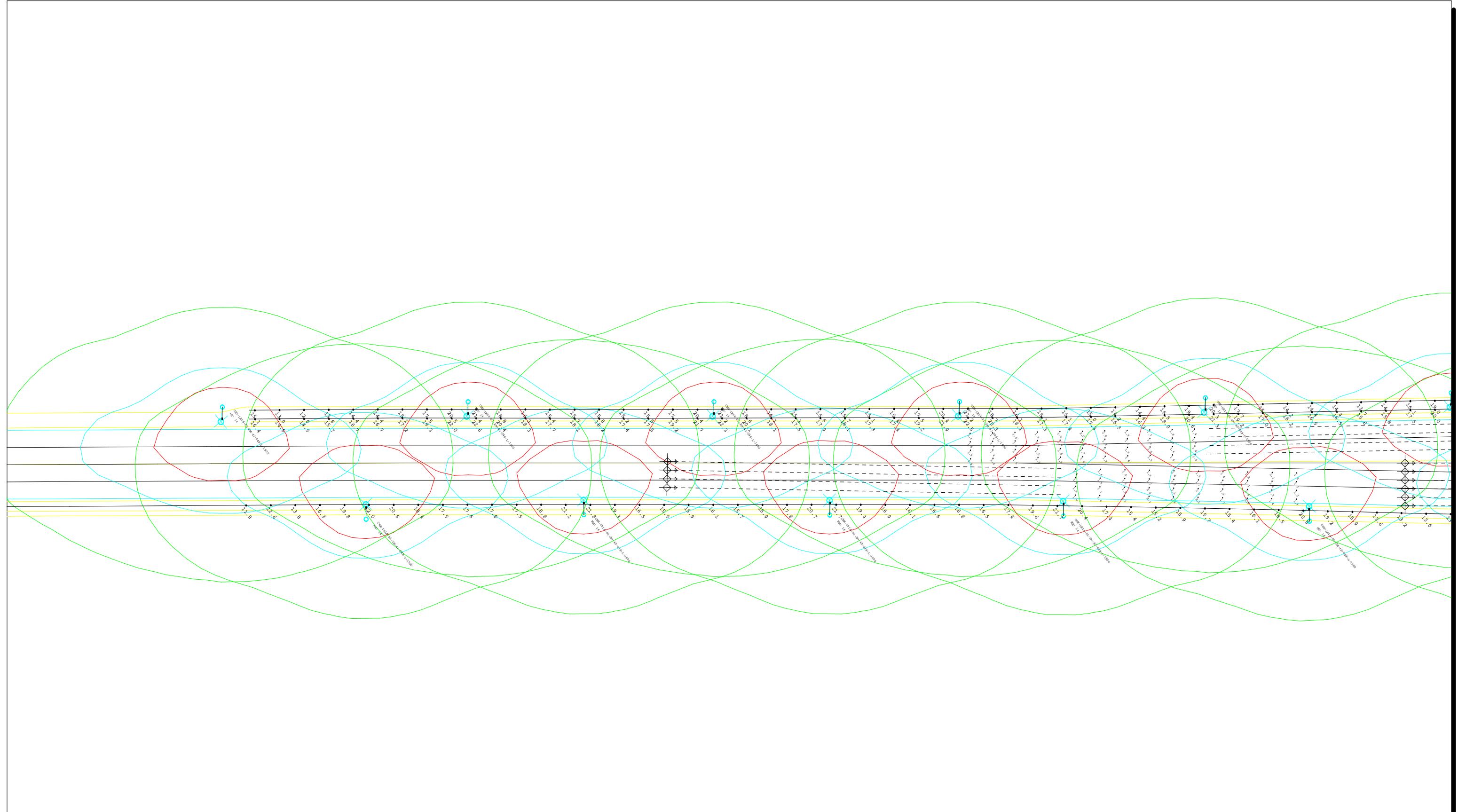
## DESIGN - PLAN VIEW



## DESIGN - PLAN VIEW



## DESIGN - PLAN VIEW



## LUMINAIRE DEFINITIONS

Luminaire Schedule											
Symbol	Label	Filename	Lamp Lumens	Lum. Lumens	LLF	IES Class	Long. Class	Cutoff Class	BUG Rating	Lum. Watts	
—■	CNX-LRL4-P1-2M-42-044-L-1050	CNX-LRL4-P1-2M-42-044-L-1050.ies	N.A.	14094	0.850	Type II	Medium	N.A.	B3-U0-G3	154.77	
—■	CNX-LRL4-P1-2M-42-044-L-1050	CNX-LRL4-P1-2M-42-044-L-1050.ies	N.A.	14094	0.850	Type II	Medium	N.A.	B3-U0-G3	154.77	
—■	CNX-LRL4-P1-3M-42-044-L-1050	CNX-LRL4-P1-3M-42-044-L-1050.ies	N.A.	14036	0.850	Type III	Short	N.A.	B3-U0-G3	155.81	
—■	CNX-LRL4-P1-2M-42-048-L-1500	CNX-LRL4-P1-2M-42-048-L-1500.ies	N.A.	23099	0.850	Type II	Medium	N.A.	B4-U0-G4	231.9	
—■	LRL4-P1-2MB-40-044-L-1500	LRL4-P1-2MB-40-044-L-1500.ies	26520	26520	0.850	Type II	Medium	Non-Cutoff	B3-U1-G3	215	
—■	P1-2M-120_Ex	P1-2M-120.ies	25035.69	25036	0.850	Type II	Short	Full Cutoff	B3-U0-G3	262.57	

Luminaire Schedule						
Symbol	Label	Description	Arrangement	Arm	Qty	
—■	CNX-LRL4-P1-2M-42-044-L-1050	CNX-LRL4-P1-2M-42-044-L-1050	SINGLE	2.4	4	
—■	CNX-LRL4-P1-2M-42-044-L-1050_Ex	CNX-LRL4-P1-2M-42-044-L-1050	SINGLE	2.4	4	
—■	CNX-LRL4-P1-3M-42-044-L-1050	CNX-LRL4-P1-3M-42-044-L-1050	SINGLE	2.4	3	
—■	CNX-LRL4-P1-2M-42-048-L-1500	CNX-LRL4-P1-2M-42-048-L-1500	SINGLE	2.4	28	
—■	LRL4-P1-2MB-40-044-L-1500	CNX-LRL4-P1-2MB-40-044-L-1500	SINGLE	2.4	6	
—■	P1-2M-120_Ex	CNX-LRL3-P1-2M-42-120-L-700	SINGLE	2.4	23	

