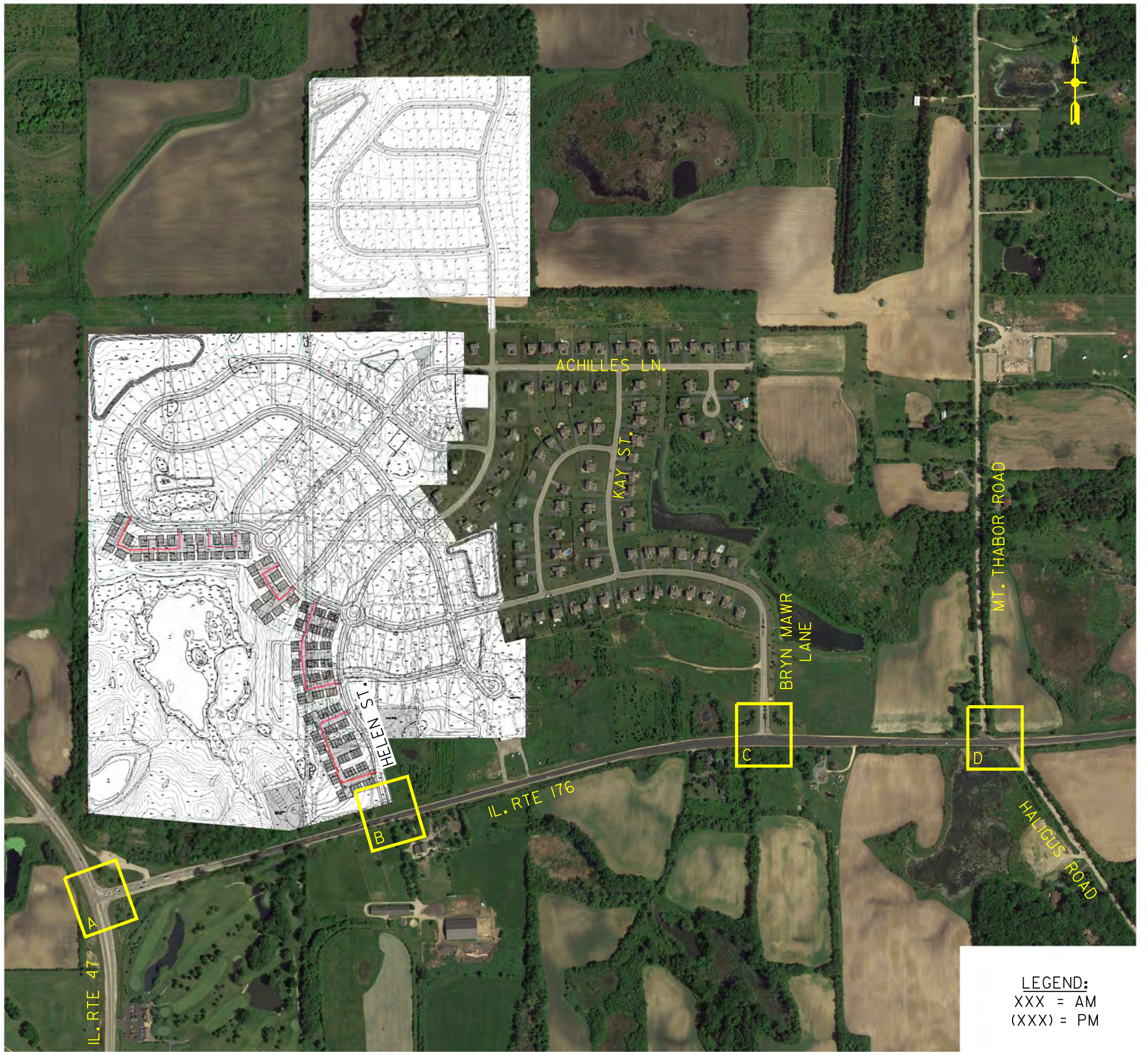


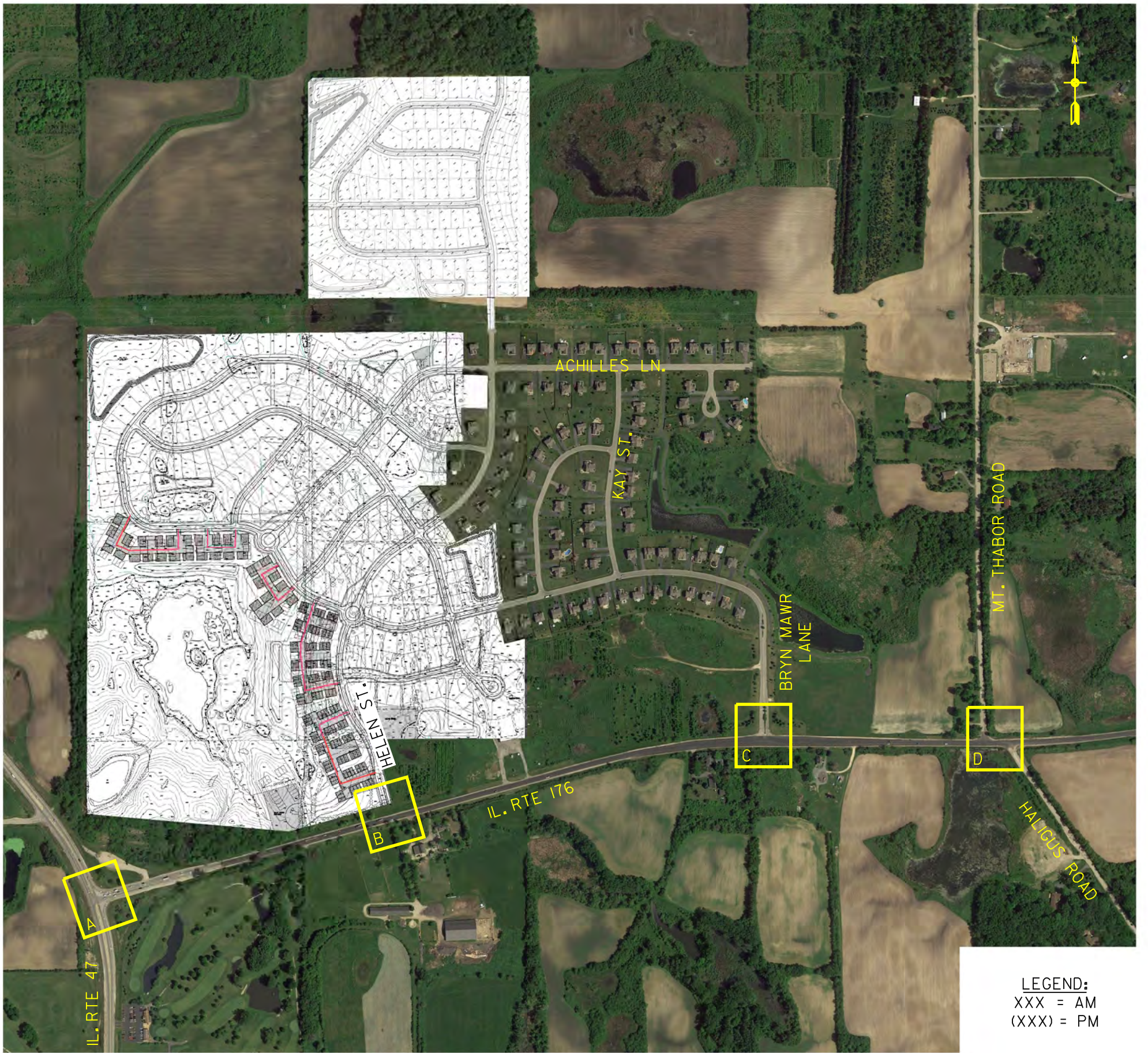
LEGEND:
 XXX = AM
 (XXX) = PM

A	B	C	D
IL. RTE 176 AND IL. RTE 47	IL. RTE 176 AND HELEN ST.	IL. RTE 176 AND BRYN MAWR LANE	IL. RTE 176 AND HALIGUS ROAD/ MT. THABOR ROAD



LEGEND:
 XXX = AM
 (XXX) = PM

A	B	C	D
IL. RTE 176 AND IL. RTE 47	IL. RTE 176 AND HELEN ST.	IL. RTE 176 AND BRYN MAWR LANE	IL. RTE 176 AND HALIGUS ROAD/ MT. THABOR ROAD



LEGEND:
 XXX = AM
 (XXX) = PM

A	B	C	D
IL. RTE 176 AND IL. RTE 47	IL. RTE 176 AND HELEN ST.	IL. RTE 176 AND BRYN MAWR LANE	IL. RTE 176 AND HALIGUS ROAD/ MT. THABOR ROAD

Appendix B – Intersection Design Study

Illinois Route 176 at Illinois Route 47

Completed by others. For reference only.

