

APPENDIX M

Preliminary Lighting Calculations

preliminary lighting
calculation

PROPOSED NEW
PERMANENT

LC-P01-R00

COURTNEYPARK DRIVE EAST
KENNEDY ROAD TO DIXIE ROAD
CITY OF MISSISSAUGA

revisions:

R00 - initial preliminary calculation

prepared for:

City of Mississauga

prepared by:



DESIGN CRITERIA	
STREET LIGHTING - SL	
FACILITY OWNER:	CITY OF MISSISSAUGA
DESIGN STANDARD USED:	RP-8-00 (14)
CALCULATION METHOD:	LUMINANCE
LOCATION:	COURTNEYPARK DRIVE EAST (CPD)
ROAD CLASSIFICATION:	MAJOR
PEDESTRIAN CONFLICT AREA:	MEDIUM
AVERAGE LUMINANCE:	0.9 Lavg (cd/m2)
UNIFORMITY RATIO:	3.1 Lavg/Lmin
UNIFORMITY RATIO:	5.1 Lmax/Lmin
VEILING LUMINANCE RATIO:	0.3.1 Lvmax/Lavg

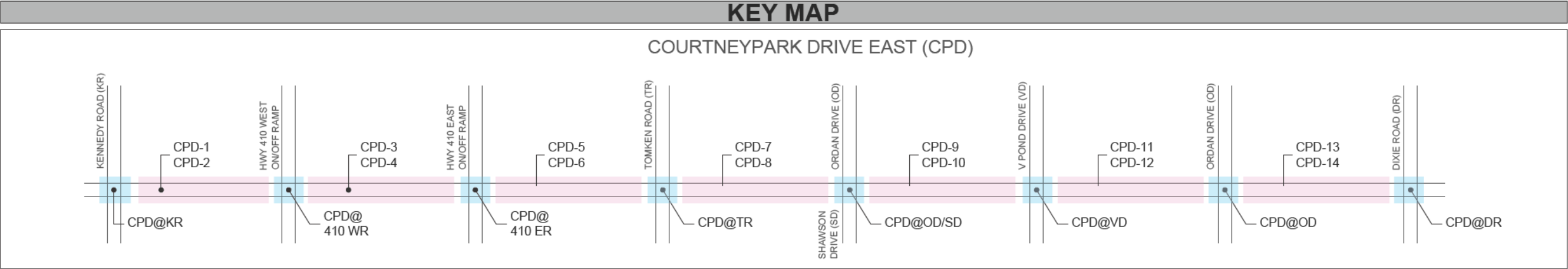
INTERSECTION LIGHTING - IL	
FACILITY OWNER:	CITY OF MISSISSAUGA
DESIGN STANDARD USED:	RP-8-00 (14)
CALCULATION METHOD:	LLUMINANCE
LOCATION:	COURTNEYPARK DRIVE EAST AND KENNEDY ROAD (CPD@KR) COURTNEYPARK DRIVE EAST AND HWY 410 WEST ON/OFF RAMP (CPD@410 WR) COURTNEYPARK DRIVE EAST AND HWY 410 EAST ON/OFF RAMP (CPD@410 ER) COURTNEYPARK DRIVE EAST AND TOMKEN ROAD(CPD@TR) COURTNEYPARK DRIVE EAST AND DIXIE ROAD (CPD@DR)
ROAD CLASSIFICATION:	MAJOR/MAJOR
PEDESTRIAN CONFLICT AREA:	MEDIUM
AVG MAINTAINED ILLUMINATION:	26.0 Lux
UNIFORMITY RATIO:	3.0.1 Eavg/Emin

INTERSECTION LIGHTING - IL	
FACILITY OWNER:	CITY OF MISSISSAUGA
DESIGN STANDARD USED:	RP-8-00 (14)
CALCULATION METHOD:	LLUMINANCE
LOCATION:	COURTNEYPARK DRIVE EAST AND VIPOND DRIVE (CPD@VD) COURTNEYPARK DRIVE EAST AND ORDAN DRIVE/SHAWSON DRIVE (CPD@OD/SD)
ROAD CLASSIFICATION:	MAJOR/COLLECTOR
PEDESTRIAN CONFLICT AREA:	MEDIUM
AVG MAINTAINED ILLUMINATION:	22.0 Lux
UNIFORMITY RATIO:	3.0.1 Eavg/Emin

INTERSECTION LIGHTING - IL	
FACILITY OWNER:	CITY OF MISSISSAUGA
DESIGN STANDARD USED:	RP-8-00 (14)
CALCULATION METHOD:	LLUMINANCE
LOCATION:	COURTNEYPARK DRIVE EAST AND ORDAN DRIVE (CPD@OD)
ROAD CLASSIFICATION:	MAJOR/LOCAL
PEDESTRIAN CONFLICT AREA:	MEDIUM
AVG MAINTAINED ILLUMINATION:	20.0 Lux
UNIFORMITY RATIO:	3.0.1 Eavg/Emin

SCHEME IDENTIFIER	
P-SL1	SCHEME NUMBER
SL	= STREET LIGHT NG POLE WITH STREET LIGHT
TSL	= TRAFFIC SIGNAL POLE WITH STREET LIGHT
HSL	= HYDRO POLE WITH STREET LIGHT
P	= PROPOSED
E	= EXIST NG
T	= TEMPORARY
F	= FUTURE
R	= RELOCATED