## RESULTS

Calculation Summary											
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min	Meter Type	LVRatio	RTable	
Burnhamthorpe Rd & Colonial Dr	Illuminance	Lux	23.69	45.0	12.2	1.94	3.69	Horizontal	N.A.	N.A.	
Burnhamthorpe Rd & Loyalist Dr	Illuminance	Lux	23.32	41.9	11.5	2.03	3.64	Horizontal	N.A.	N.A.	
Burnhamthorpe Rd & Ridgeway Dr	Illuminance	Lux	27.72	48.8	11.8	2.35	4.14	Horizontal	N.A.	N.A.	
Road_1_EB_Illum	Illuminance	Lux	20.15	29.1	11.7	1.72	2.49	Horizontal	N.A.	N.A.	
Road_1_EB_Luminance	Luminance	Cd/Sq.m	1.20	2.1	0.8	1.50	2.63	Horizontal	N.A.	R3	
Road_1_EB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.19	0.3	0.1	1.90	3.00	Horizontal	N.A.	R3	
Road_1_WB_Illum	Illuminance	Lux	26.83	42.3	17.5	1.53	2.42	Horizontal	N.A.	N.A.	
Road_1_WB_Luminance	Luminance	Cd/Sq.m	1.63	2.1	1.4	1.16	1.50	Horizontal	N.A.	R3	
Road_1_WB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.22	0.3	0.1	2.20	3.00	Horizontal	N.A.	R3	
Road_2_EB_Illum	Illuminance	Lux	21.13	29.2	14.7	1.44	1.99	Horizontal	N.A.	N.A.	
Road_2_EB_Luminance	Luminance	Cd/Sq.m	1.66	2.2	1.4	1.19	1.57	Horizontal	N.A.	R3	
Road_2_EB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.26	0.3	0.2	1.30	1.50	Horizontal	N.A.	R3	
Road_2_WB_Illum	Illuminance	Lux	28.23	43.5	20.7	1.36	2.10	Horizontal	N.A.	N.A.	
Road_2_WB_Luminance	Luminance	Cd/Sq.m	1.64	2.0	1.4	1.17	1.43	Horizontal	N.A.	R3	
Road_2_WB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.25	0.3	0.2	1.25	1.50	Horizontal	N.A.	R3	
Road_3_EB_Illum	Illuminance	Lux	21.22	30.3	16.0	1.33	1.89	Horizontal	N.A.	N.A.	
Road_3_EB_Luminance	Luminance	Cd/Sq.m	1.78	2.2	1.4	1.27	1.57	Horizontal	N.A.	R3	
Road_3_EB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.24	0.3	0.2	1.20	1.50	Horizontal	N.A.	R3	
Road_3_WB_Illum	Illuminance	Lux	32.49	45.8	21.6	1.50	2.12	Horizontal	N.A.	N.A.	
Road_3_WB_Luminance	Luminance	Cd/Sq.m	1.89	2.7	1.4	1.35	1.93	Horizontal	N.A.	R3	
Road_3_WB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.26	0.3	0.2	1.30	1.50	Horizontal	N.A.	R3	
Road_4_EB_Illum	Illuminance	Lux	19.47	29.3	13.9	1.40	2.11	Horizontal	N.A.	N.A.	
Road_4_EB_Luminance	Luminance	Cd/Sq.m	1.25	2.1	0.8	1.56	2.63	Horizontal	N.A.	R3	
Road_4_EB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.30	0.4	0.2	1.50	2.00	Horizontal	N.A.	R3	
Road_4_WB_Illum	Illuminance	Lux	24.03	42.2	14.1	1.70	2.99	Horizontal	N.A.	N.A.	
Road_4_WB_Luminance	Luminance	Cd/Sq.m	1.58	2.2	1.2	1.32	1.83	Horizontal	N.A.	R3	
Road_4_WB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.24	0.3	0.2	1.20	1.50	Horizontal	N.A.	R3	
Road_5_EB_Illum	Illuminance	Lux	19.57	25.6	13.7	1.43	1.87	Horizontal	N.A.	N.A.	
Road_5_EB_Luminance	Luminance	Cd/Sq.m	1.63	2.7	0.9	1.81	3.00	Horizontal	N.A.	R3	
Road_5_EB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.33	0.5	0.2	1.65	2.50	Horizontal	N.A.	R3	
Road_5_WB_Illum	Illuminance	Lux	13.49	35.2	6.6	2.04	5.33	Horizontal	N.A.	N.A.	
Road_5_WB_Luminance	Luminance	Cd/Sq.m	0.91	2.1	0.6	1.52	3.50	Horizontal	N.A.	R3	
Road_5_WB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.24	0.3	0.2	1.20	1.50	Horizontal	N.A.	R3	
Road_6_EB_Illum	Illuminance	Lux	16.80	39.4	10.0	1.68	3.94	Horizontal	N.A.	N.A.	
Road_6_EB_Luminance	Luminance	Cd/Sq.m	1.32	2.4	0.8	1.65	3.00	Horizontal	N.A.	R3	
Road_6_EB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.23	0.4	0.2	1.15	2.00	Horizontal	N.A.	R3	
Road_6_WB_Illum	Illuminance	Lux	17.62	34.2	12.9	1.37	2.65	Horizontal	N.A.	N.A.	
Road_6_WB_Luminance	Luminance	Cd/Sq.m	1.33	2.1	1.0	1.33	2.10	Horizontal	N.A.	R3	
Road_6_WB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.28	0.5	0.2	1.40	2.50	Horizontal	N.A.	R3	
Road_7_EB_Illum	Illuminance	Lux	20.66	22.8	17.7	1.17	1.29	Horizontal	N.A.	N.A.	
Road_7_EB_Luminance	Luminance	Cd/Sq.m	1.60	2.3	1.2	1.33	1.92	Horizontal	N.A.	R3	
Road_7_EB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.32	0.4	0.3	1.07	1.33	Horizontal	N.A.	R3	
Road_7_WB_Illum	Illuminance	Lux	22.01	23.8	19.2	1.15	1.24	Horizontal	N.A.	N.A.	
Road_7_WB_Luminance	Luminance	Cd/Sq.m	1.57	2.0	1.4	1.12	1.43	Horizontal	N.A.	R3	
Road_7_WB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.27	0.3	0.2	1.35	1.50	Horizontal	N.A.	R3	
Sidewalk N_1	Illuminance	Lux	23.82	38.2	13.2	1.80	2.89	Horizontal	N.A.	N.A.	
Sidewalk N_2	Illuminance	Lux	16.00	27.0	8.2	1.95	3.29	Horizontal	N.A.	N.A.	
Sidewalk N_3	Illuminance	Lux	19.94	37.6	8.1	2.46	4.64	Horizontal	N.A.	N.A.	
Sidewalk N_4	Illuminance	Lux	12.57	31.4	4.2	2.99	7.48	Horizontal	N.A.	N.A.	
Sidewalk N_5	Illuminance	Lux	16.41	29.1	9.7	1.69	3.00	Horizontal	N.A.	N.A.	
Sidewalk S_1	Illuminance	Lux	8.84	16.0	5.1	1.73	3.14	Horizontal	N.A.	N.A.	
Sidewalk S_2	Illuminance	Lux	8.43	20.2	1.9	4.44	10.63	Horizontal	N.A.	N.A.	
Sidewalk S_3	Illuminance	Lux	16.86	34.0	8.5	1.98	4.00	Horizontal	N.A.	N.A.	

## LUMINAIRE LOCATION

Luminaire Location Summary										
LumNo	Label	X	Y	Z	Orient	Tilt	Roll	Spin	Switched	Dimming
3	P1-2M-120_Ex	604754.443	4820868.001	14	321.408	0	0	0	On	1.00
4	P1-2M-120_Ex	604701.177	4820801.774	14	321.96	0	0	0	On	1.00
5	P1-2M-120_Ex	604670.156	4820762.657	14	320.778	0	0	0	On	1.00
6	P1-2M-120_Ex	604639.019	4820723.492	14	323.197	0	0	0	On	1.00
7	P1-2M-120_Ex	604608.127	4820684.344	14	321.812	0	0	0	On	1.00
8	P1-2M-120_Ex	604575.941	4820643.677	14	321.599	0	0	0	On	1.00
9	P1-2M-120_Ex	604543.487	4820602.173	14	322.755	0	0	0	On	1.00
10	P1-2M-120_Ex	604511.853	4820562.145	14	321.815	0	0	0	On	1.00
11	P1-2M-120_Ex	604480.259	4820522.208	14	322.174	0	0	0	On	1.00
12	P1-2M-120_Ex	604453.542	4820488.982	14	320.473	0	0	0	On	1.00
13	P1-2M-120_Ex	604428.469	4820456.18	14	321.82	0	0	0	On	1.00
14	P1-2M-120_Ex	604342.665	4820346.819	14	321.827	0	0	0	On	1.00
15	P1-2M-120_Ex	604311.79	4820307.671	14	323.989	31.427	0	0	On	1.00
16	P1-2M-120_Ex	604279.507	4820266.751	14	322.915	0	0	0	On	1.00
17	P1-2M-120_Ex	604249.114	4820228.194	14	320.668	0	0	0	On	1.00
18	P1-2M-120_Ex	604251.118	4820188.961	14	141.55	0	0	0	On	1.00
19	P1-2M-120_Ex	604218.94	4820189.291	14	322.104	0	0	0	On	1.00
20	P1-2M-120_Ex	604188.374	4820155.418	14	321.684	0	0	0	On	1.00
21	LRL4-P1-2MB-40-044-L-1500	604221.858	4820148.699	14	142.12	0	0	0	On	1.00
22	P1-2M-120_Ex	604157.885	4820122.567	14	318.398	0	0	0	On	1.00
23	P1-2M-120_Ex	604075.748	4819959.08	14	142.109	0	0	0	On	1.00
24	P1-2M-120_Ex	604734.654	4820843.096	14	320.865	0	0	0	On	1.00
27	CNX-LRL4-P1-2M-42-044-L-1050_Ex	604730.229	4820792.86	10.5	140.439	0	0	0	On	1.00
28	P1-2M-120_Ex	604400.803	4820424.237	14	317.85	0	0	0	On	1.00
29	P1-2M-120_Ex	604377.578	4820392.878	14	322.053	0	0	0	On	1.00
34	CNX-LRL4-P1-2M-42-044-L-1050	604154.181	4820045.314	10.5	232.312	0	0	0	On	1.00
35	CNX-LRL4-P1-2M-42-044-L-1050	604134.257	4820021.099	10.5	54.55	0	0	0	On	1.00
37	LRL4-P1-2MB-40-044-L-1500	604098.273	4820041.304	10.5	323.957	0	0	0	On	1.00
38	CNX-LRL4-P1-2M-42-044-L-1050	604093.636	4820054.034	10.5	53.54	0	0	0	On	1.00
39	CNX-LRL4-P1-2M-42-044-L-1050	604113.297	4820076.552	10.5	231.246	0	0	0	On	1.00
40	LRL4-P1-2MB-40-044-L-1500	604118.905	4820075.368	10.5	323.79	0	0	0	On	1.00
41	CNX-LRL4-P1-2M-42-048-L-1500	604069.577	4820000.359	14	322.768	0	0	0	On	1.00
42	CNX-LRL4-P1-2M-42-048-L-1500	604038.93	4819960.853	14	322.109	0	0	0	On	1.00
43	CNX-LRL4-P1-2M-42-048-L-1500	604043.241	4819921.017	14	141.663	0	0	0	On	1.00