SIGNALIZED CAPACITY DESIGN ANALYSIS

PROGRAM USED: HCS 2010 VERSION 6.65 SIGNAL TYPE: ACTUATED AREA TYPE: NON-CBD
 NUMBER OF PHASES: (A.M.) 6 (P.M.) 6 CYCLE LENGTH (A.M.) 120 SEC. (P.M.) 120 SEC. PEAK HOUR FACTOR 0.95
 INTERSECTION DELAY/LEVEL-OF-SERVICE (A.M.) 26.2 SECONDS LOS C (P.M.) 24.3 SECONDS LOS C

APPROACH	EASTBOUND (C)				WESTBOUND (D)				NORTHBOUND (B)				SOUTHBOUND (A)			
	L	T	R	P	L	T	R	P	L	T	R	P	L	T	R	P
NUMBER OF LANES	1	1	1	1	2	1	1	1	1	2	1	1	2	2	1	1
2020 30TH MAX HOUR TRAFFIC (veh/h)	A.M. 5	P.M. 5	75	55	100	10	10	10	45	570	160	160	365	615	5	5
BASE SATURATION FLOW RATE (veh/h)	1900	1900	1900	1900	1900	2000	1900	1900	1900	2000	1900	1900	1900	2000	1900	1900
LANE WIDTH (FT)	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
VOLUME OF RIGHT TURN ON RED (veh/h)	A.M. 0	P.M. 0	0	0	A.M. 0	P.M. 0	0	0	A.M. 0	P.M. 0	0	0	A.M. 0	P.M. 0	0	0
PEDESTRIANS/HOUR (ped/h)	A.M. 0	P.M. 0	0	0	A.M. 0	P.M. 0	0	0	A.M. 0	P.M. 0	0	0	A.M. 0	P.M. 0	0	0
ARRIVAL TYPE	3				3				3				3			
LANE UTILIZATION ADJ. FACTOR	1.00	1.00			0.97	1.00			1.00	0.95	1.00		0.97	0.95	1.00	
GREEN TIME (SECONDS)	A.M. 3.00	P.M. 3.00	12.00	9.30	6.00	15.00			5.50	63.80	69.80		17.20	74.50	78.50	
GREEN RATIO	A.M. 0.03	P.M. 0.03	0.10	0.08	0.05	0.13			0.05	0.53	0.58		0.14	0.62	0.65	
CAPACITY (C)	A.M. 44	P.M. 44	165	136	165	236			76	1857	859		467	2219	976	
v/c	A.M. 0.119	P.M. 0.119	0.479	0.426	0.638	0.045			0.625	0.323	0.196		0.823	0.292	0.005	
RATIO (X)	A.M. 0.119	P.M. 0.119	0.426	0.389	0.748	0.089			0.364	0.414	0.165		0.807	0.315	0.005	
STORAGE QUEUE (FT)	A.M. 8	P.M. 8	115	86	84	15			78	242	122		281	210	3	
LANE GROUP DELAY (SECONDS)	A.M. 58.4	P.M. 58.4	54.1	55.8	60	45.6			64.4	16.4	12.4		53.6	10.4	7.2	
LANE GROUP LEVEL-OF-SERVICE	A.M. E	P.M. E	D	D	E	D			E	B	A		D	B	A	
APPROACH DELAY (SECONDS/VEHICLE)	A.M. 54.4	P.M. 56.0			58.8				11.3				26.4			
APPROACH	A.M. D	P.M. D			E				B				C			
LEVEL-OF-SERVICE	A.M. E	P.M. E			E				B				C			

PHASE	1		2		3		4		5		6		CYCLE LENGTH
	YELLOW	RED	YELLOW	RED	YELLOW	RED	YELLOW	RED	YELLOW	RED	YELLOW	RED	
GREEN TIME IN SECONDS	A.M. 5.5	P.M. 3.5	1.0	7.2	3.5	1.0	63.8	4.0	2.0	3.0	3.5	1.0	120
	A.M. 3.1	P.M. 3.5	1.0	7.0	3.5	1.0	66.3	4.0	2.0	3.0	3.5	1.0	120

ELEMENTS CONTROLLING DESIGN

PREFERRED ROUTE:
 F.A. ROUTE NUMBER: FAP 326
 STREET NAME: IL ROUTE 47
 FUNCTIONAL CLASSIFICATION: OTHER PRINC. ARTERIAL
 EXISTING ADT: 18,700 VPD (NORTH) 18,400 VPD (SOUTH)
 PROPOSED DESIGN SPEED: 60 MPH

MARKED ROUTE NUMBER: NA
 SRA ROUTE: YES
 OSOW DESIGN: YES
 DESIGN YEAR ADT: 25,000 VPD (NORTH) 21,000 VPD (SOUTH)
 PROPOSED POSTED SPEED: 55 MPH

SECONDARY ROUTES:
 F.A. ROUTE NUMBER: FAP 335 (EAST LEG)
 STREET NAME: IL ROUTE 176/PLEASANT VALLEY RD
 FUNCTIONAL CLASSIFICATION: OTHER PRINC. ARTERIAL
 EXISTING ADT: 10,800 VPD (EAST) 1,050 VPD (WEST)
 PROPOSED DESIGN SPEED: 45 MPH (WEST) 60 MPH (EAST)
 PROPOSED POSTED SPEED: 40 MPH (WEST) 55 MPH (EAST)

MARKED ROUTE NUMBER: TR 191 (WEST LEG)
 SRA ROUTE: YES (EAST LEG)
 OSOW DESIGN: YES (EAST LEG)
 DESIGN YEAR ADT: 3,000 VPD (WEST)
 PROPOSED POSTED SPEED: 40 MPH (WEST) 55 MPH (EAST)

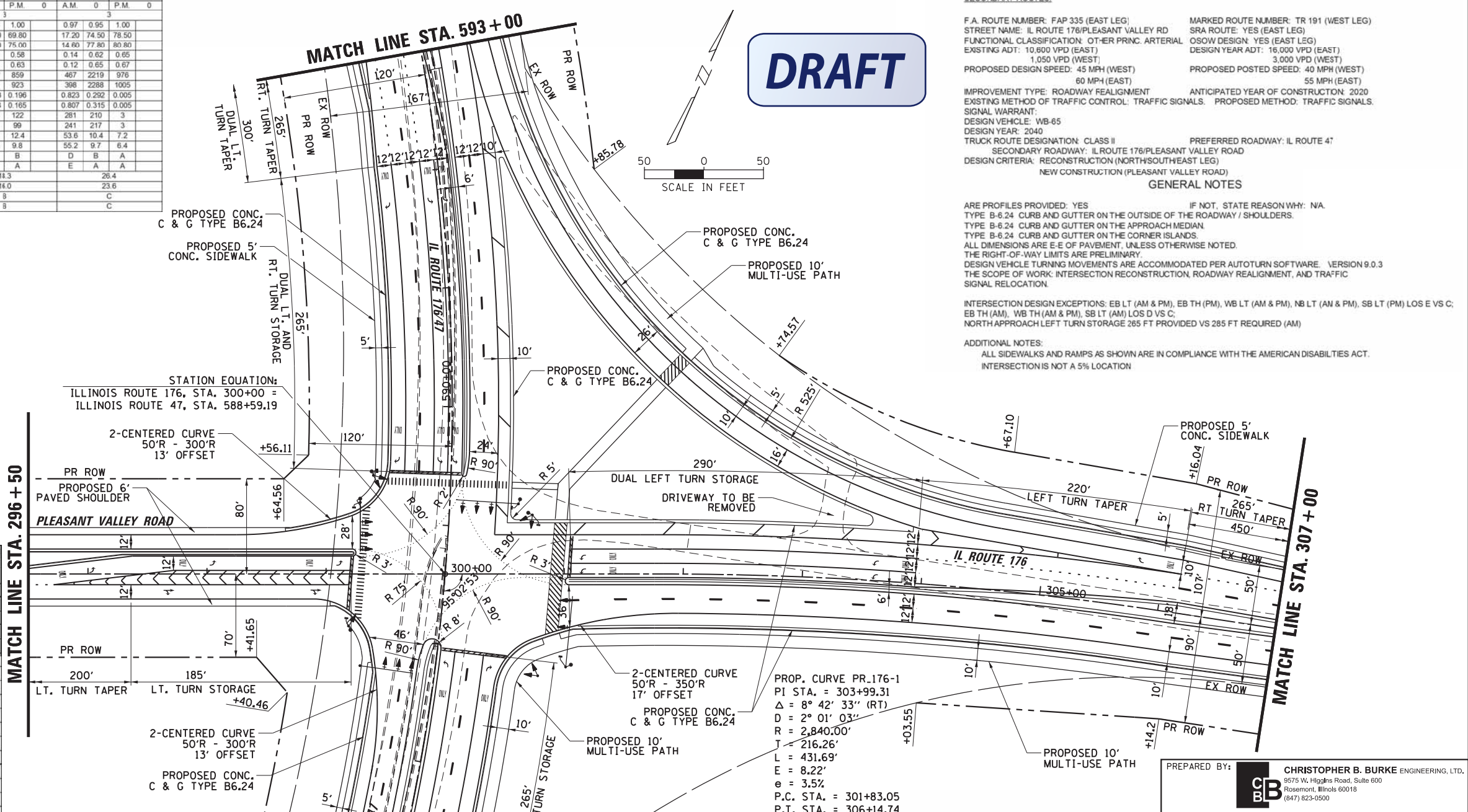
IMPROVEMENT TYPE: ROADWAY REALIGNMENT
 EXISTING METHOD OF TRAFFIC CONTROL: TRAFFIC SIGNALS
 PROPOSED METHOD: TRAFFIC SIGNALS
 SIGNAL WARRANT: DESIGN YEAR: WB-65
 DESIGN YEAR: 2040
 TRUCK ROUTE DESIGNATION: CLASS II
 PREFERRED ROADWAY: IL ROUTE 47
 SECONDARY ROADWAY: IL ROUTE 176/PLEASANT VALLEY ROAD
 DESIGN CRITERIA: RECONSTRUCTION (NORTHSOUTHEAST LEG)
 NEW CONSTRUCTION (PLEASANT VALLEY ROAD)