LEGEND	
P-TSL1	CONXCORP CNX-LRL3-P1-3M-42-120-L-XXX-700-C2 / CNX-LBL-P1-3M-42-120-L-XXX-700-C2 LIGHT LABORATORY, INC. test report no. LB9137915 lamp(s): N/A ballast: PHILIPS ADVANCE LEDINTA0700C21DO (TWO DRIVERS) candela file P1-3M-120.IES 1 lamp(s) per luminaire, photometry is absolute Light Loss Factor = 0.850, watts per luminaire = 120 Outreach (from mounting axis to photometric center)= 2400 mm mounting height= 11.5 m number locations= 49, number luminaires= 49 kw all locations= 5.9
P-HSL1	CONXCORP CNX-LRL4-2M-42-048-L-XXX-700 LIGHT LABORATORY, INC. test report no. CONXCORP lamp(s): N/A ballast: PHILIPS ADVANCE XHO75C070V105CN1M candela file P1-2M-048.ies 1 lamp(s) per luminaire, 11016 initial lumens per lamp Light Loss Factor = 0.850, watts per luminaire = 48 Outreach (from mounting axis to photometric center)= 2400 mm mounting height= 7.5 m number locations= 34, number luminaires= 34 kw all locations= 1.6
P-SL1	CONXCORP CNX-LRL3-P1-2M-42-120-L-700 LIGHT LABORATORY, INC. test report no. CONXCORP lamp(s): N/A ballast: PHILIPS ADVANCE LEDINTA0700C21DO (TWO DRIVERS) candela file P1-2M-120.IES 1 lamp(s) per luminaire, 25036 initial lumens per lamp Light Loss Factor = 0.850, watts per luminaire = 120 Outreach (from mounting axis to photometric center)= 2400 mm mounting height= 14.3 m number locations= 59, number luminaires= 59 kw all locations= 7.1
P-SL2	CONXCORP CNX-LRL3-P1-2M-42-120-L-700 LIGHT LABORATORY, INC. test report no. CONXCORP lamp(s): N/A ballast: PHILIPS ADVANCE LEDINTA0700C21DO (TWO DRIVERS) 2 luminaires per location, candela file P1-2M-120.IES 1 lamp(s) per luminaire, 25036 initial lumens per lamp Light Loss Factor = 0.850, watts per luminaire = 120 Outreach (from mounting axis to photometric center)= 2400 mm mounting height= 11.5 m number locations= 3, number luminaires= 6 kw all locations= 0.7



LIGHTING CALCULATION	
LC-P01-R00	
SHEET NAME: DESIGN CRITERIA, LEGEND & KEY MAP	
ISSUED FOR: PRELIMINARY DESIGN	
PREPARED BY: 	
CALC:	AK
REVIEW:	GH
DATE:	JUNE 17 2015
SCALE:	NTS
NORTH: 	
PROJECT: COURTNEYPARK DRIVE EAST KENNEDY ROAD TO DIXIE ROAD	
1 OF 7	

CALCULATION SUMMARY

STREET LIGHTING - SL

CPD-1
84 points

	A	B
Average	1.10	0.08
Maximum	2.03	0.20
Minimum	0.53	0.02
Avg/Min	1.75	4.20
Max/Min	3.22	10.00
Coef Var	0.29	0.61

A ROADWAY LUMINANCE (CD/SQ METER) travel direction 223.0 DEG - CIE_surface_R3 - q0 = 0.070
B VEILING LUMINANCE (CD/SQ METER) travel direction 223.0 DEG

Ratio (Max veiling luminance / Avg road luminance) = 0.18

CPD-5
78 points

	A	B
Average	1.01	0.09
Maximum	1.91	0.20
Minimum	0.52	0.03
Avg/Min	1.94	3.15
Max/Min	3.67	6.67
Coef Var	0.28	0.55

A ROADWAY LUMINANCE (CD/SQ METER) travel direction 207.0 DEG - CIE_surface_R3 - q0 = 0.070
B VEILING LUMINANCE (CD/SQ METER) travel direction 207.0 DEG

Ratio (Max veiling luminance / Avg road luminance) = 0.20

CPD-9
78 points

	A	B
Average	0.97	0.09
Maximum	1.85	0.20
Minimum	0.48	0.03
Avg/Min	2.02	2.91
Max/Min	3.85	6.67
Coef Var	0.29	0.60

A ROADWAY LUMINANCE (CD/SQ METER) travel direction 227.0 DEG - CIE_surface_R3 - q0 = 0.070
B VEILING LUMINANCE (CD/SQ METER) travel direction 227.0 DEG

Ratio (Max veiling luminance / Avg road luminance) = 0.21

CPD-13
60 points

	A	B
Average	1.38	0.09
Maximum	2.70	0.19
Minimum	0.74	0.04
Avg/Min	1.86	2.32
Max/Min	3.65	4.75
Coef Var	0.29	0.44

A ROADWAY LUMINANCE (CD/SQ METER) travel direction 232.0 DEG - CIE_surface_R3 - q0 = 0.070
B VEILING LUMINANCE (CD/SQ METER) travel direction 232.0 DEG

Ratio (Max veiling luminance / Avg road luminance) = 0.14

CPD-2
102 points

	A	B
Average	0.93	0.11
Maximum	1.64	0.21
Minimum	0.50	0.03
Avg/Min	1.96	3.53
Max/Min	3.28	7.00
Coef Var	0.27	0.47

A ROADWAY LUMINANCE (CD/SQ METER) travel direction 42.0 DEG - CIE_surface_R3 - q0 = 0.070
B VEILING LUMINANCE (CD/SQ METER) travel direction 42.0 DEG

Ratio (Max veiling luminance / Avg road luminance) = 0.23

CPD-6
48 points

	A	B
Average	0.58	0.09
Maximum	1.54	0.20
Minimum	0.33	0.03
Avg/Min	1.75	2.97
Max/Min	4.67	6.67
Coef Var	0.46	0.62