Total Quantity: 68 ( 34 shown, 1 through 34 )

## LUMINAIRE LOCATION

Luminaire Location Summary										
LumNo	Label	X	Y	Z	Orient	Tilt	Roll	Spin	Switched	Dimming
44	CNX-LRL4-P1-2M-42-048-L-1500	604008.837	4819920.922	14	320.901	0	0	0	On	1.00
45	CNX-LRL4-P1-2M-42-048-L-1500	604011.76	4819882.144	14	144.249	0	0	0	On	1.00
46	CNX-LRL4-P1-2M-42-048-L-1500	603978.955	4819880.834	14	323.299	0	0	0	On	1.00
47	CNX-LRL4-P1-2M-42-048-L-1500	603980.156	4819843.325	14	140.924	0	0	0	On	1.00
48	CNX-LRL4-P1-2M-42-048-L-1500	603948.88	4819840.89	14	322.132	0	0	0	On	1.00
49	CNX-LRL4-P1-2M-42-048-L-1500	603950.83	4819805.929	14	140.928	0	0	0	On	1.00
50	CNX-LRL4-P1-2M-42-048-L-1500	603918.214	4819801.451	14	322.132	0	0	0	On	1.00
51	CNX-LRL4-P1-2M-42-048-L-1500	603920.124	4819766.439	14	141.815	0	0	0	On	1.00
52	CNX-LRL4-P1-2M-42-048-L-1500	603887.522	4819761.98	14	322.132	0	0	0	On	1.00
53	CNX-LRL4-P1-2M-42-048-L-1500	603893.648	4819730.926	14	141.815	0	0	0	On	1.00
54	CNX-LRL4-P1-2M-42-048-L-1500	603857.682	4819721.86	14	321.738	0	0	0	On	1.00
55	CNX-LRL4-P1-2M-42-044-L-1050_Ex	604755.638	4820826.348	10.5	141.379	0	0	0	On	1.00
56	CNX-LRL4-P1-2M-42-044-L-1050_Ex	604753.158	4820816.415	10.5	230.755	0	0	0	On	1.00
57	CNX-LRL4-P1-2M-42-044-L-1050_Ex	604708.244	4820826.247	10.5	52.788	0	0	0	On	1.00
58	CNX-LRL4-P1-3M-42-044-L-1050	604425.257	4820401.198	10.5	231.179	0	0	0	On	1.00
59	CNX-LRL4-P1-3M-42-044-L-1050	604377.173	4820409.316	10.5	48.324	0	0	0	On	1.00
66	CNX-LRL4-P1-2M-42-048-L-1500	604281.082	4820229.039	14	141.462	0	0	0	On	1.00
67	CNX-LRL4-P1-2M-42-048-L-1500	604311.333	4820266.398	14	142.183	0	0	0	On	1.00
68	CNX-LRL4-P1-2M-42-048-L-1500	604342.01	4820303.727	14	142.087	0	0	0	On	1.00
69	CNX-LRL4-P1-2M-42-048-L-1500	604373.404	4820343.232	14	143.57	0	0	0	On	1.00
70	CNX-LRL4-P1-2M-42-048-L-1500	604437.528	4820423.359	14	142.125	0	0	0	On	1.00
71	CNX-LRL4-P1-2M-42-048-L-1500	604462.219	4820456.57	14	141.345	0	0	0	On	1.00
72	CNX-LRL4-P1-2M-42-048-L-1500	604487.805	4820490.733	14	142.68	0	0	0	On	1.00
73	CNX-LRL4-P1-2M-42-048-L-1500	604517.746	4820530.59	14	142.902	0	0	0	On	1.00
74	CNX-LRL4-P1-2M-42-048-L-1500	604549.143	4820570.512	14	142.79	0	0	0	On	1.00
75	CNX-LRL4-P1-2M-42-048-L-1500	604580.238	4820609.782	14	143.584	0	0	0	On	1.00
76	CNX-LRL4-P1-2M-42-048-L-1500	604610.773	4820649.97	14	142.908	0	0	0	On	1.00
77	CNX-LRL4-P1-2M-42-048-L-1500	604642.451	4820689.356	14	143.709	0	0	0	On	1.00
78	CNX-LRL4-P1-2M-42-048-L-1500	604674.771	4820728.149	14	143.664	0	0	0	On	1.00
79	LRL4-P1-2MB-40-044-L-1500	604154.442	4820059.069	14	142.117	0	0	0	On	1.00
80	LRL4-P1-2MB-40-044-L-1500	604124.584	4820021.764	14	142.571	0	0	0	On	1.00
81	CNX-LRL4-P1-2M-42-048-L-1500	604707.101	4820764.844	14	142.546	0	0	0	On	1.00
84	LRL4-P1-2MB-40-044-L-1500	604184.346	4820100.117	14	142.202	0	0	0	On	1.00
85	CNX-LRL4-P1-3M-42-044-L-1050	604401.778	4820378.058	10.5	143.038	0	0	0	On	1.00

Total Quantity: 68 ( 34 shown, 35 through 68 )

# Burnhamthorpe Road Class EA

## Photometric Report

Plan 'B'

City of Mississauga

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Patrick Lambert, P.Eng  
PEO : M100201924



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Burnhamthorpe Road Class EA
Ref. Number : B000856
Prepared by : Yan Jiang
File : B000856 Burnhamthorpe Road_Plan 'B'.AGI

Client :



Date : 4/3/2019
AGI32 Version 19.4.15
Page 1 of 13

## PHOTOMETRIC REQUIREMENTS

### Burnhamthorpe Road

Street Identification	:	Major/Arterial
Sector	:	Urban
Pedestrian Conflict Identification	:	Medium
Avg. Maintained Luminance	- Lavg	: 0.9 cd/m <sup>2</sup>
Uniformity	- Lavg/Lmin	: 3.0
Uniformity	- Lmax/Lmin	: 6.0
Veiling Luminance Ratio	- Lvmax/Lavg	: 0.3
Avg. Maintained Illuminance	- Eavg	: 13 Lux
Uniformity	- Eavg/Emin	: 3.0