GENERAL NOTES

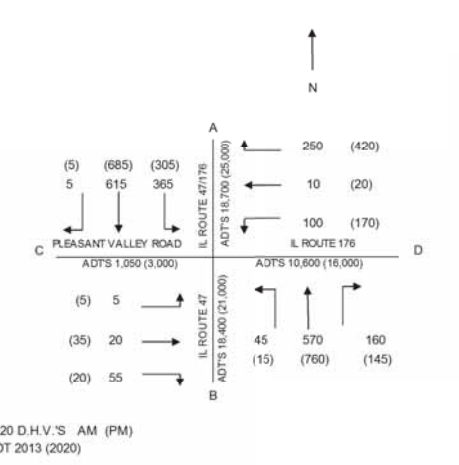
ARE PROFILES PROVIDED: YES IF NOT, STATE REASON WHY: NA
 TYPE B-6.24 CURB AND GUTTER ON THE OUTSIDE OF THE ROADWAY / SHOULDERS.
 TYPE B-6.24 CURB AND GUTTER ON THE APPROACH MEDIAN.
 TYPE B-6.24 CURB AND GUTTER ON THE CORNER ISLANDS.
 ALL DIMENSIONS ARE E-E OF PAVEMENT, UNLESS OTHERWISE NOTED.
 THE RIGHT-OF-WAY LIMITS ARE PRELIMINARY.
 DESIGN VEHICLE TURNING MOVEMENTS ARE ACCOMMODATED PER AUTOTURN SOFTWARE. VERSION 9.0.3
 THE SCOPE OF WORK: INTERSECTION RECONSTRUCTION, ROADWAY REALIGNMENT, AND TRAFFIC SIGNAL RELOCATION.

INTERSECTION DESIGN EXCEPTIONS: EB LT (AM & PM), EB TH (PM), WB LT (AM & PM), NB LT (AM & PM), SB LT (PM) LOS E VS C;
 EB TH (AM), WB TH (AM & PM), SB LT (AM) LOS D VS C;
 NORTH APPROACH LEFT TURN STORAGE 265 FT PROVIDED VS 285 FT REQUIRED (AM)

ADDITIONAL NOTES:
 ALL SIDEWALKS AND RAMPS AS SHOWN ARE IN COMPLIANCE WITH THE AMERICAN DISABILITIES ACT.
 INTERSECTION IS NOT A 5% LOCATION



MOVEMENT	YEAR 2013 30TH MAXIMUM HOUR TRAFFIC		PERCENT TRUCK TRAFFIC IN 30TH MAX. HOUR		ESTIMATED PERCENT INCREASE BY 2020		YEAR 2020 30TH MAXIMUM HOUR TRAFFIC	
	A.M.	P.M.	A.M.	P.M.			A.M.	P.M.
AD (L)	340	285	8%	8%	7%	7%	365	305
AB (T)	575	640	8%	8%	7%	7%	615	685
AC (R)	5	5	8%	8%	0%	0%	5	5
BC (L)	40	15	9%	9%	13%	0%	45	15
BA (T)	530	710	9%	9%	8%	7%	570	760
BD (R)	150	135	9%	9%	7%	7%	160	145
CA (L)	5	5	2%	2%	0%	0%	5	5
CD (T)	20	35	2%	2%	0%	0%	20	35
CB (R)	55	20	2%	2%	0%	0%	55	20
DB (L)	95	160	6%	6%	5%	6%	100	170
DC (T)	10	20	6%	6%	0%	0%	10	20
DA (R)	235	390	6%	6%	6%	8%	250	420
TOTAL A	1690	2035	8%	8%	7%	7%	1810	2180
TOTAL B	1445	1680	8%	8%	7%	7%	1545	1795
TOTAL C	135	100	5%	4%	4%	0%	140	100
TOTAL D	850	1025	7%	7%	6%	7%	905	1095



PREPARED BY: **CHRISTOPHER B. BURKE ENGINEERING, LTD.**
 9575 W. Higgins Road, Suite 600
 Rosemont, Illinois 60018
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PROJ. MGR. **GMZ** PROJ. ENG. **FN/BG**

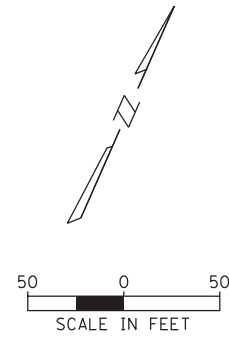
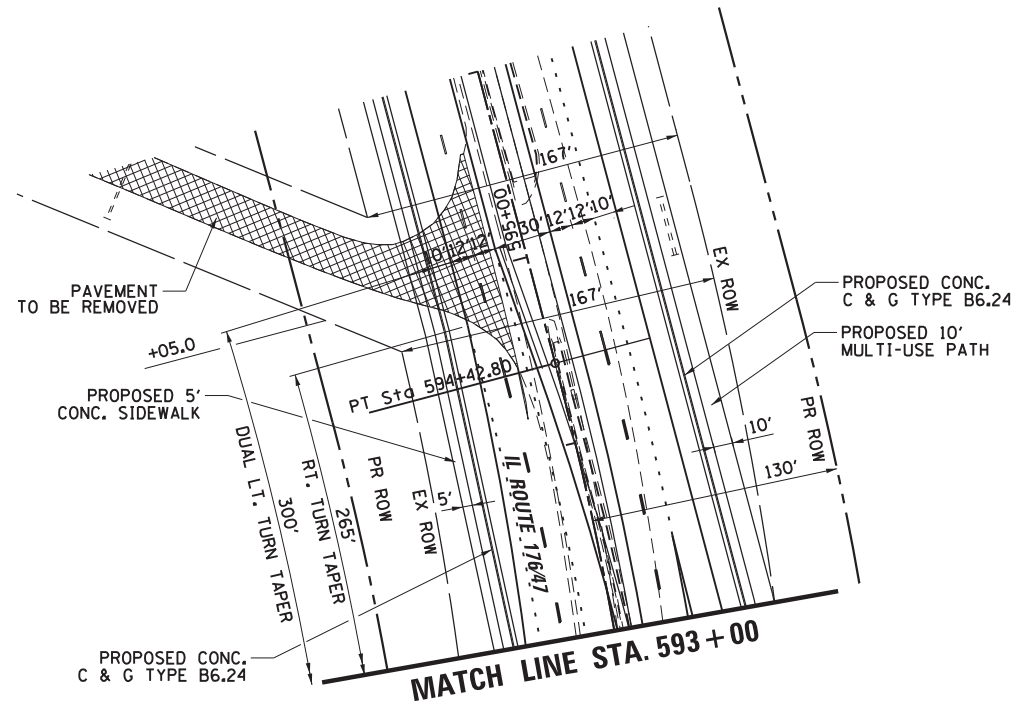
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 FAP ROUTE 326 WITH IL ROUTE 47
 EAST LEG: FAP 335 WITH IL ROUTE 176
 WEST LEG: TR 191 (PLEASANT VALLEY ROAD)
 SEC. NO. PROJ. NO. 100356.00021
 SCALE: 1" = 50' COUNTY LAKE
 S.J.N. REV. NO.