A ROADWAY LUMINANCE (CD/SQ METER) travel direction 27.0 DEG - CIE_surface_R3 - q0 = 0.070
B VEILING LUMINANCE (CD/SQ METER) travel direction 27.0 DEG

Ratio (Max veiling luminance / Avg road luminance) = 0.35

CPD-10
84 points

	A	B
Average	0.52	0.08
Maximum	1.90	0.35
Minimum	0.19	0.03
Avg/Min	2.71	2.76
Max/Min	10.00	11.67
Coef Var	0.61	0.93

A ROADWAY LUMINANCE (CD/SQ METER) travel direction 48.0 DEG - CIE_surface_R3 - q0 = 0.070
B VEILING LUMINANCE (CD/SQ METER) travel direction 48.0 DEG

Ratio (Max veiling luminance / Avg road luminance) = 0.68

CPD-14
66 points

	A	B
Average	0.49	0.08
Maximum	1.66	0.35
Minimum	0.21	0.03
Avg/Min	2.32	2.75
Max/Min	7.90	11.67
Coef Var	0.55	0.83

A ROADWAY LUMINANCE (CD/SQ METER) travel direction 52.0 DEG - CIE_surface_R3 - q0 = 0.070
B VEILING LUMINANCE (CD/SQ METER) travel direction 52.0 DEG

Ratio (Max veiling luminance / Avg road luminance) = 0.72

CPD-4
80 points

	A	B
Average	0.89	0.10
Maximum	1.58	0.21
Minimum	0.42	0.03
Avg/Min	2.11	3.21
Max/Min	3.76	7.00
Coef Var	0.36	0.50

A ROADWAY LUMINANCE (CD/SQ METER) travel direction 33.0 DEG - CIE_surface_R3 - q0 = 0.070
B VEILING LUMINANCE (CD/SQ METER) travel direction 33.0 DEG

Ratio (Max veiling luminance / Avg road luminance) = 0.24

CPD-7
78 points

	A	B
Average	0.98	0.09
Maximum	1.89	0.19
Minimum	0.46	0.03
Avg/Min	2.12	2.87
Max/Min	4.11	6.33
Coef Var	0.32	0.59

A ROADWAY LUMINANCE (CD/SQ METER) travel direction 218.0 DEG - CIE_surface_R3 - q0 = 0.070
B VEILING LUMINANCE (CD/SQ METER) travel direction 218.0 DEG

Ratio (Max veiling luminance / Avg road luminance) = 0.19

CPD-11
78 points

	A	B
Average	0.97	0.12
Maximum	1.86	0.19
Minimum	0.50	0.04
Avg/Min	1.93	2.96
Max/Min	3.72	4.75
Coef Var	0.30	0.39

A ROADWAY LUMINANCE (CD/SQ METER) travel direction 232.0 DEG - CIE_surface_R3 - q0 = 0.070
B VEILING LUMINANCE (CD/SQ METER) travel direction 232.0 DEG

Ratio (Max veiling luminance / Avg road luminance) = 0.20

CPD-3
78 points

	A	B
Average	1.02	0.08
Maximum	2.06	0.20
Minimum	0.48	0.02
Avg/Min	2.13	3.92
Max/Min	4.29	10.00
Coef Var	0.32	0.71

A ROADWAY LUMINANCE (CD/SQ METER) travel direction 211.0 DEG - CIE_surface_R3 - q0 = 0.070
B VEILING LUMINANCE (CD/SQ METER) travel direction 211.0 DEG

Ratio (Max veiling luminance / Avg road luminance) = 0.20

CPD-8
60 points

	A	B
Average	0.57	0.06
Maximum	1.73	0.34
Minimum	0.30	0.03
Avg/Min	1.89	2.16
Max/Min	5.77	11.33
Coef Var	0.47	0.91

A ROADWAY LUMINANCE (CD/SQ METER) travel direction 38.0 DEG - CIE_surface_R3 - q0 = 0.070
B VEILING LUMINANCE (CD/SQ METER) travel direction 38.0 DEG

Ratio (Max veiling luminance / Avg road luminance) = 0.60

CPD-12
66 points

	A	B
Average	0.55	0.05
Maximum	1.62	0.33
Minimum	0.30	0.03
Avg/Min	1.84	1.81
Max/Min	5.40	11.00
Coef Var	0.43	0.88

A ROADWAY LUMINANCE (CD/SQ METER) travel direction 52.0 DEG - CIE_surface_R3 - q0 = 0.070
B VEILING LUMINANCE (CD/SQ METER) travel direction 52.0 DEG

Ratio (Max veiling luminance / Avg road luminance) = 0.60

INTERSECTION LIGHTING - IL

CPD@KR

753 points at z=0, sp 2m by 2m	
HORIZONTAL LUX	
Average	27.1
Maximum	41.7
Minimum	16.3
Avg/Min	1.66
Max/Min	2.56
Coef Var	0.17
UnifGrad	1.32

CPD@410 WR

491 points at z=0, sp 2m by 2m	
HORIZONTAL LUX	
Average	28,3
Maximum	43,7
Minimum	15,2
Avg:Min	1,86
Max:Min	2,88
Coef Var	0,25
UnifGrad	1,34

CPD@410 ER

566 points at z=0, sp 2m by 2m	
HORIZONTAL LUX	
Average	29.6
Maximum	51.0
Minimum	12.3
Avg:Min	2.40
Max:Min	4.15
Coef Var	0.28
UnifGrad	1.45

CPD@TR

810 points at z=0, sp 2m by 2m	
HORIZONTAL LUX	
Average	24.3
Maximum	43.1
Minimum	8.8
Avg:Min	2.76
Max:Min	4.90
Coef Var	0.24
UnifGrad	1.53