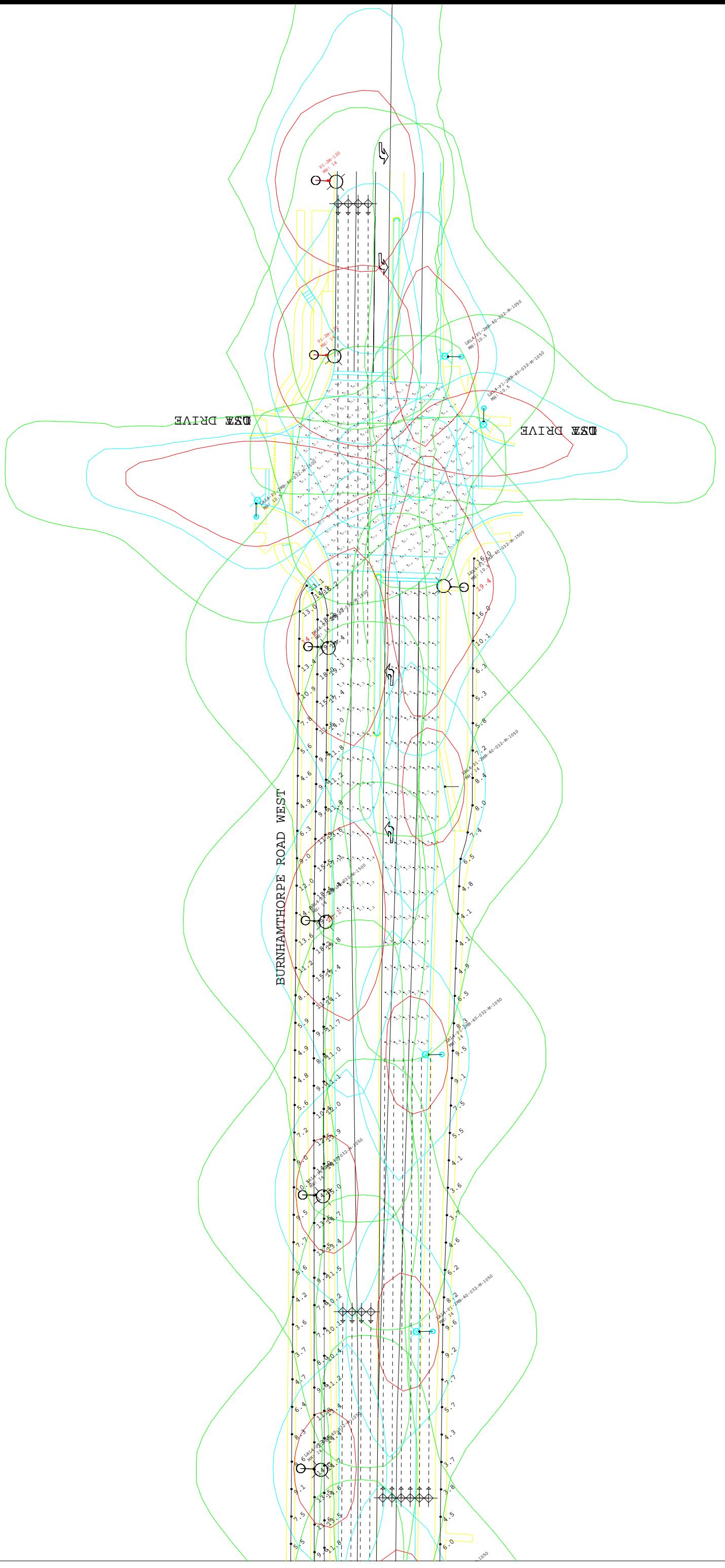
### Sidewalk / Bikeway

Sector	:	Urban
Pedestrian Conflict Identification	:	Medium
Avg. Maintained Horizontal Illuminance	- Ehavg	: 5.0 Lux
Uniformity	- Ehavg/Ehmin	: 4.0
Avg. Maintained Vertical Illuminance	- Evavg	: 2.0 Lux

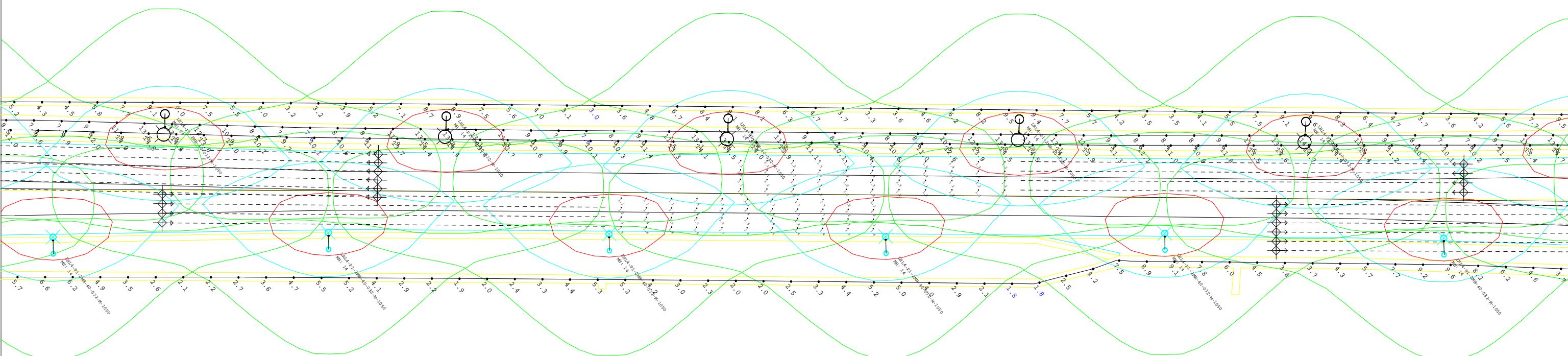
### Intersections

Side Road Identification	:	Collector
Sector	:	Urban
Pedestrian Conflict Identification	:	Medium
Avg. Maintained Illuminance	- Eavg	: 13 Lux
Uniformity	- Eavg/Emin	: 3.0