DATE	QA/QC REVIEWER	REMARKS

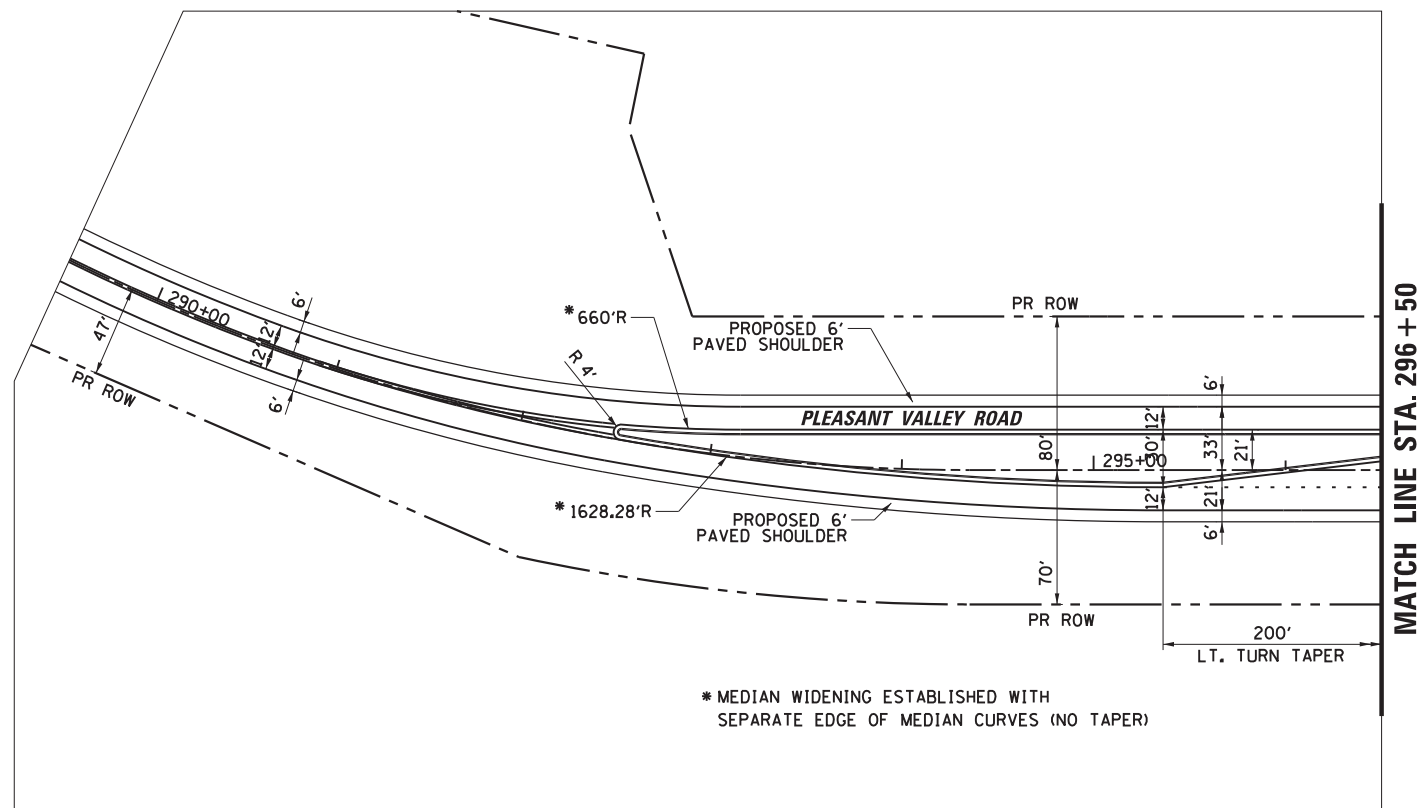
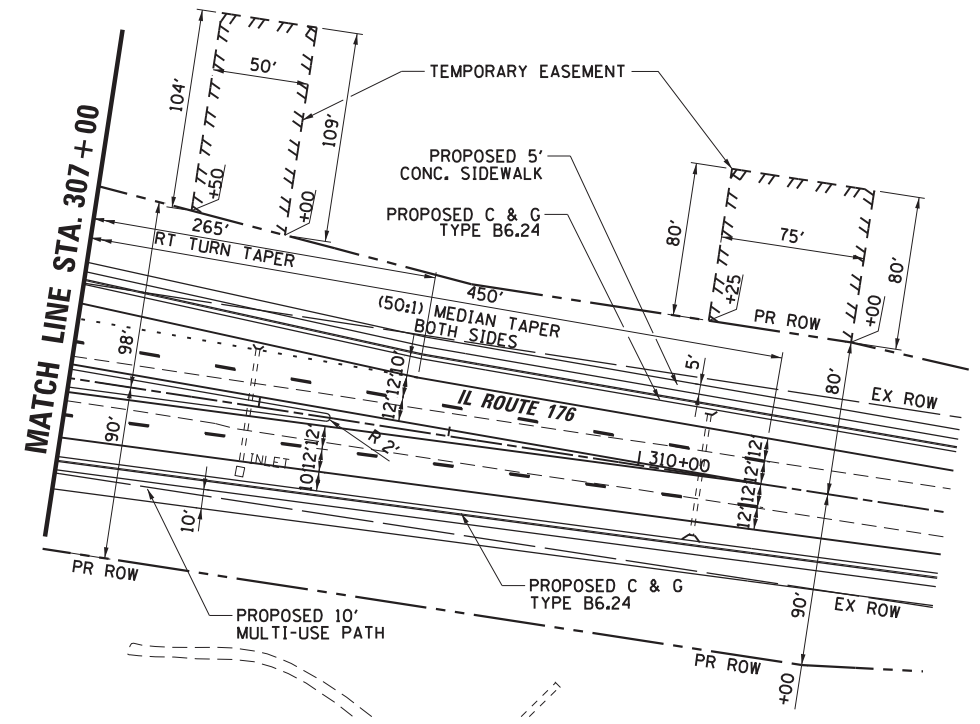
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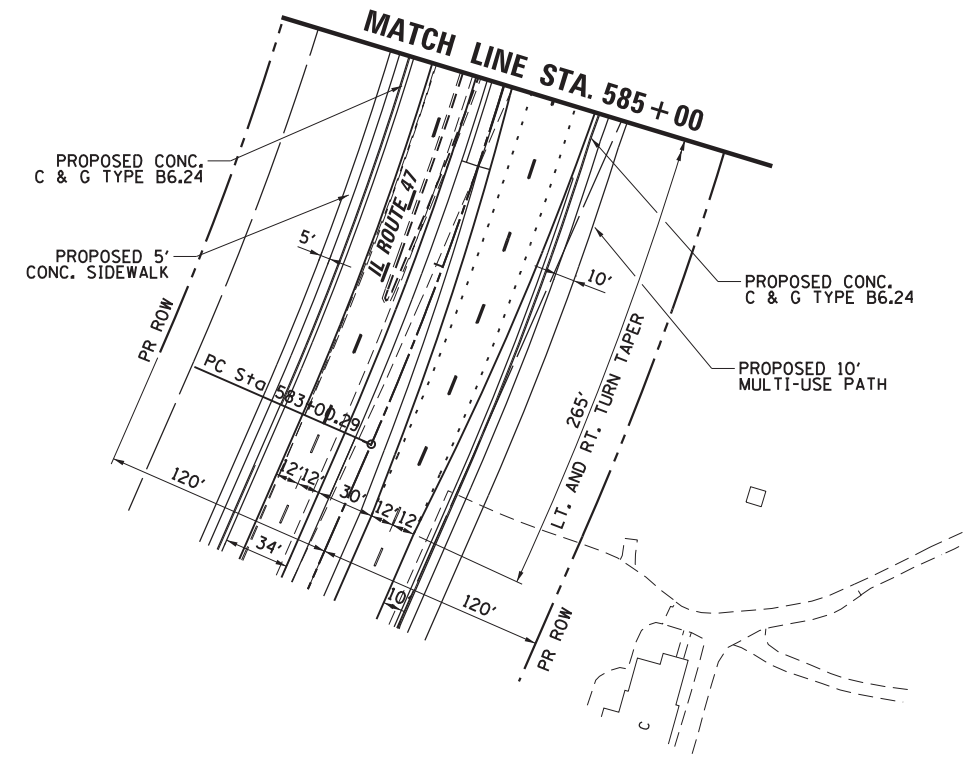
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DRAFT



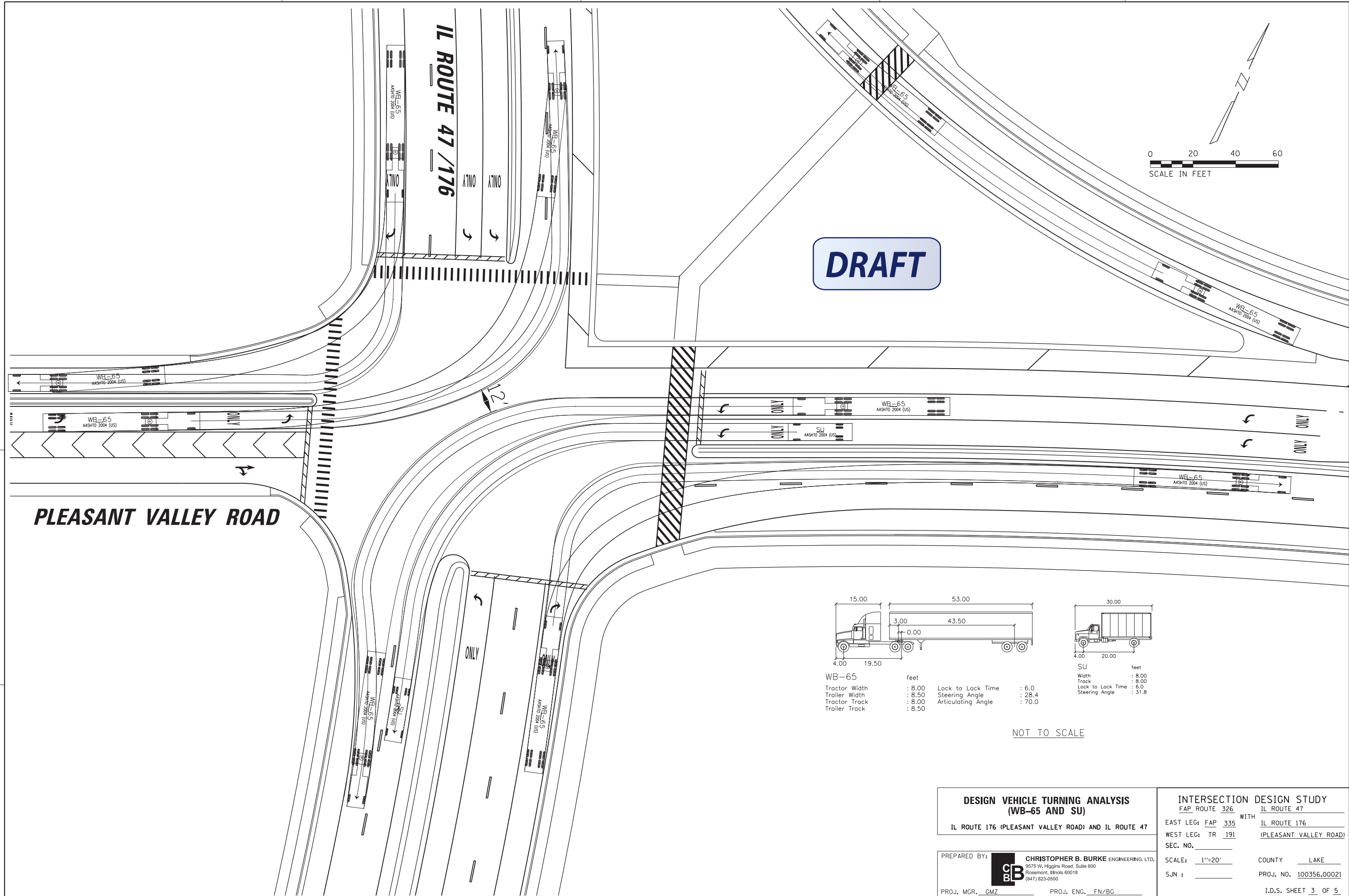
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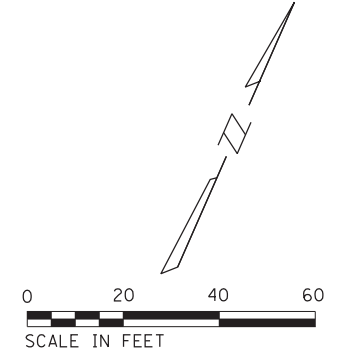
INTERSECTION DESIGN STUDY	
FAP ROUTE 326	IL ROUTE 47
EAST LEG: FAP 335	WITH IL ROUTE 176
WEST LEG: TR 191	(PLEASANT VALLEY ROAD)
SEC. NO.	
SCALE: 1"=50'	COUNTY LAKE
SJN :	PROJ. NO. 100356.00021
	I.D.S. SHEET 2 OF 5