CPD@OD/SD

546 points at z=0, sp 2m by 2m	
HORIZONTAL LUX	
Average	23.4
Maximum	50.9
Minimum	6.3
Avg:Min	3.72
Max:Min	8.08
Coef Var	0.44
UnifGrad	1.70

CPD@VD

543 points at z=0, sp 2m by 2m	
HORIZONTAL LUX	
Average	22.4
Maximum	46.4
Minimum	5.8
Avg:Min	3.86
Max:Min	8.00
Coef Var	0.43
Unit/Grad	1.75

CPD@OD

577 points at z=0, sp 2m by 2m	
HORIZONTAL LUX	
Average	20.2
Maximum	45.9
Minimum	5.2
Avg:Min	3.89
Max:Min	8.83
Coef Var	0.52
Unit/Grad	1.77

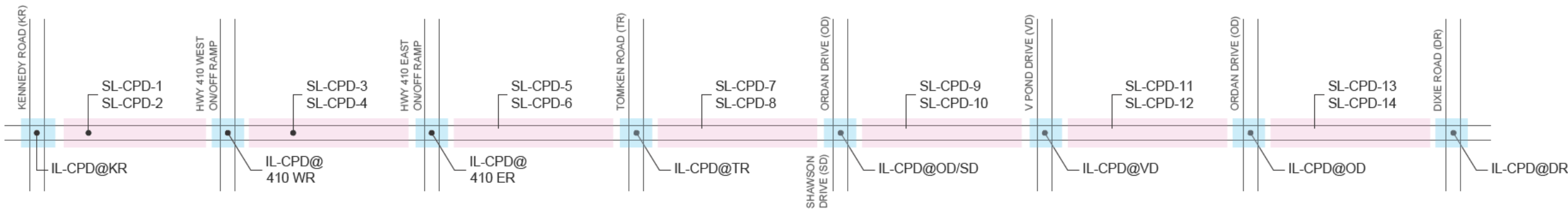
CPD@DR

400 points at z=0, sp 2m by 2m	
HORIZONTAL LUX	
Average	27.4
Maximum	38.2
Minimum	15.6
Avg:Min	1.76
Max:Min	2.45
Coef Var	0.15
Unit/Grad	1.31

NOTE: COORDINATION WITH HYDRO IS REQUIRED TO ACHIEVED OPTIMAL LIGHTING LEVELS, IN ACCORDANCE WITH CITY STANDARDS, FOR LIGHTING ON OR NEARBY, HYDRO POLES.

KEY MAP

COURTNEYPARK DRIVE EAST (CPD)



LIGHTING CALCULATION

LC-P01-R00

SHEET NAME:

SUMMARY
& KEY MAP

ISSUED FOR:

PRELIMINARY
DESIGN

PREPARED BY:



CALC: AK

REVIEW: GH

DATE: JUNE 17 2015

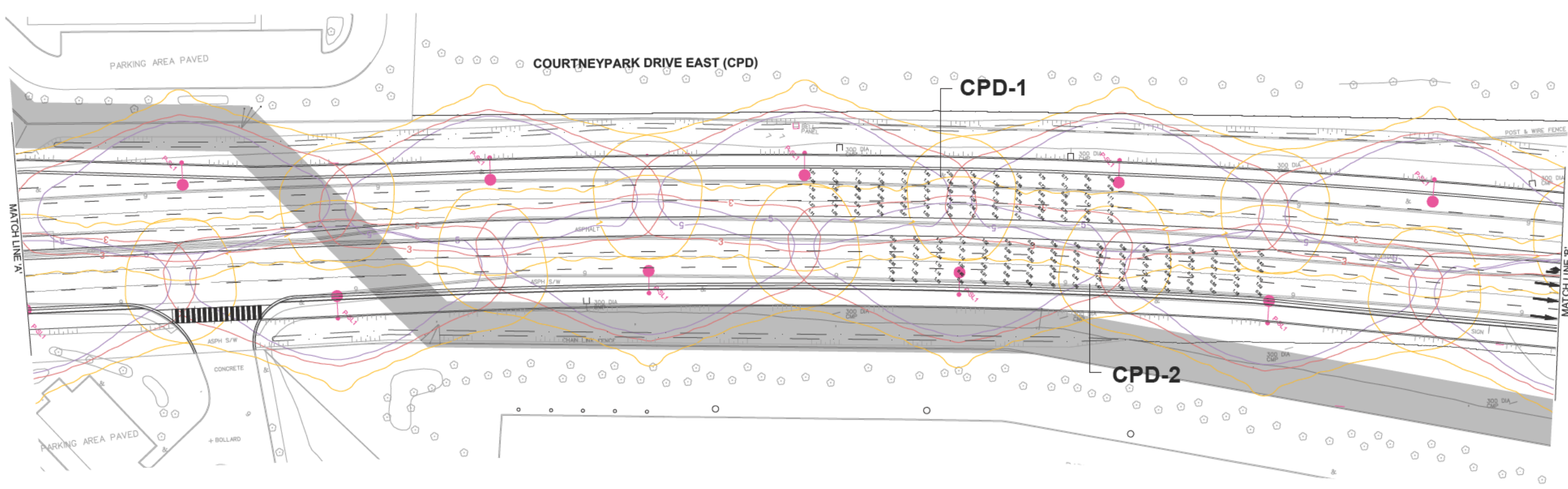
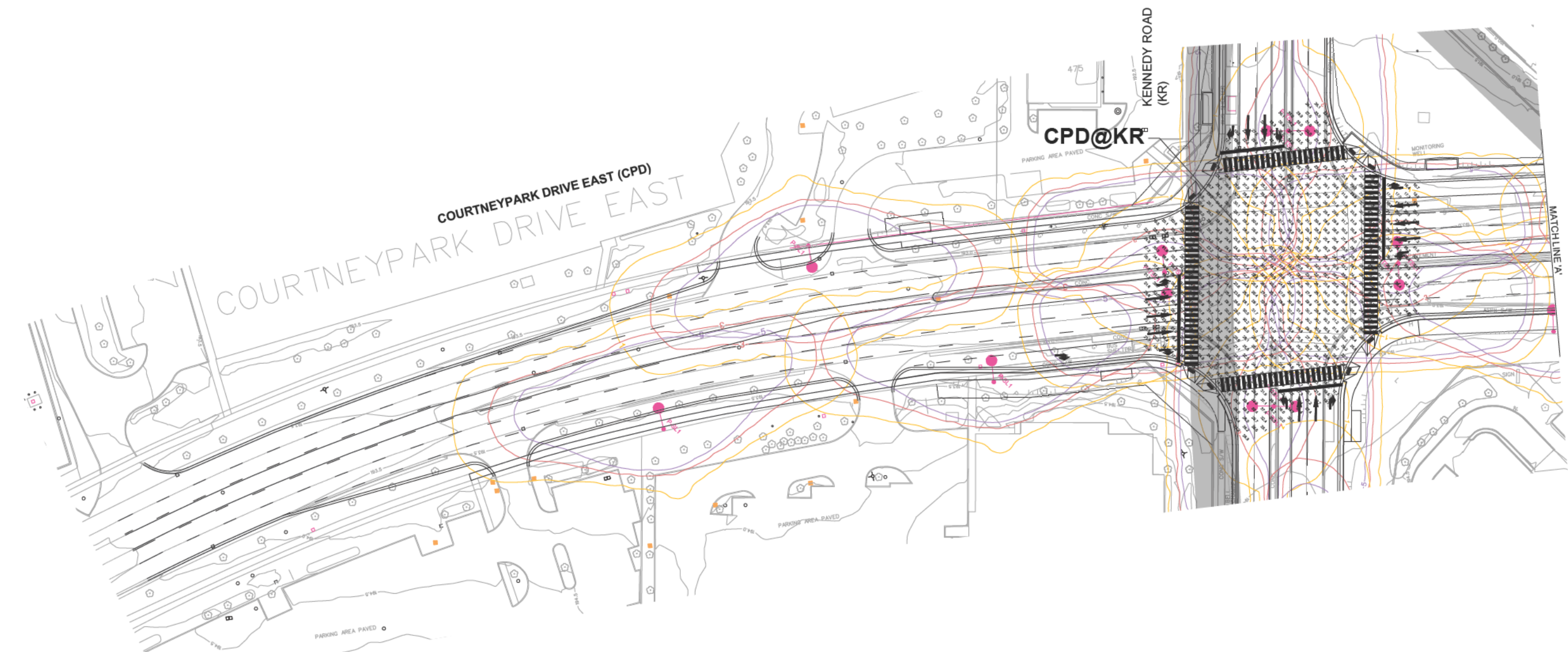
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NORTH:



PROJECT:

COURTNEYPARK
DRIVE EAST
KENNEDY ROAD TO
DIXIE ROAD



LIGHTING CALCULATION	
LC-P01-R00	
SHEET NAME:	
CALCULATIONS LAYOUT	
ISSUED FOR:	
PRELIMINARY DESIGN	
PREPARED BY:	
	
CALC:	AK
REVIEW:	GH
DATE:	JUNE 17 2015
SCALE:	1:1000
NORTH:	
PROJECT:	
COURTNEYPARK DRIVE EAST KENNEDY ROAD TO DIX E ROAD	
3 OF 7	