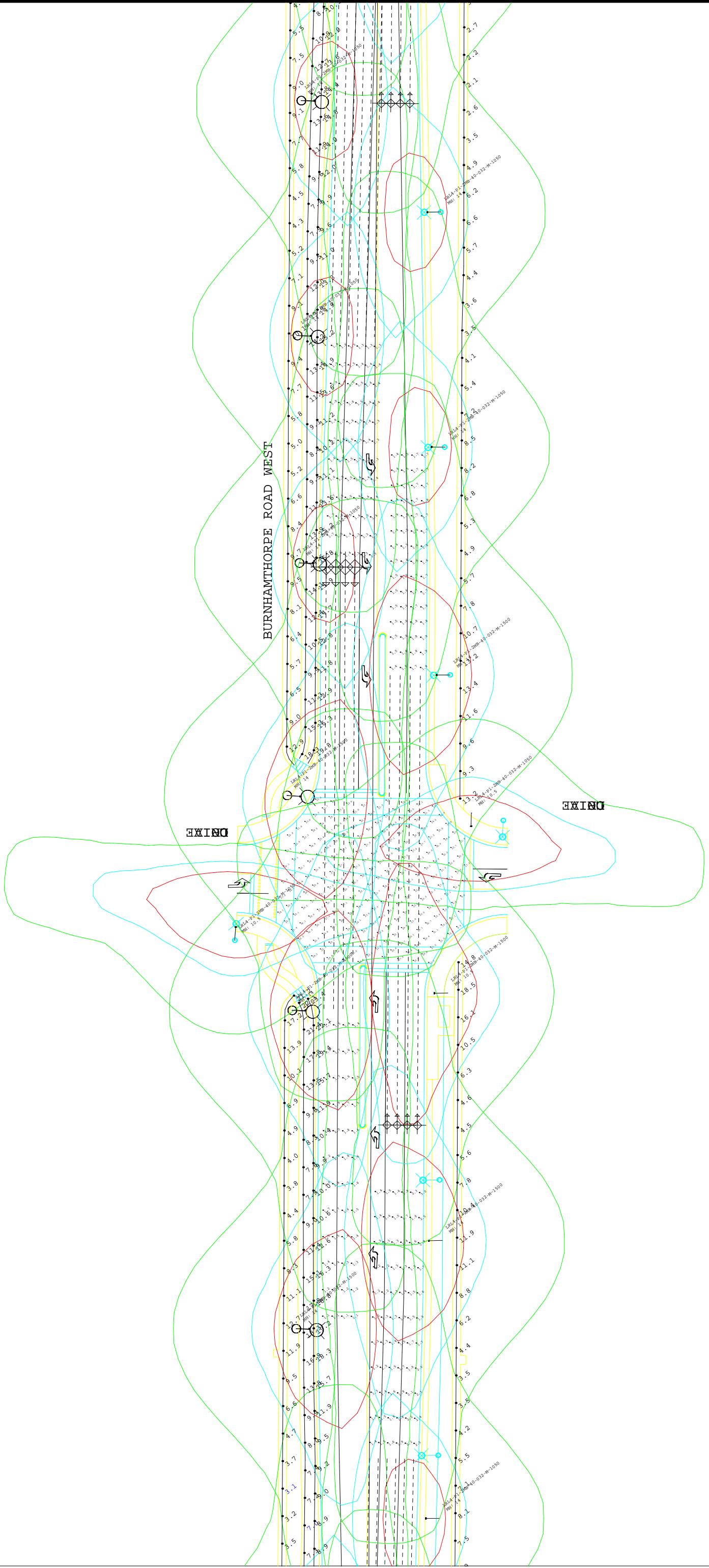
## DESIGN - PLAN VIEW



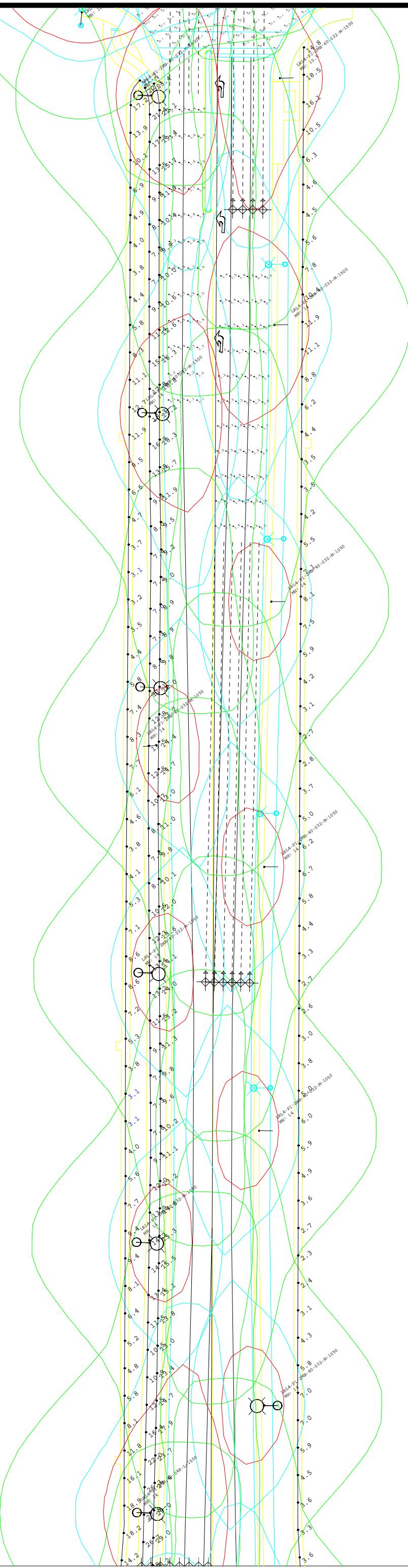
## DESIGN - PLAN VIEW



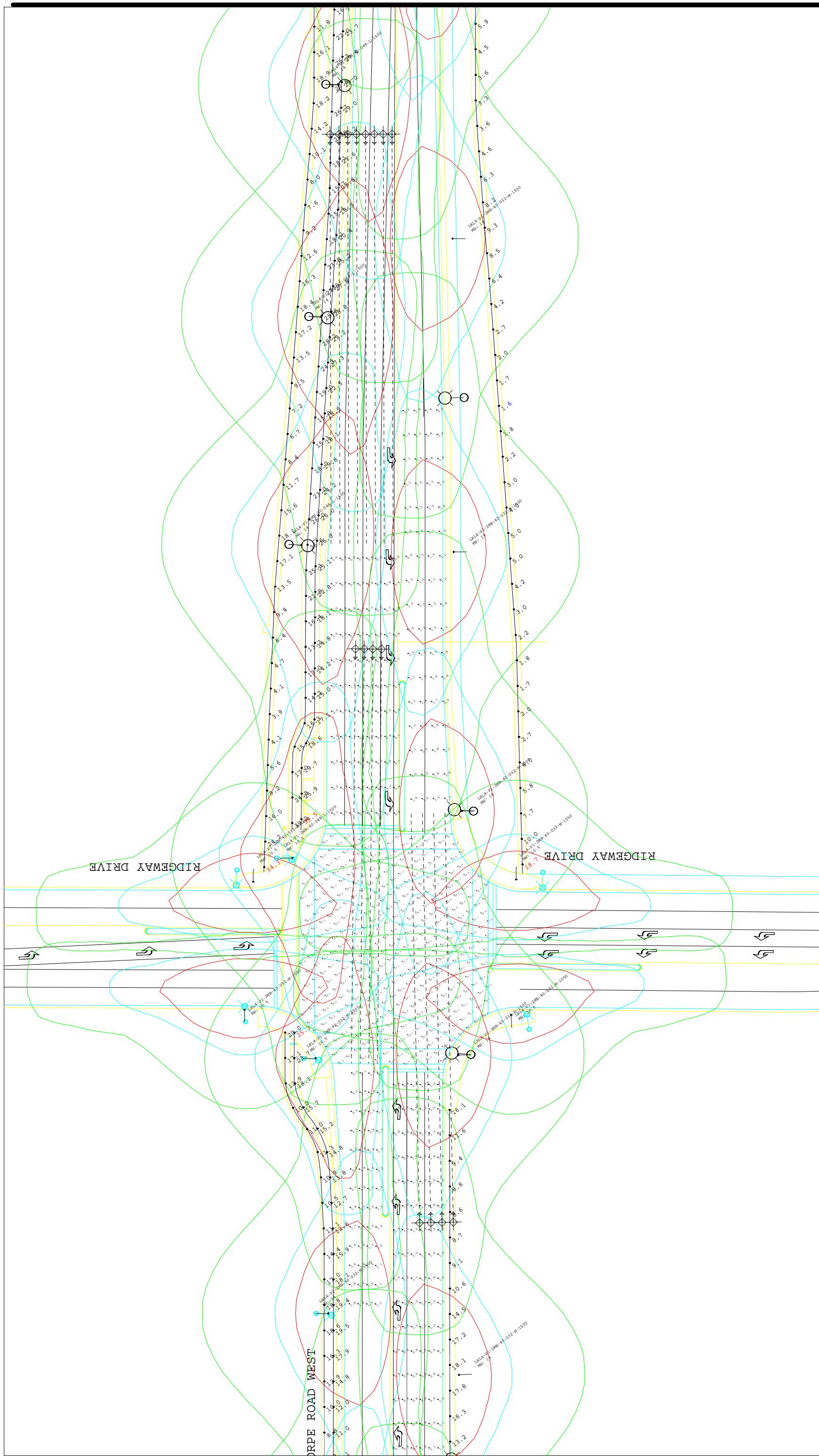
## DESIGN - PLAN VIEW



## DESIGN - PLAN VIEW



DESIGN - PLAN VIEW



**DISCLAIMER:** The calculations are carried out according to IES and TAC standards and practices. There may be a significant difference between the measured values and the calculated values. This difference is due to tolerances in the calculation methods, test procedures, component performance, measurement techniques and to the site conditions such as height and temperature variations. Data used to perform the calculations, room dimensions, furniture and equipment are different from those used in the calculations. If the actual environmental conditions do not match the data, there will be significant differences.