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 PROJ. MGR. CMZ PROJ. ENG. FN/BG

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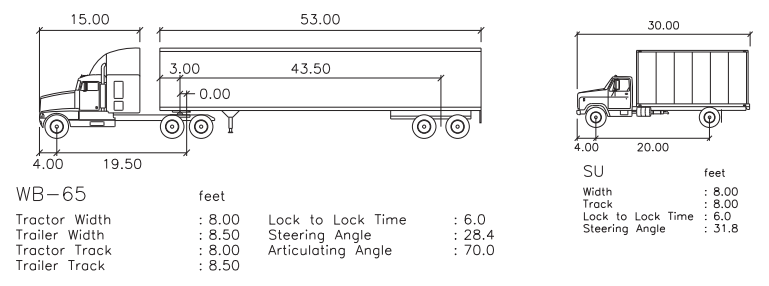


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PLEASANT VALLEY ROAD

IL ROUTE 47 /176



WB-65	feet		
Tractor Width	: 8.00	Lock to Lock Time	: 6.0
Trailer Width	: 8.50	Steering Angle	: 28.4
Tractor Track	: 8.00	Articulating Angle	: 70.0
Trailer Track	: 8.50		

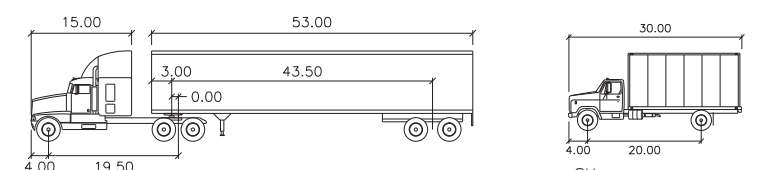
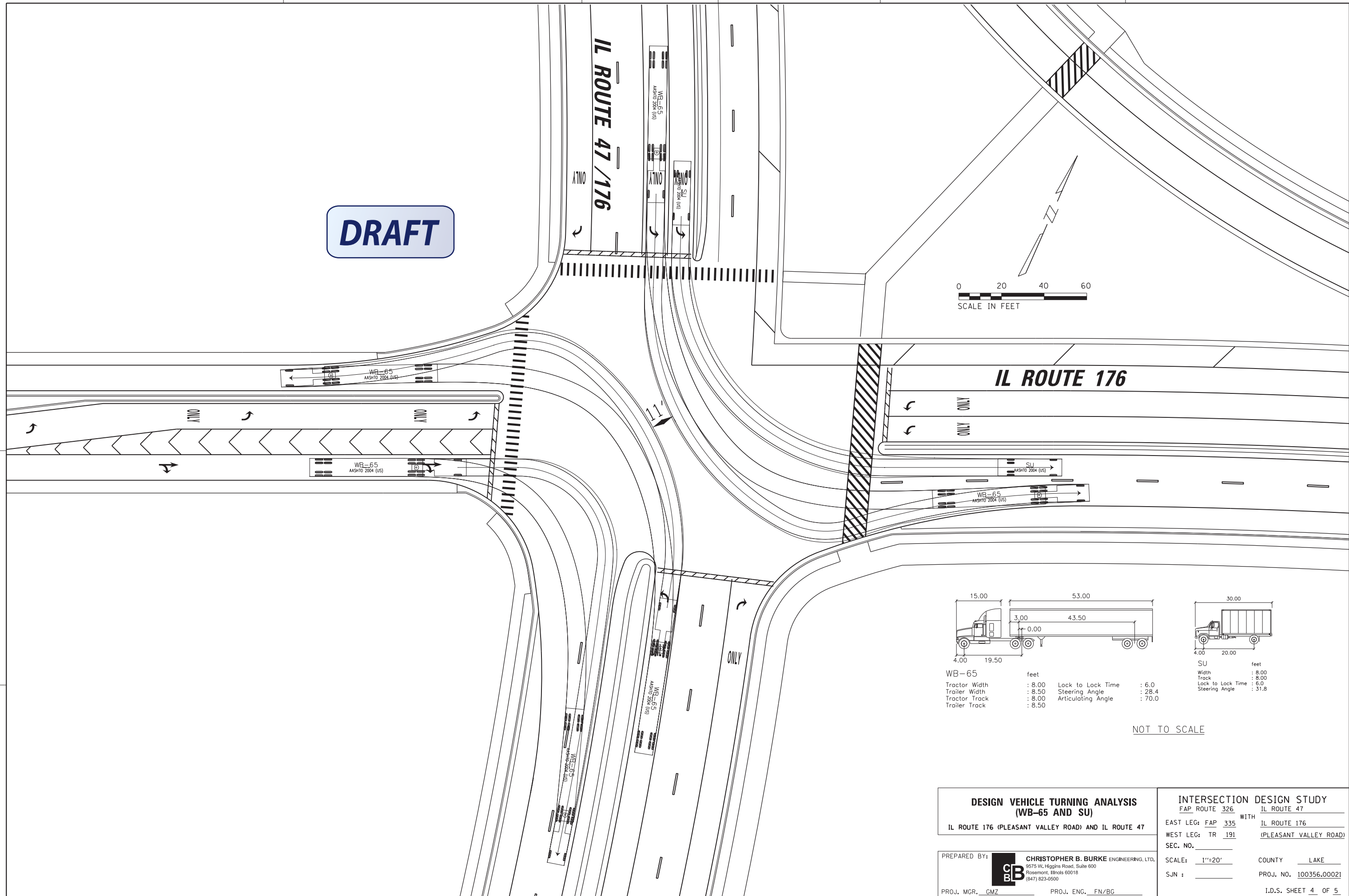
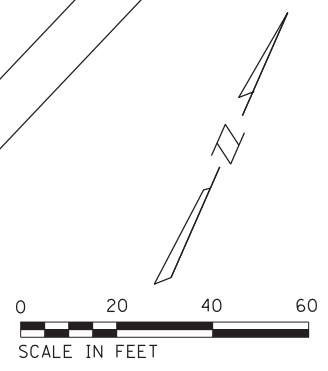
SU	feet
Width	: 8.00
Track	: 8.00
Lock to Lock Time	: 6.0
Steering Angle	: 31.8

NOT TO SCALE

DESIGN VEHICLE TURNING ANALYSIS (WB-65 AND SU)		INTERSECTION DESIGN STUDY	
IL ROUTE 176 (PLEASANT VALLEY ROAD) AND IL ROUTE 47		FAP ROUTE 326 WITH IL ROUTE 47	
		EAST LEG: FAP 335 WITH IL ROUTE 176	
		WEST LEG: TR 191 (PLEASANT VALLEY ROAD)	
		SEC. NO. _____	
PREPARED BY: CB CHRISTOPHER B. BURKE ENGINEERING, LTD. 2575 W. Higgins Road, Suite 600 Rosemont, Illinois 60018 (847) 823-0500		SCALE: 1"=20'	
PROJ. MGR. CMZ		COUNTY LAKE	
PROJ. ENG. FN/BG		SUN : _____	
		PROJ. NO. 100356.00021	
		I.D.S. SHEET 3 OF 5	

PLOT DATE = 9/2/2015
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 PLOT SCALE = 20'
 USER NAME = Frazzetta