LIGHTING
CALCULATION

LC-P01-R00

SHEET NAME:
CALCULATIONS
LAYOUT

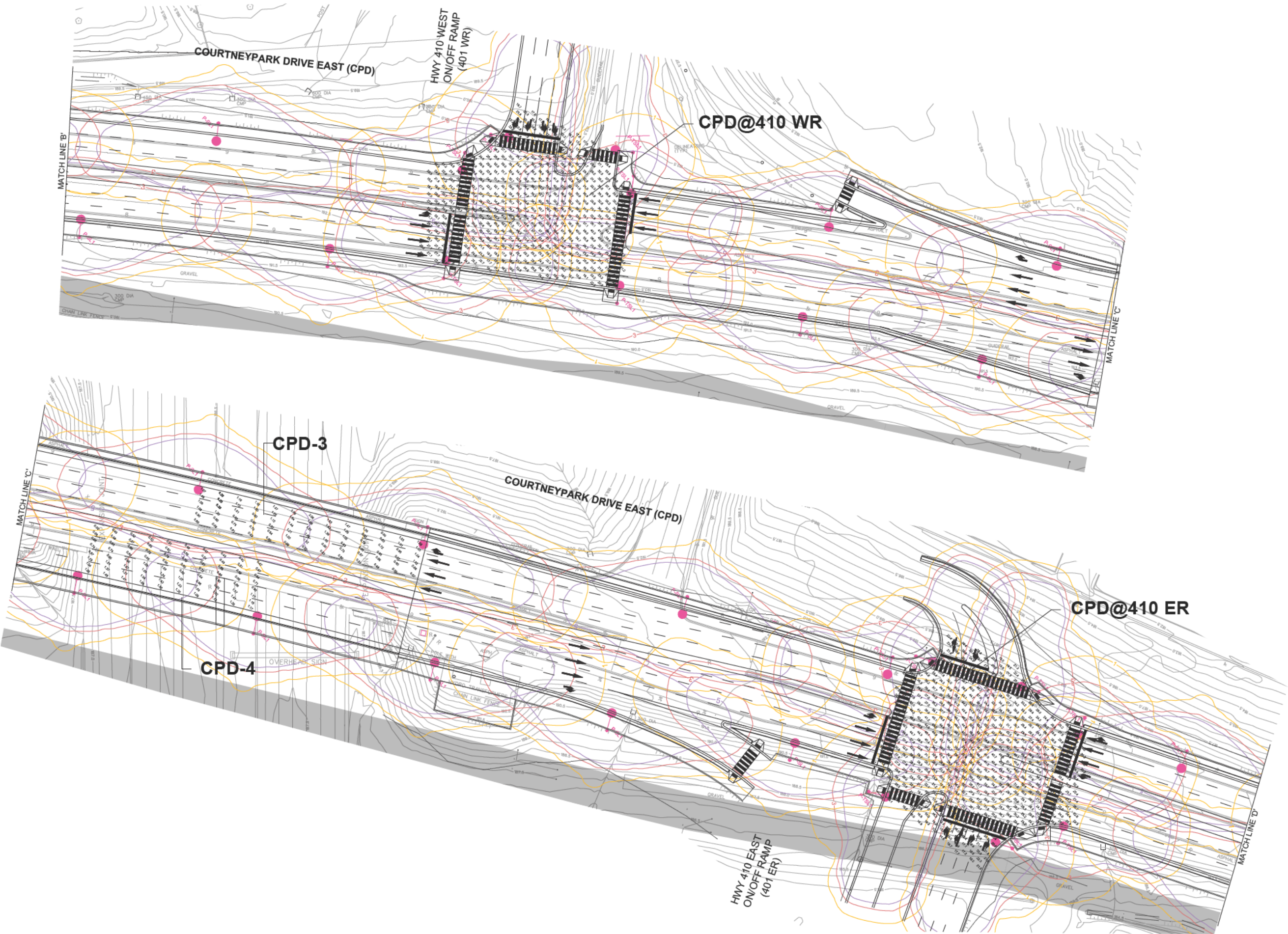
ISSUED FOR:
PRELIMINARY
DESIGN

PREPARED BY:


CALC:	AK
REVIEW:	GH
DATE:	JUNE 17 2015
SCALE:	1:1000



PROJECT:
**COURTNEYPARK
DRIVE EAST**
KENNEDY ROAD TO
DIX E ROAD



LIGHTING
CALCULATION

LC-P01-R00

SHEET NAME:

CALCULATIONS
LAYOUT

ISSUED FOR:

PRELIMINARY
DESIGN

PREPARED BY:



CALC:

AK

REVIEW:

GH

DATE:

JUNE 17 2015

SCALE:

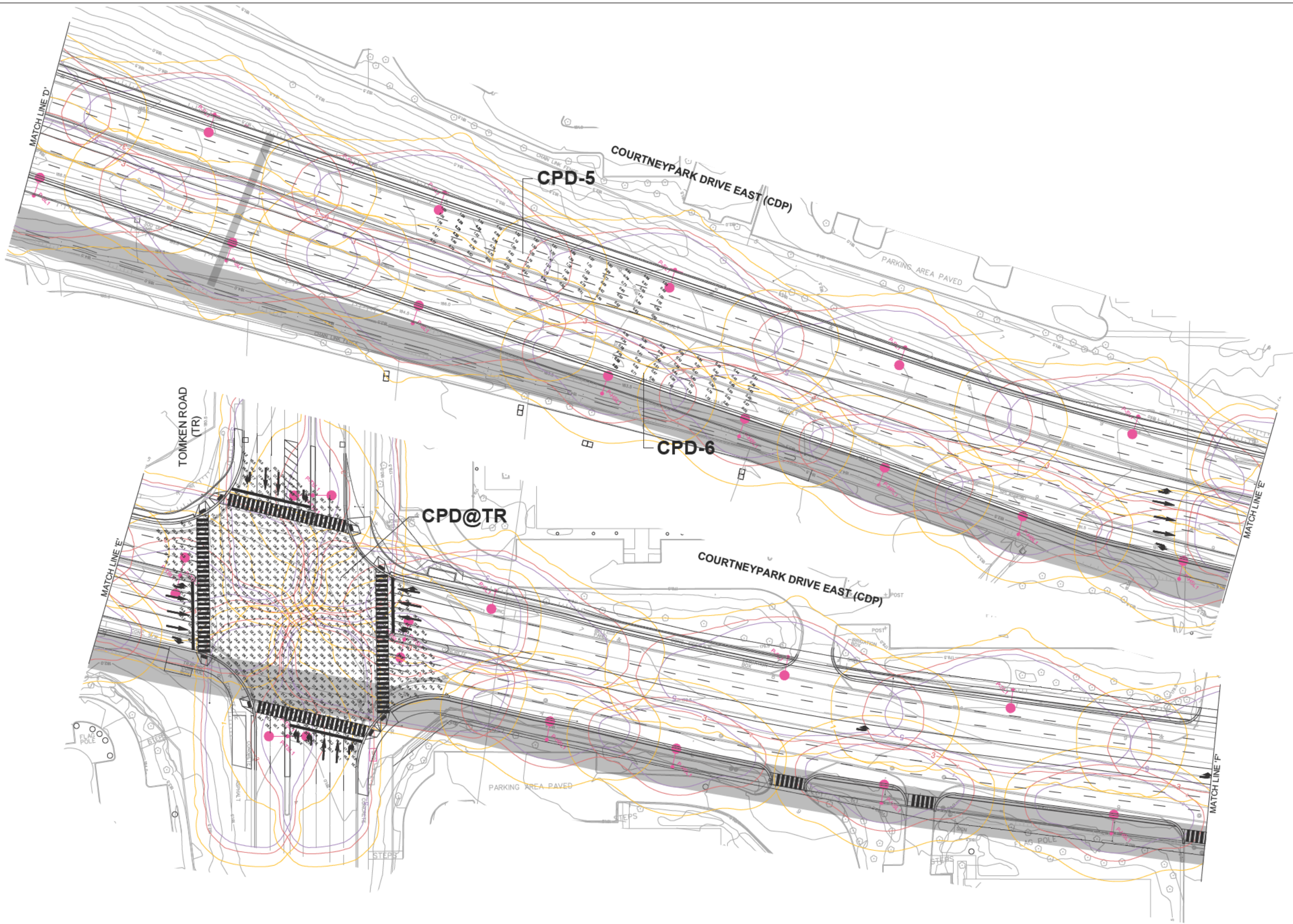
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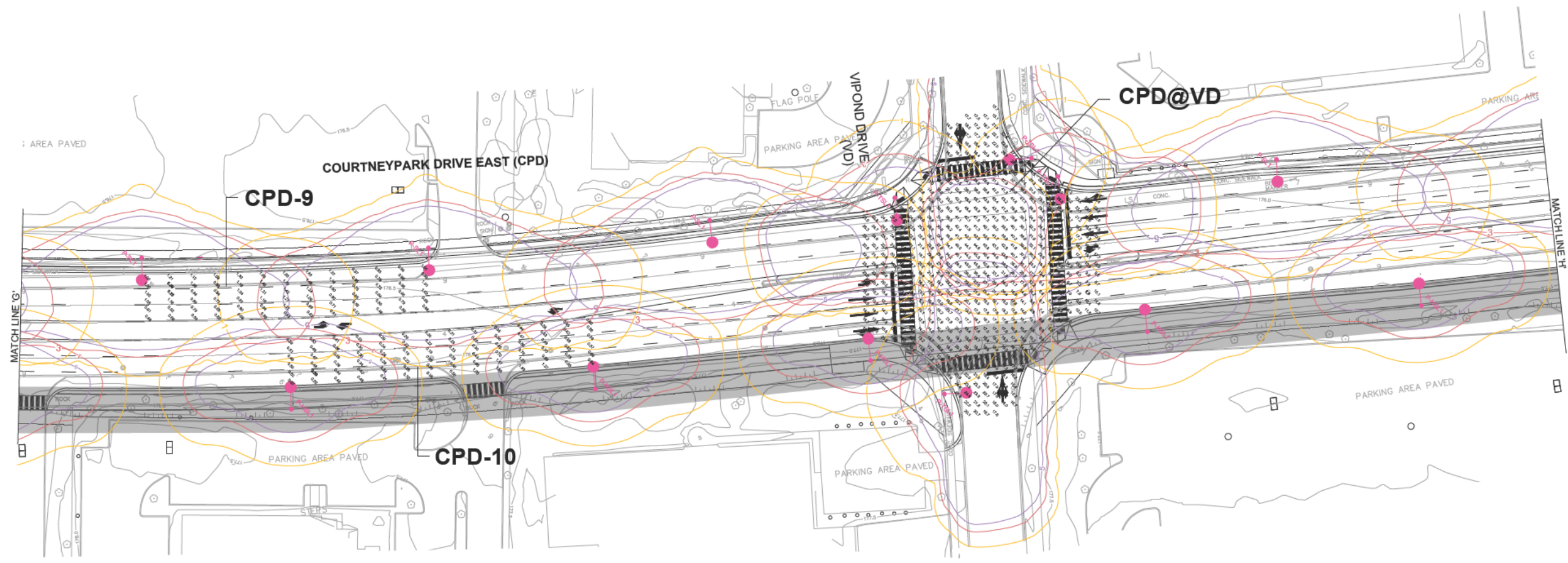
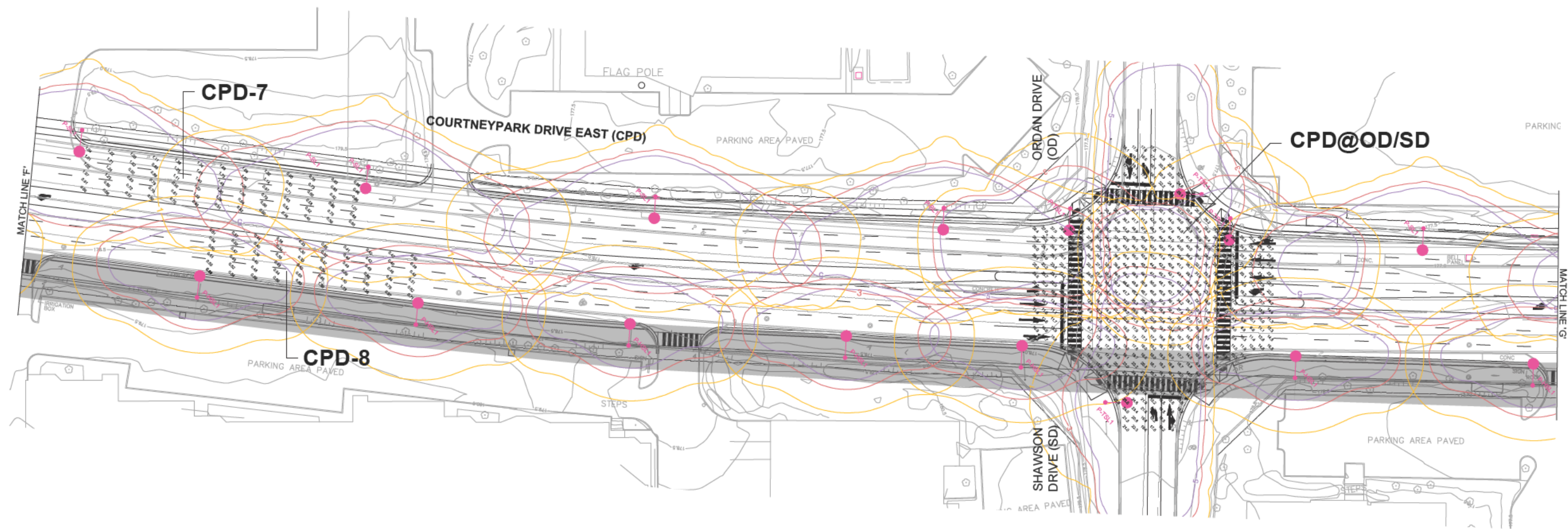
NORTH:



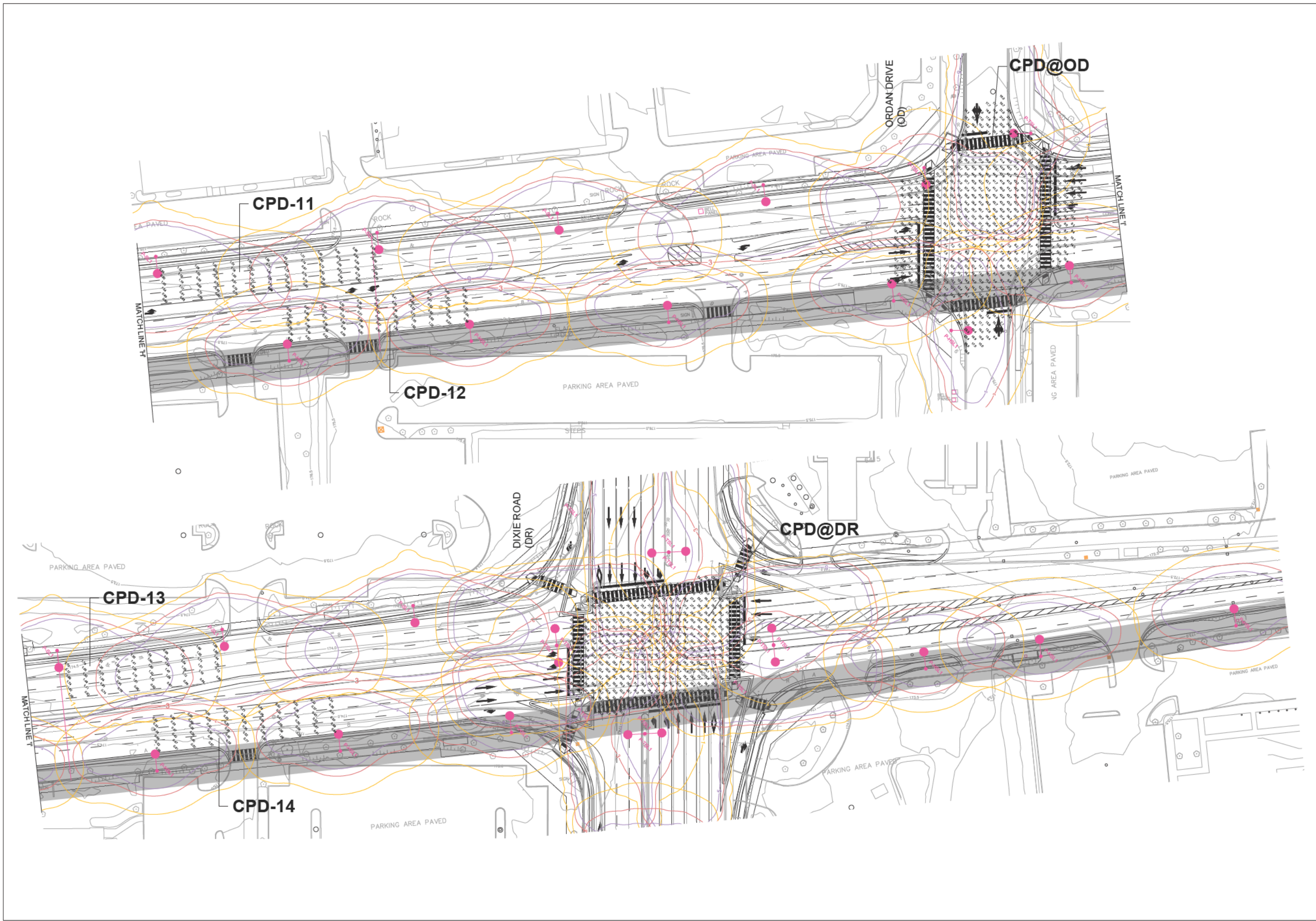
PROJECT:



COURTNEYPARK
DRIVE EAST
KENNEDY ROAD TO
DIX E ROAD





LIGHTING CALCULATION	
LC-P01-R00	
SHEET NAME:	
CALCULATIONS LAYOUT	
ISSUED FOR:	
PRELIMINARY DESIGN	
PREPARED BY:	
tsi	
CALC:	AK
REVIEW:	GH
DATE:	JUNE 17 2015
SCALE:	1:1000
NORTH:	
PROJECT:	
COURTNEYPARK DRIVE EAST	
KENNEDY ROAD TO DIX E ROAD	
6 OF 7	



LIGHTING CALCULATION	
LC-P01-R00	
SHEET NAME:	
CALCULATIONS LAYOUT	
ISSUED FOR:	
PRELIMINARY DESIGN	
PREPARED BY:	
	
CALC:	AK
REVIEW:	GH
DATE:	JUNE 17 2015
SCALE:	1:1000
NORTH:	
PROJECT:	
COURTNEYPARK DRIVE EAST KENNEDY ROAD TO DIXIE ROAD	
7 OF 7	