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Date : 4/3/2019

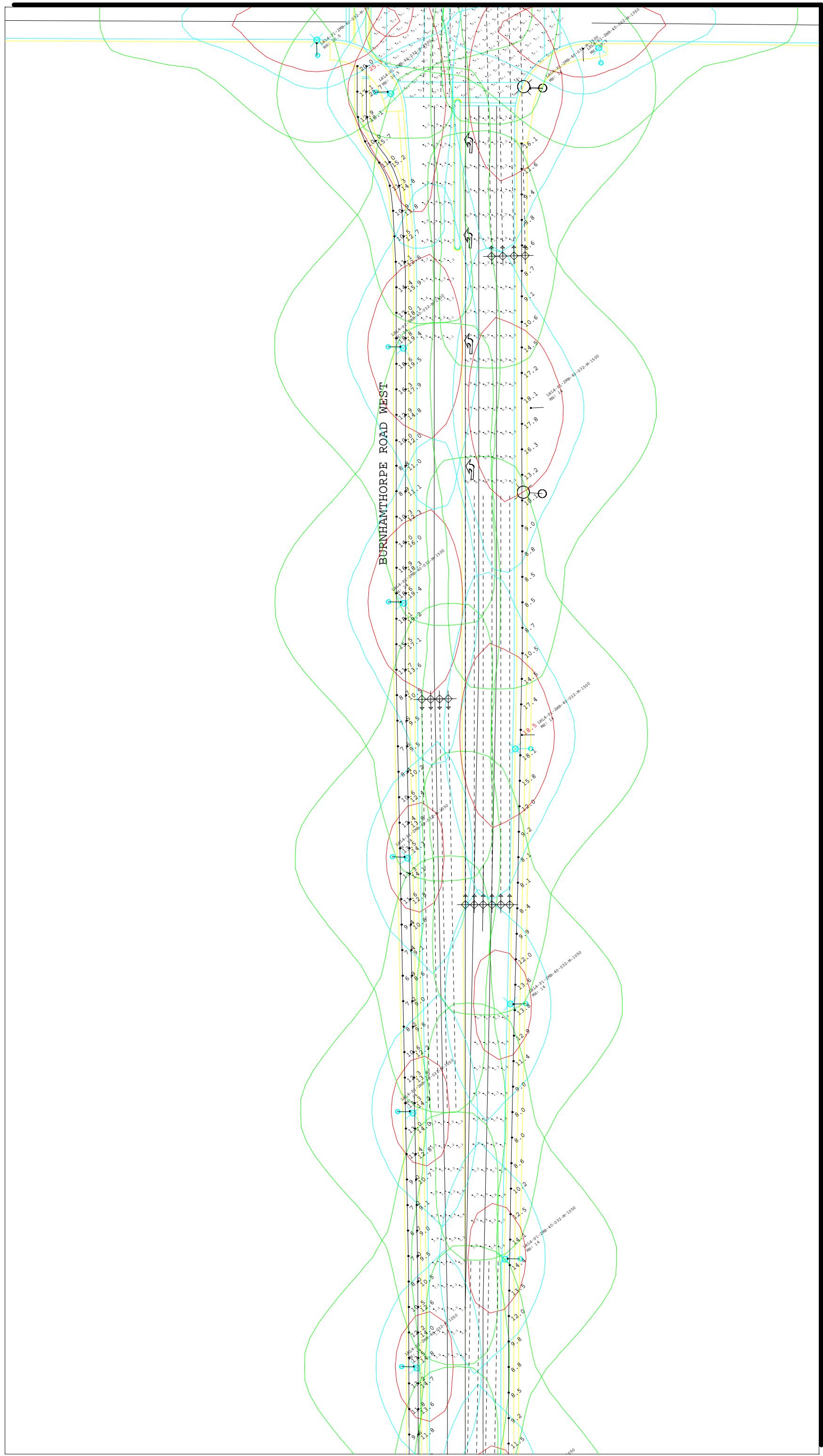


Burnhamthorpe Road Class EA  
Ref. Number : B000856  
Prepared by : Yan Jiang  
Title : **B000856 Burnhamthorpe Road, Plan 'B'.AGI**

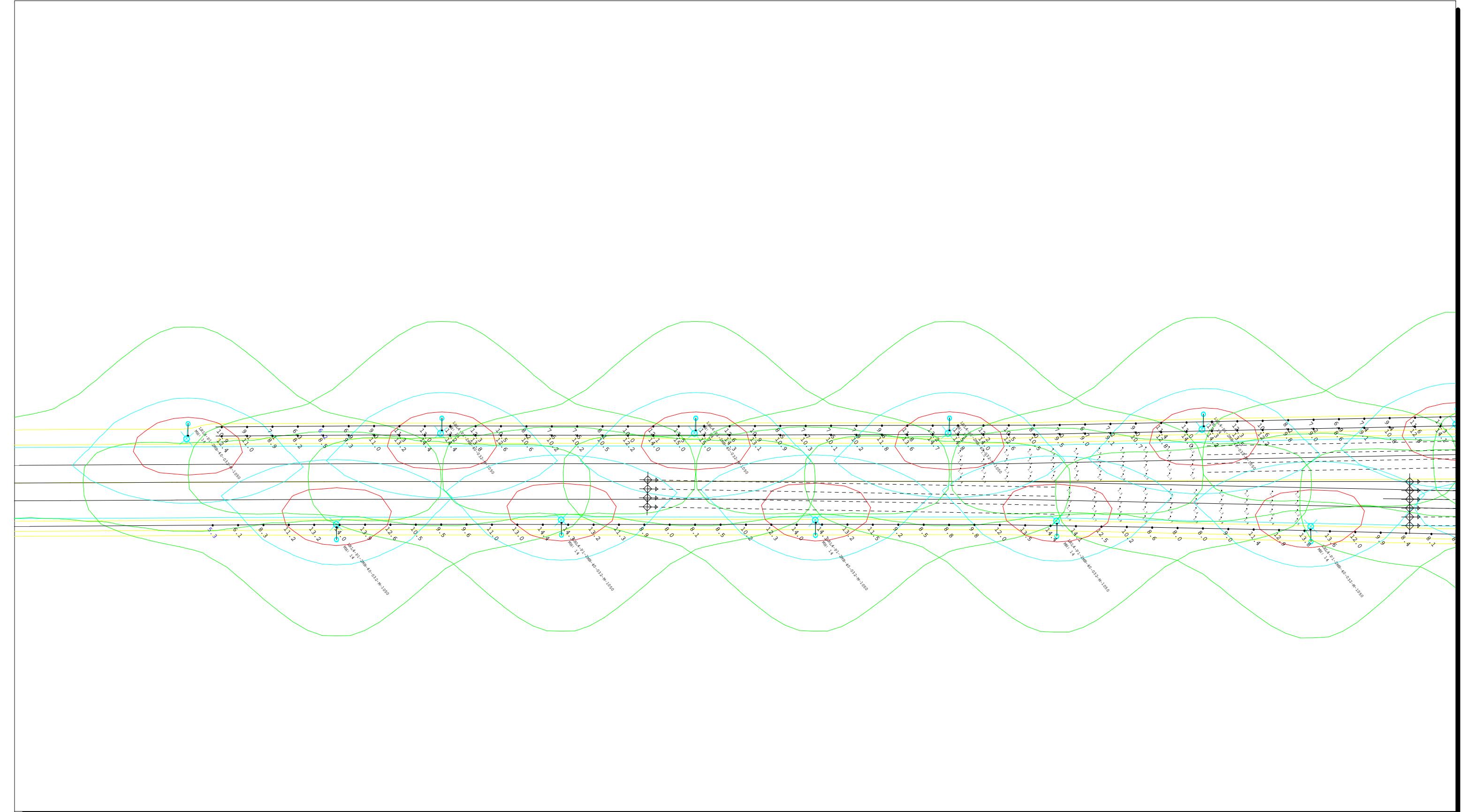
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## DESIGN - PLAN VIEW



## **DESIGN - PLAN VIEW**



## LUMINAIRE DEFINITIONS

Luminaire Schedule											
Symbol	Label	Filename	Lamp Lumens	Lum. Lumens	LLF	IES Class	Long. Class	Cutoff Class	BUG Rating	Lum. Watts	
—■	P1-2M-120	P1-2M-120.ies	25035.69	25036	0.850	Type II	Short	Full Cutoff	B3-U0-G3	262.57	
—■	LRL4-P1-2MB-40-048-L-1500	LRL4-P1-2MB-40-048-L-1500.ies	28987	28987	0.850	Type II	Medium	Non-Cutoff	B3-U1-G3	235.1	
—■	LRL4-P1-2MB-40-032-M-1500	LRL4-P1-2MB-40-032-M-1500.ies	20352	20352	0.850	Type II	Medium	Non-Cutoff	B3-U1-G3	165.1	
—■	LRL4-P1-2MB-40-032-M-1050	LRL4-P1-2MB-40-032-M-1050.ies	13568	13568	0.850	Type II	Medium	Non-Cutoff	B3-U1-G3	109.21	

Luminaire Schedule					
Symbol	Label	Description	Arrangement	Arm	Qty
—■	P1-2M-120	CNX-LRL3-P1-2M-42-120-L-700	SINGLE	2.4	2
—■	LRL4-P1-2MB-40-048-L-1500	CNX-LRL4-P1-2MB-40-048-L-1500	SINGLE	2.4	4
—■	LRL4-P1-2MB-40-032-M-1500	CNX-LRL4-P1-2MB-40-032-S-1500	SINGLE	2.4	19
—■	LRL4-P1-2MB-40-032-M-1050	CNX-LRL4-P1-2MB-40-032-S-1050	SINGLE	2.4	43