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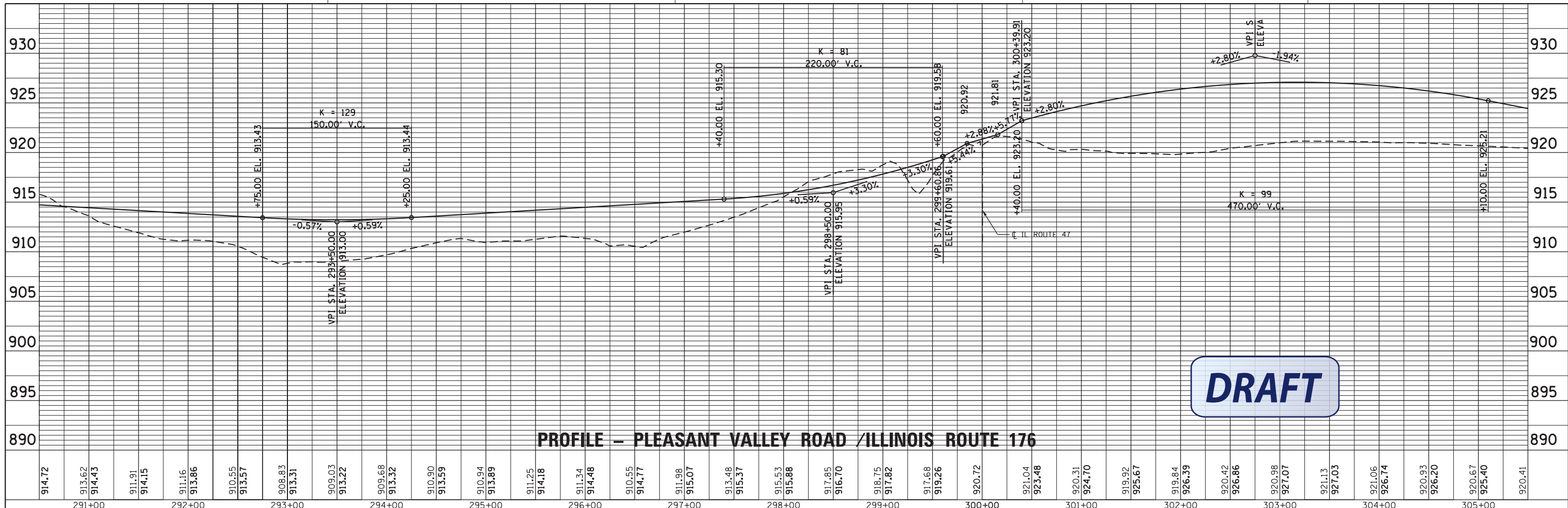
WB-65	feet		
Tractor Width	: 8.00	Lock to Lock Time	: 6.0
Trailer Width	: 8.50	Steering Angle	: 28.4
Tractor Track	: 8.00	Articulating Angle	: 70.0
Trailer Track	: 8.50		

SU	feet	
Width	: 8.00	
Track	: 8.00	
Lock to Lock Time	: 6.0	
Steering Angle	: 31.8	

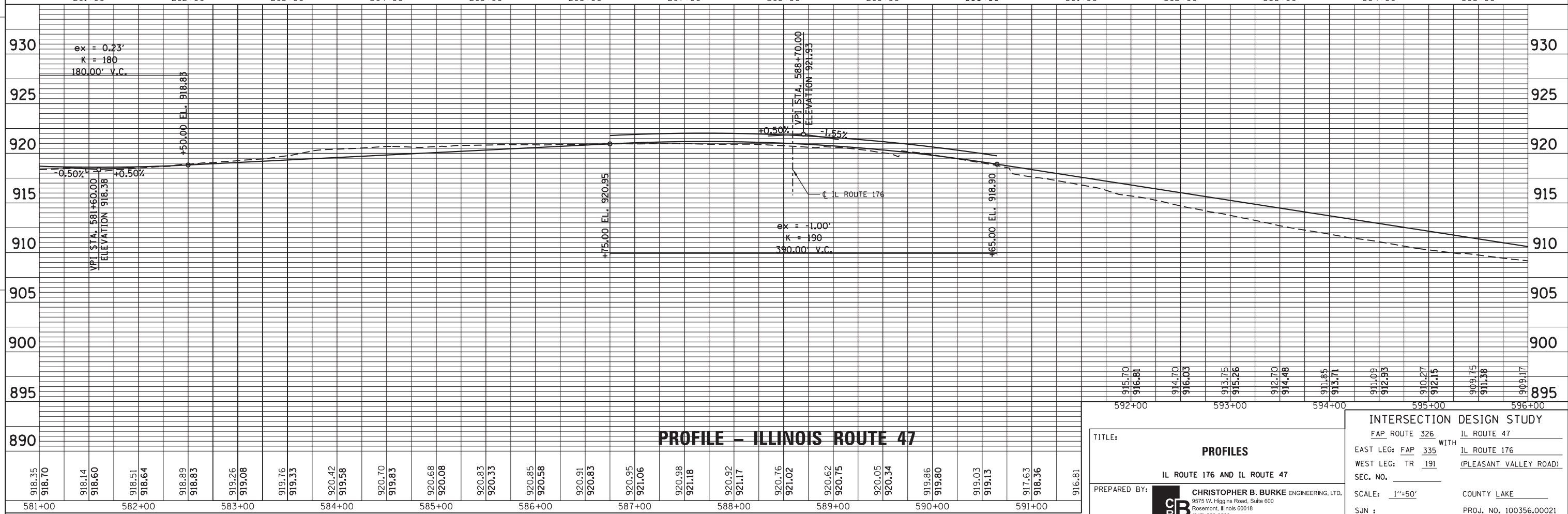
NOT TO SCALE

DESIGN VEHICLE TURNING ANALYSIS (WB-65 AND SU)		INTERSECTION DESIGN STUDY	
IL ROUTE 176 (PLEASANT VALLEY ROAD) AND IL ROUTE 47		FAP ROUTE 326 WITH IL ROUTE 47 IL ROUTE 176 (PLEASANT VALLEY ROAD)	
PREPARED BY:	 CHRISTOPHER B. BURKE ENGINEERING, LTD. 9575 W. Higgins Road, Suite 600 Rosemont, Illinois 60018 (847) 823-0500	EAST LEG:	FAP 335 WITH IL ROUTE 176
PROJ. MGR.:		TR 191	(PLEASANT VALLEY ROAD)
		SEC. NO.:	
		SCALE:	1"=20'
		SUN :	
		COUNTY:	LAKE
		PROJ. NO.:	100356.00021
		I.D.S. SHEET:	4 OF 5

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 PLOT SCALE = 50'
 USER NAME = Fpactone



DRAFT



918.70 918.14 918.60 918.51 918.64 918.89 918.83 919.26 919.08 919.76 919.33 920.42 919.58 920.70 919.83 920.68 920.08 920.83 920.33 920.85 920.58 920.91 920.83 920.95 921.06 920.98 921.18 920.92 921.17 920.76 921.02 920.62 920.75 920.05 920.34 919.86 919.80 919.03 919.13 917.63 918.36 916.81	592+00 593+00 594+00 595+00 596+00	915.70 916.81 914.70 916.03 913.75 915.26 912.70 914.48 911.85 913.71 911.09 912.93 910.27 912.15 909.75 911.38 909.17	INTERSECTION DESIGN STUDY FAP ROUTE 326 IL ROUTE 47 EAST LEG: FAP 335 WITH IL ROUTE 176 WEST LEG: TR 191 (PLEASANT VALLEY ROAD) SEC. NO. _____ SCALE: 1"=50' SJN : _____ PROJ. NO. 100356.00021 I.D.S. SHEET 5 OF 5
--	--	--	--

TITLE: **PROFILES**
 IL ROUTE 176 AND IL ROUTE 47
 PREPARED BY: **CHRISTOPHER B. BURKE ENGINEERING, LTD.**
 9575 W. Higgins Road, Suite 600
 Rosemont, Illinois 60018
 (847) 823-9500
 PROJ. MGR. CMZ PROJ. ENG. FN

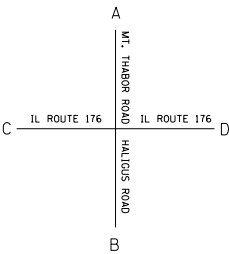
Appendix C – Intersection Design Study

Illinois Route 176 at Mt. Thabor Road/Haligus Road

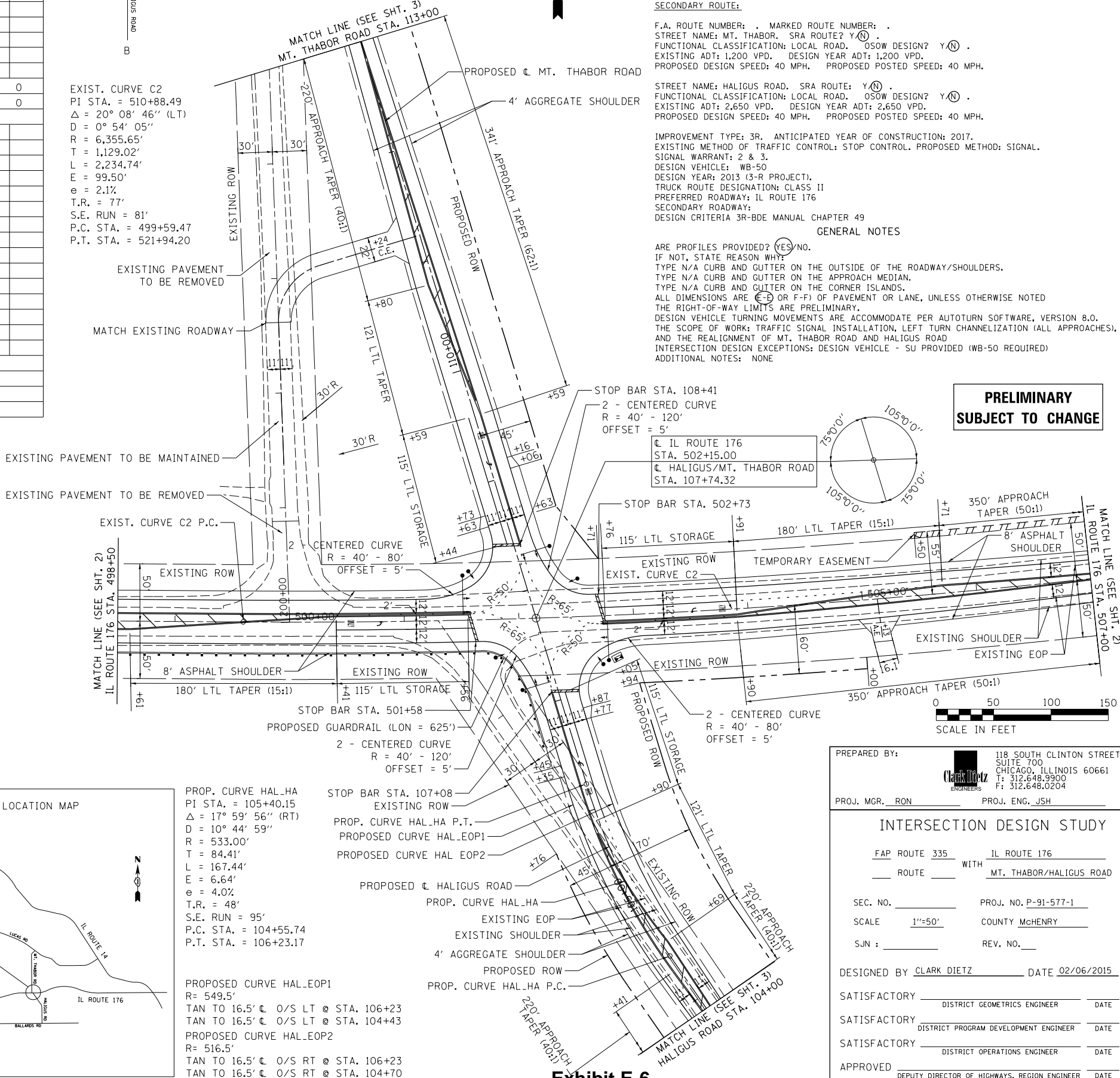
Completed by others. For reference only.

SIGNALIZED CAPACITY DESIGN ANALYSIS

PROGRAM USED:	HCS 2010		VERSION:	6.5		SIGNAL TYPE:	ACTUATED		AREA TYPE:	OTHER	
NUMBER OF PHASES:	(A.M.) 5 (P.M.) 5		CYCLE LENGTH:	(A.M.) 90 SEC. (P.M.) 90 SEC.		PEAK HOUR FACTOR:	0.95				
INTERSECTION DELAY/LEVEL-OF-SERVICE	A.M. 16.5 SECONDS LOS B		P.M. 14.1 SECONDS LOS B								
APPROACH	A		B		C		D				
LANE GROUP	AD	AB/AC	BC	BA/BD	CA	CD/CB	DB	DC/CA			
NUMBER OF LANES	1	1	1	1	1	1	1	1			
20 30TH MAX. HOUR TRAFFIC (veh/h)	A.M. 1	P.M. 26	22	149	13	421	38	270			
	P.M. 4	78	20	75	15	358	79	411			
BASE SATURATION FLOW RATE (veh/h)	1900	1900	1900	1900	1900	1900	1900	1900			
LANE WIDTH (FT)	11	11	11	11	12	12	12	12			
VOLUME OF RIGHT TURN ON RED (veh/h)	A.M. 0	P.M. 0	A.M. 0	P.M. 0	A.M. 0	P.M. 0	A.M. 0	P.M. 0			
PEDESTRIANS/HOUR (ped/h)	A.M. 0	P.M. 0	A.M. 0	P.M. 0	A.M. 0	P.M. 0	A.M. 0	P.M. 0			
ARRIVAL TYPE	3		3		3		3				
LANE UTILIZATION ADJ. FACTOR	1	1	1	1	1	1	1	1			
GREEN TIME (SECONDS)	A.M. 2.2	10.2	3.0	10.2	3.0	54.8	3.0	54.8			
	P.M. 2.8	7.9	2.8	7.9	3.0	56.8	3.5	56.8			
GREEN RATIO (g/C)	A.M. 0.14	0.11	0.15	0.12	0.64	0.61	0.64	0.61			
	P.M. 0.12	0.09	0.12	0.09	0.66	0.63	0.67	0.64			
CAPACITY (c)	A.M. 137	202	278	208	733	1105	584	1080			
	P.M. 192	158	165	145	563	1108	692	1150			
v/c RATIO (X)	A.M. 0.008	0.136	0.083	0.755	0.019	0.401	0.068	0.263			
	P.M. 0.022	0.519	0.128	0.543	0.028	0.340	0.120	0.376			
RED-TIME STORAGE QUEUE (FEET)	A.M. 1'	29'	23'	166'	6'	213'	17'	141'			
	P.M. 4'	89'	22'	87'	7'	176'	33'	194'			
LANE GROUP DELAY(SECONDS)	A.M. 34.0	36.4	33.4	45.9	6.1	10.2	6.9	8.8			
	P.M. 35.1	42.9	35.9	43.7	5.9	8.6	5.7	8.8			
LANE GROUP LEVEL-OF-SERVICE	A.M. C	D	C	D	A	B	A	A			
	P.M. D	D	D	D	A	A	A	A			
APPROACH DELAY (SECONDS/VEHICLE)	A.M.	36.3	44.3		10.1		8.6				
	P.M.	42.6	42.1		8.5		8.3				
APPROACH LEVEL-OF-SERVICE	A.M.	D	D		B		A				
	P.M.	D	D		A		A				



EXIST. CURVE C2
 PI STA. = 510+88.49
 $\Delta = 20^\circ 08' 46''$ (LT)
 $D = 0^\circ 54' 05''$
 $R = 6,355.65'$
 $T = 1,129.02'$
 $L = 2,234.74'$
 $E = 99.50'$
 $\theta = 2.1\%$
 $T.R. = 77'$
 $S.E. RUN = 81'$
 $P.C. STA. = 499+59.47$
 $P.T. STA. = 521+94.20$



PREFERRED ROUTE:
 F.A. ROUTE NUMBER: FAP 335. MARKED ROUTE NUMBER: IL ROUTE 176.
 STREET NAME: IL ROUTE 176. SRA ROUTE? $\text{Y}(\text{N})$.
 FUNCTIONAL CLASSIFICATION: OTHER PRINCIPAL ARTERIAL. OSOW DESIGN? $\text{Y}(\text{N})$.
 EXISTING ADT: 11,000 VPD. DESIGN YEAR ADT: 11,000 VPD.
 PROPOSED DESIGN SPEED: 55 MPH. PROPOSED POSTED SPEED: 55 MPH.

SECONDARY ROUTE:
 F.A. ROUTE NUMBER: . MARKED ROUTE NUMBER: .
 STREET NAME: MT. THABOR. SRA ROUTE? $\text{Y}(\text{N})$.
 FUNCTIONAL CLASSIFICATION: LOCAL ROAD. OSOW DESIGN? $\text{Y}(\text{N})$.
 EXISTING ADT: 1,200 VPD. DESIGN YEAR ADT: 1,200 VPD.
 PROPOSED DESIGN SPEED: 40 MPH. PROPOSED POSTED SPEED: 40 MPH.

STREET NAME: HALIGUS ROAD. SRA ROUTE? $\text{Y}(\text{N})$.
 FUNCTIONAL CLASSIFICATION: LOCAL ROAD. OSOW DESIGN? $\text{Y}(\text{N})$.
 EXISTING ADT: 2,650 VPD. DESIGN YEAR ADT: 2,650 VPD.
 PROPOSED DESIGN SPEED: 40 MPH. PROPOSED POSTED SPEED: 40 MPH.

IMPROVEMENT TYPE: 3R. ANTICIPATED YEAR OF CONSTRUCTION: 2017.
 EXISTING METHOD OF TRAFFIC CONTROL: STOP CONTROL. PROPOSED METHOD: SIGNAL.
 SIGNAL WARRANT: 2 & 3.
 DESIGN VEHICLE: WB-50
 DESIGN YEAR: 2013 (3-R PROJECT).
 TRUCK ROUTE DESIGNATION: CLASS II
 PREFERRED ROADWAY: IL ROUTE 176
 SECONDARY ROADWAY:
 DESIGN CRITERIA 3R-BDE MANUAL CHAPTER 49

GENERAL NOTES

ARE PROFILES PROVIDED? $\text{YES}(\text{NO})$.
 IF NOT, STATE REASON WHY?
 TYPE N/A CURB AND GUTTER ON THE OUTSIDE OF THE ROADWAY/SHOULDERS.
 TYPE N/A CURB AND GUTTER ON THE APPROACH MEDIAN.
 TYPE N/A CURB AND GUTTER ON THE CORNER ISLANDS.
 ALL DIMENSIONS ARE (E-D OR F-F) OF PAVEMENT OR LANE, UNLESS OTHERWISE NOTED
 THE RIGHT-OF-WAY LIMITS ARE PRELIMINARY.
 DESIGN VEHICLE TURNING MOVEMENTS ARE ACCOMMODATE PER AUTOTURN SOFTWARE, VERSION 8.0.
 THE SCOPE OF WORK: TRAFFIC SIGNAL INSTALLATION, LEFT TURN CHANNELIZATION (ALL APPROACHES),
 AND THE REALIGNMENT OF MT. THABOR ROAD AND HALIGUS ROAD
 INTERSECTION DESIGN EXCEPTIONS: DESIGN VEHICLE - SU PROVIDED (WB-50 REQUIRED)
 ADDITIONAL NOTES: NONE