## RESULTS

Calculation Summary											
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min	Meter Type	LVRatio	RTable	
Burnhamthorpe Rd & Colonial Dr	Illuminance	Lux	23.83	30.8	7.6	3.14	4.05	Horizontal	N.A.	N.A.	
Burnhamthorpe Rd & Loyalist Dr	Illuminance	Lux	25.92	37.5	10.0	2.59	3.75	Horizontal	N.A.	N.A.	
Burnhamthorpe Rd & Ridgeway Dr	Illuminance	Lux	24.70	55.8	9.1	2.71	6.13	Horizontal	N.A.	N.A.	
Road_1_EB_Illum	Illuminance	Lux	18.30	32.6	8.4	2.18	3.88	Horizontal	N.A.	N.A.	
Road_1_EB_Luminance	Luminance	Cd/Sq.m	1.43	3.0	0.9	1.59	3.33	Horizontal	N.A.	R3	
Road_1_EB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.22	0.3	0.1	2.20	3.00	Horizontal	N.A.	R3	
Road_1_WB_Illum	Illuminance	Lux	18.37	20.9	13.8	1.33	1.51	Horizontal	N.A.	N.A.	
Road_1_WB_Luminance	Luminance	Cd/Sq.m	1.54	2.1	1.1	1.40	1.91	Horizontal	N.A.	R3	
Road_1_WB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.28	0.4	0.2	1.40	2.00	Horizontal	N.A.	R3	
Road_2_EB_Illum	Illuminance	Lux	14.82	18.0	10.3	1.44	1.75	Horizontal	N.A.	N.A.	
Road_2_EB_Luminance	Luminance	Cd/Sq.m	1.39	1.8	1.2	1.16	1.50	Horizontal	N.A.	R3	
Road_2_EB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.23	0.3	0.2	1.15	1.50	Horizontal	N.A.	R3	
Road_2_WB_Illum	Illuminance	Lux	16.55	17.7	14.3	1.16	1.24	Horizontal	N.A.	N.A.	
Road_2_WB_Luminance	Luminance	Cd/Sq.m	1.25	1.5	1.1	1.14	1.36	Horizontal	N.A.	R3	
Road_2_WB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.28	0.3	0.2	1.40	1.50	Horizontal	N.A.	R3	
Road_3_EB_Illum	Illuminance	Lux	18.59	22.2	13.7	1.36	1.62	Horizontal	N.A.	N.A.	
Road_3_EB_Luminance	Luminance	Cd/Sq.m	1.61	1.9	1.4	1.15	1.36	Horizontal	N.A.	R3	
Road_3_EB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.30	0.6	0.2	1.50	3.00	Horizontal	N.A.	R3	
Road_3_WB_Illum	Illuminance	Lux	17.87	20.9	13.0	1.37	1.61	Horizontal	N.A.	N.A.	
Road_3_WB_Luminance	Luminance	Cd/Sq.m	1.50	1.9	1.3	1.15	1.46	Horizontal	N.A.	R3	
Road_3_WB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.30	0.3	0.3	1.00	1.00	Horizontal	N.A.	R3	
Road_4_EB_Illum	Illuminance	Lux	18.43	23.3	11.1	1.66	2.10	Horizontal	N.A.	N.A.	
Road_4_EB_Luminance	Luminance	Cd/Sq.m	1.61	3.0	1.2	1.34	2.50	Horizontal	N.A.	R3	
Road_4_EB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.28	0.3	0.2	1.40	1.50	Horizontal	N.A.	R3	
Road_4_WB_Illum	Illuminance	Lux	17.61	22.0	11.9	1.48	1.85	Horizontal	N.A.	N.A.	
Road_4_WB_Luminance	Luminance	Cd/Sq.m	1.58	2.3	1.1	1.44	2.09	Horizontal	N.A.	R3	
Road_4_WB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.34	0.4	0.3	1.13	1.33	Horizontal	N.A.	R3	
Road_5_EB_Illum	Illuminance	Lux	15.29	19.7	10.9	1.40	1.81	Horizontal	N.A.	N.A.	
Road_5_EB_Luminance	Luminance	Cd/Sq.m	1.34	2.1	0.9	1.49	2.33	Horizontal	N.A.	R3	
Road_5_EB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.27	0.4	0.2	1.35	2.00	Horizontal	N.A.	R3	
Road_5_WB_Illum	Illuminance	Lux	13.04	27.2	6.7	1.95	4.06	Horizontal	N.A.	N.A.	
Road_5_WB_Luminance	Luminance	Cd/Sq.m	0.90	2.2	0.4	2.25	5.50	Horizontal	N.A.	R3	
Road_5_WB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.31	0.5	0.2	1.55	2.50	Horizontal	N.A.	R3	
Road_6_EB_Illum	Illuminance	Lux	14.72	19.2	10.4	1.42	1.85	Horizontal	N.A.	N.A.	
Road_6_EB_Luminance	Luminance	Cd/Sq.m	1.12	2.0	0.8	1.40	2.50	Horizontal	N.A.	R3	
Road_6_EB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.27	0.4	0.2	1.35	2.00	Horizontal	N.A.	R3	
Road_6_WB_Illum	Illuminance	Lux	17.28	27.9	13.3	1.30	2.10	Horizontal	N.A.	N.A.	
Road_6_WB_Luminance	Luminance	Cd/Sq.m	1.55	2.3	1.1	1.41	2.09	Horizontal	N.A.	R3	
Road_6_WB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.20	0.4	0.1	2.00	4.00	Horizontal	N.A.	R3	
Road_7_EB_Illum	Illuminance	Lux	14.89	18.0	10.7	1.39	1.68	Horizontal	N.A.	N.A.	
Road_7_EB_Luminance	Luminance	Cd/Sq.m	1.37	1.8	1.1	1.25	1.64	Horizontal	N.A.	R3	
Road_7_EB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.28	0.3	0.2	1.40	1.50	Horizontal	N.A.	R3	
Road_7_WB_Illum	Illuminance	Lux	16.79	19.7	13.0	1.29	1.52	Horizontal	N.A.	N.A.	
Road_7_WB_Luminance	Luminance	Cd/Sq.m	1.33	1.5	1.2	1.11	1.25	Horizontal	N.A.	R3	
Road_7_WB_Veil_Lum	Veiling Luminance	Cd/Sq.m	0.20	0.3	0.2	1.00	1.50	Horizontal	N.A.	R3	
Sidewalk N_1	Illuminance	Lux	12.46	20.1	7.6	1.64	2.64	Horizontal	N.A.	N.A.	
Sidewalk N_2	Illuminance	Lux	7.06	14.2	3.0	2.35	4.73	Horizontal	N.A.	N.A.	
Sidewalk N_3	Illuminance	Lux	16.31	39.5	7.0	2.33	5.64	Horizontal	N.A.	N.A.	
Sidewalk N_4	Illuminance	Lux	9.18	34.3	3.1	2.96	11.06	Horizontal	N.A.	N.A.	
Sidewalk N_5	Illuminance	Lux	12.11	25.3	6.2	1.95	4.08	Horizontal	N.A.	N.A.	
Sidewalk S_1	Illuminance	Lux	5.92	19.4	1.8	3.29	10.78	Horizontal	N.A.	N.A.	
Sidewalk S_2	Illuminance	Lux	5.51	18.7	1.6	3.44	11.69	Horizontal	N.A.	N.A.	
Sidewalk S_3	Illuminance	Lux	11.47	18.5	5.3	2.16	3.49	Horizontal	N.A.	N.A.	

## LUMINAIRE LOCATION

Luminaire Location Summary										
LumNo	Label	X	Y	Z	Orient	Tilt	Roll	Spin	Switched	Dimming
3	P1-2M-120	604754.443	4820868.001	14	321.408	0	0	0	On	1.00
4	LRL4-P1-2MB-40-032-M-1500	604701.177	4820801.774	14	321.96	0	0	0	On	1.00
5	LRL4-P1-2MB-40-032-M-1500	604670.156	4820762.657	14	320.778	0	0	0	On	1.00
6	LRL4-P1-2MB-40-032-M-1050	604639.019	4820723.492	14	323.197	0	0	0	On	1.00
7	LRL4-P1-2MB-40-032-M-1050	604608.127	4820684.344	14	321.812	0	0	0	On	1.00
8	LRL4-P1-2MB-40-032-M-1050	604575.941	4820643.677	14	321.599	0	0	0	On	1.00
9	LRL4-P1-2MB-40-032-M-1050	604543.487	4820602.173	14	322.755	0	0	0	On	1.00
10	LRL4-P1-2MB-40-032-M-1050	604511.853	4820562.145	14	321.815	0	0	0	On	1.00
11	LRL4-P1-2MB-40-032-M-1050	604480.259	4820522.208	14	322.174	0	0	0	On	1.00
12	LRL4-P1-2MB-40-032-M-1050	604453.542	4820488.982	14	320.473	0	0	0	On	1.00
13	LRL4-P1-2MB-40-032-M-1050	604428.469	4820456.18	14	321.82	0	0	0	On	1.00
14	LRL4-P1-2MB-40-032-M-1500	604342.665	4820346.819	14	321.827	0	0	0	On	1.00
15	LRL4-P1-2MB-40-032-M-1050	604305.544	4820298.668	14	326.678	0	0	0	On	1.00
16	LRL4-P1-2MB-40-032-M-1050	604279.507	4820266.751	14	322.915	0	0	0	On	1.00
17	LRL4-P1-2MB-40-032-M-1050	604249.114	4820228.194	14	320.668	0	0	0	On	1.00
18	LRL4-P1-2MB-40-032-M-1050	604251.118	4820188.961	14	141.55	0	0	0	On	1.00
19	LRL4-P1-2MB-40-048-L-1500	604218.94	4820189.291	14	322.104	0	0	0	On	1.00
20	LRL4-P1-2MB-40-048-L-1500	604188.374	4820155.418	14	321.684	0	0	0	On	1.00
21	LRL4-P1-2MB-40-032-M-1500	604221.858	4820148.699	14	142.12	0	0	0	On	1.00
22	LRL4-P1-2MB-40-048-L-1500	604157.885	4820122.567	14	318.398	0	0	0	On	1.00
23	LRL4-P1-2MB-40-032-M-1500	604086.262	4819972.323	14	144.914	0	0	0	On	1.00
24	P1-2M-120	604734.654	4820843.096	14	320.865	0	0	0	On	1.00
27	LRL4-P1-2MB-40-032-M-1500	604730.229	4820792.86	10.5	140.439	0	0	0	On	1.00
28	LRL4-P1-2MB-40-032-M-1500	604400.803	4820424.237	14	317.85	0	0	0	On	1.00
29	LRL4-P1-2MB-40-032-M-1500	604377.578	4820392.878	14	322.053	0	0	0	On	1.00
34	LRL4-P1-2MB-40-032-M-1050	604154.181	4820045.314	10.5	232.312	0	0	0	On	1.00
35	LRL4-P1-2MB-40-032-M-1050	604134.257	4820021.099	10.5	54.55	0	0	0	On	1.00
37	LRL4-P1-2MB-40-032-M-1500	604098.273	4820041.304	10.5	323.957	0	0	0	On	1.00
38	LRL4-P1-2MB-40-032-M-1050	604093.636	4820054.034	10.5	53.54	0	0	0	On	1.00
39	LRL4-P1-2MB-40-032-M-1050	604113.297	4820076.552	10.5	231.246	0	0	0	On	1.00
40	LRL4-P1-2MB-40-048-L-1500	604118.812	4820075.091	10.5	322.62	0	0	0	On	1.00
41	LRL4-P1-2MB-40-032-M-1500	604069.577	4820000.359	14	322.768	0	0	0	On	1.00
42	LRL4-P1-2MB-40-032-M-1500	604038.93	4819960.853	14	322.109	0	0	0	On	1.00
43	LRL4-P1-2MB-40-032-M-1500	604045.463	4819922.717	14	143.009	0	0	0	On	1.00

Total Quantity: 68 ( 34 shown, 1 through 34 )

## LUMINAIRE LOCATION

Luminaire Location Summary										
LumNo	Label	X	Y	Z	Orient	Tilt	Roll	Spin	Switched	Dimming
44	LRL4-P1-2MB-40-032-M-1050	604008.837	4819920.922	14	320.901	0	0	0	On	1.00
45	LRL4-P1-2MB-40-032-M-1050	604011.76	4819882.144	14	144.249	0	0	0	On	1.00
46	LRL4-P1-2MB-40-032-M-1050	603978.955	4819880.834	14	323.299	0	0	0	On	1.00
47	LRL4-P1-2MB-40-032-M-1050	603980.156	4819843.325	14	140.924	0	0	0	On	1.00
48	LRL4-P1-2MB-40-032-M-1050	603948.88	4819840.89	14	322.132	0	0	0	On	1.00
49	LRL4-P1-2MB-40-032-M-1050	603950.83	4819805.929	14	140.928	0	0	0	On	1.00
50	LRL4-P1-2MB-40-032-M-1050	603918.214	4819801.451	14	322.132	0	0	0	On	1.00
51	LRL4-P1-2MB-40-032-M-1050	603920.124	4819766.439	14	141.815	0	0	0	On	1.00
52	LRL4-P1-2MB-40-032-M-1050	603887.522	4819761.98	14	322.132	0	0	0	On	1.00
53	LRL4-P1-2MB-40-032-M-1050	603893.648	4819730.926	14	141.815	0	0	0	On	1.00
54	LRL4-P1-2MB-40-032-M-1050	603857.682	4819721.86	14	321.738	0	0	0	On	1.00
55	LRL4-P1-2MB-40-032-M-1050	604755.638	4820826.348	10.5	141.379	0	0	0	On	1.00
56	LRL4-P1-2MB-40-032-M-1050	604753.158	4820816.415	10.5	230.755	0	0	0	On	1.00
57	LRL4-P1-2MB-40-032-M-1500	604708.244	4820826.247	10.5	52.788	0	0	0	On	1.00
58	LRL4-P1-2MB-40-032-M-1050	604425.257	4820401.198	10.5	231.179	0	0	0	On	1.00
59	LRL4-P1-2MB-40-032-M-1050	604377.173	4820409.316	10.5	48.324	0	0	0	On	1.00
66	LRL4-P1-2MB-40-032-M-1050	604281.082	4820229.039	14	141.462	0	0	0	On	1.00
67	LRL4-P1-2MB-40-032-M-1050	604311.333	4820266.398	14	142.183	0	0	0	On	1.00
68	LRL4-P1-2MB-40-032-M-1050	604342.01	4820303.727	14	142.087	0	0	0	On	1.00
69	LRL4-P1-2MB-40-032-M-1500	604373.404	4820343.232	14	143.57	0	0	0	On	1.00
70	LRL4-P1-2MB-40-032-M-1500	604437.528	4820423.359	14	142.125	0	0	0	On	1.00
71	LRL4-P1-2MB-40-032-M-1050	604462.219	4820456.57	14	141.345	0	0	0	On	1.00
72	LRL4-P1-2MB-40-032-M-1050	604487.805	4820490.733	14	142.68	0	0	0	On	1.00
73	LRL4-P1-2MB-40-032-M-1050	604517.746	4820530.59	14	142.902	0	0	0	On	1.00
74	LRL4-P1-2MB-40-032-M-1050	604549.143	4820570.512	14	142.79	0	0	0	On	1.00
75	LRL4-P1-2MB-40-032-M-1050	604580.238	4820609.782	14	143.584	0	0	0	On	1.00
76	LRL4-P1-2MB-40-032-M-1050	604610.773	4820649.97	14	142.908	0	0	0	On	1.00
77	LRL4-P1-2MB-40-032-M-1050	604642.451	4820689.356	14	143.709	0	0	0	On	1.00
78	LRL4-P1-2MB-40-032-M-1050	604674.771	4820728.149	14	143.664	0	0	0	On	1.00
79	LRL4-P1-2MB-40-032-M-1500	604154.442	4820059.069	14	142.117	0	0	0	On	1.00
80	LRL4-P1-2MB-40-032-M-1500	604124.584	4820021.764	14	142.571	0	0	0	On	1.00
81	LRL4-P1-2MB-40-032-M-1050	604707.101	4820764.844	14	142.546	0	0	0	On	1.00
84	LRL4-P1-2MB-40-032-M-1500	604184.346	4820100.117	14	142.202	0	0	0	On	1.00
85	LRL4-P1-2MB-40-032-M-1500	604401.778	4820378.058	10.5	143.038	0	0	0	On	1.00

Total Quantity: 68 ( 34 shown, 35 through 68 )