**PRELIMINARY
 SUBJECT TO CHANGE**

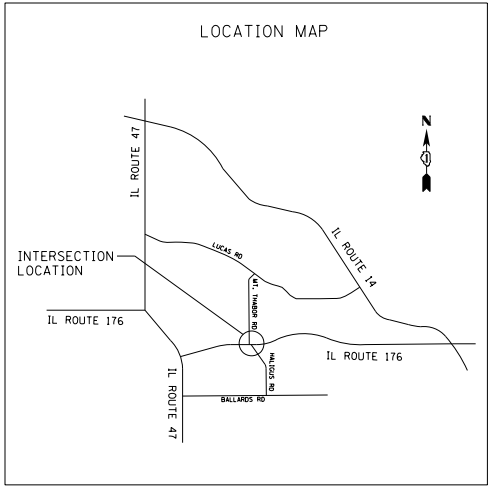


PHASE	1		2		3		4		5		CYCLE LENGTH 90 SEC.
	YELLOW	RED	YELLOW	RED	YELLOW	RED	YELLOW	RED	YELLOW	RED	
GREEN TIME IN SECONDS	A.M. 3.0	P.M. 3.5(0.0)	54.8	4.0(2.0)	2.2	3.5(0.0)	0.8	0.0(0.0)	10.2	4.0(2.0)	90 SEC.
	YELLOW	RED	YELLOW	RED	YELLOW	RED	YELLOW	RED	YELLOW	RED	
	YELLOW	RED	YELLOW	RED	YELLOW	RED	YELLOW	RED	YELLOW	RED	
GREEN TIME IN SECONDS	A.M. 3.0	P.M. 3.5(0.0)	0.5	0.0(0.0)	56.8	4.0(2.0)	2.8	3.5(0.0)	7.9	4.0(2.0)	90 SEC.
	YELLOW	RED	YELLOW	RED	YELLOW	RED	YELLOW	RED	YELLOW	RED	
	YELLOW	RED	YELLOW	RED	YELLOW	RED	YELLOW	RED	YELLOW	RED	

TRAFFIC DATA

MOVEMENT	YEAR 2013 30TH MAXIMUM HOUR TRAFFIC		PERCENT TRUCK TRAFFIC IN 30TH MAX. HOUR		ESTIMATED PERCENT INCREASE BY	YEAR 30TH MAXIMUM HOUR TRAFFIC		ESTIMATED PERCENT INCREASE BY	YEAR 30TH MAXIMUM HOUR TRAFFIC	
	A.M.	P.M.	A.M.	P.M.		A.M.	P.M.		A.M.	P.M.
AD (L)	1	4	0	0						
AB (T)	18	57	0	0						
AC (R)	8	21	0	0						
BC (L)	22	20	0	0						
BA (T)	70	27	1	2						
BD (R)	79	48	0	0						
CA (L)	13	15	0	13						
CD (T)	403	316	4	6						
CB (R)	18	42	0	0						
DB (L)	38	79	0	0						
DC (T)	268	407	7	5						
DA (R)	2	4	0	0						
TOTAL A	112	128								
TOTAL B	245	273								
TOTAL C	732	821								
TOTAL D	791	858								

T = THROUGH, L = LEFT, R = RIGHT



PROP. CURVE HAL-HA
 PI STA. = 105+40.15
 $\Delta = 17^\circ 59' 56''$ (RT)
 $D = 10^\circ 44' 59''$
 $R = 533.00'$
 $T = 84.41'$
 $L = 167.44'$
 $E = 6.64'$
 $\theta = 4.0\%$
 $T.R. = 48'$
 $S.E. RUN = 95'$
 $P.C. STA. = 104+55.74$
 $P.T. STA. = 106+23.17$

PROPOSED CURVE HAL.EOP1
 $R = 549.5'$
 TAN TO 16.5' C O/S LT @ STA. 106+23
 TAN TO 16.5' C O/S LT @ STA. 104+43
 PROPOSED CURVE HAL.EOP2
 $R = 516.5'$
 TAN TO 16.5' C O/S RT @ STA. 106+23
 TAN TO 16.5' C O/S RT @ STA. 104+70

PREPARED BY: **Clark Dietz**
 ENGINEERS
 118 SOUTH CLINTON STREET
 SUITE 700
 CHICAGO, ILLINOIS 60661
 T: 312.648.9900
 F: 312.648.0204

INTERSECTION DESIGN STUDY

FAP ROUTE 335 WITH IL ROUTE 176
 ROUTE WITH MT. THABOR/HALIGUS ROAD

SEC. NO. _____ PROJ. NO. P-91-577-1
 SCALE 1"=50' COUNTY McHENRY
 SJN: _____ REV. NO. _____

DESIGNED BY CLARK DIETZ DATE 02/06/2015

SATISFACTORY _____ DISTRICT GEOMETRICS ENGINEER DATE _____

SATISFACTORY _____ DISTRICT PROGRAM DEVELOPMENT ENGINEER DATE _____

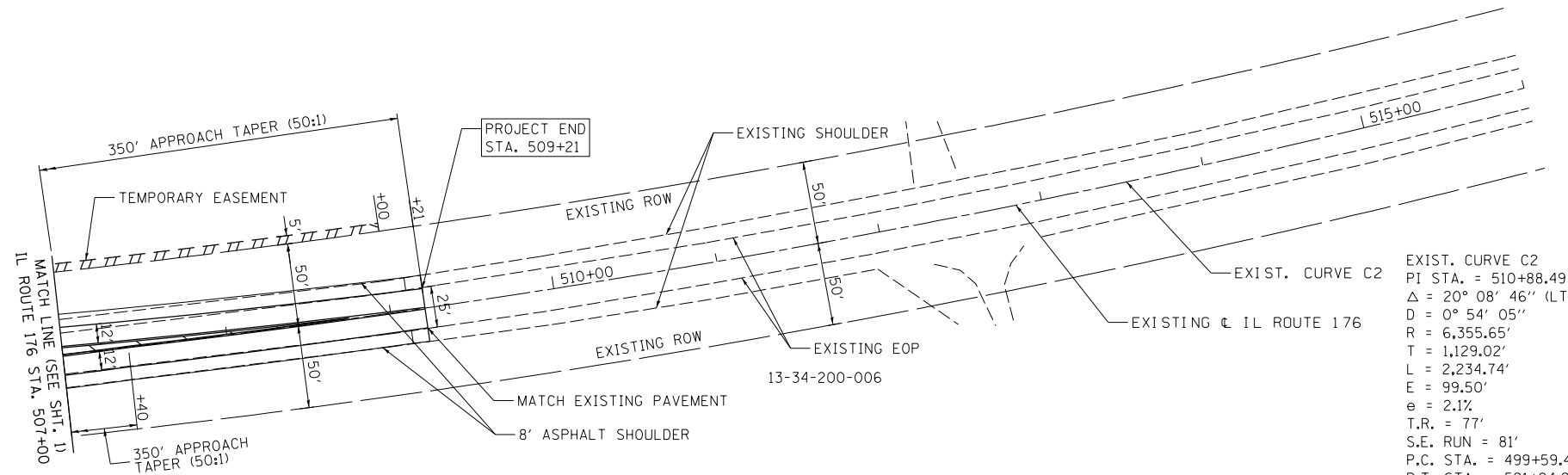
SATISFACTORY _____ DISTRICT OPERATIONS ENGINEER DATE _____

APPROVED _____ DEPUTY DIRECTOR OF HIGHWAYS, REGION ENGINEER DATE _____

CADD FILE NAME: [D013284]sh1-ids-1 I.D.S. SHEET 1 OF 11

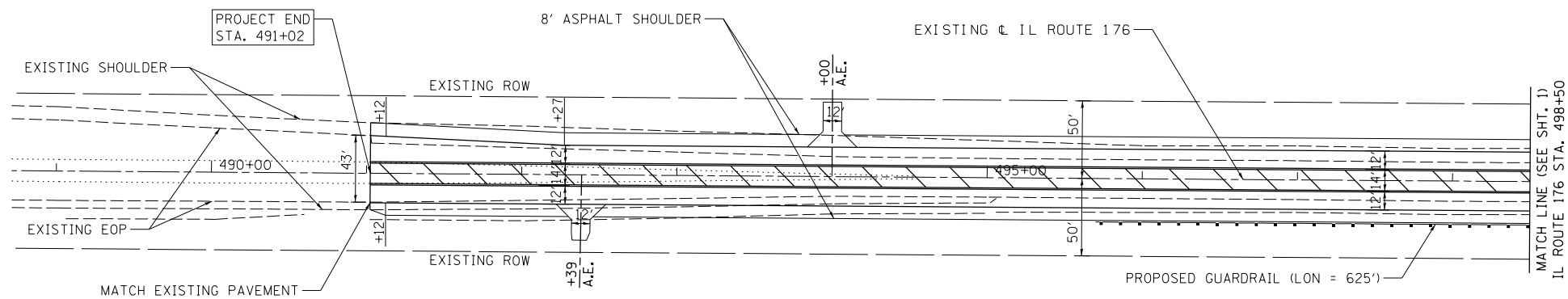
Exhibit E-6

PLOT DATE = 7/24/2015
 FILE NAME = 20152064-rt-148-2.dgn
 PLOT SCALE = 100,0000 / in.
 USER NAME = User:VPakrosms



EXIST. CURVE C2
 PI STA. = 510+88.49
 $\Delta = 20^\circ 08' 46''$ (LT)
 $D = 0^\circ 54' 05''$
 $R = 6,355.65'$
 $T = 1,129.02'$
 $L = 2,234.74'$
 $E = 99.50'$
 $e = 2.1\%$
 $T.R. = 77'$
 $S.E. RUN = 81'$
 $P.C. STA. = 499+59.47$
 $P.T. STA. = 521+94.20$

IL ROUTE 176



IL ROUTE 176

**PRELIMINARY
 SUBJECT TO CHANGE**



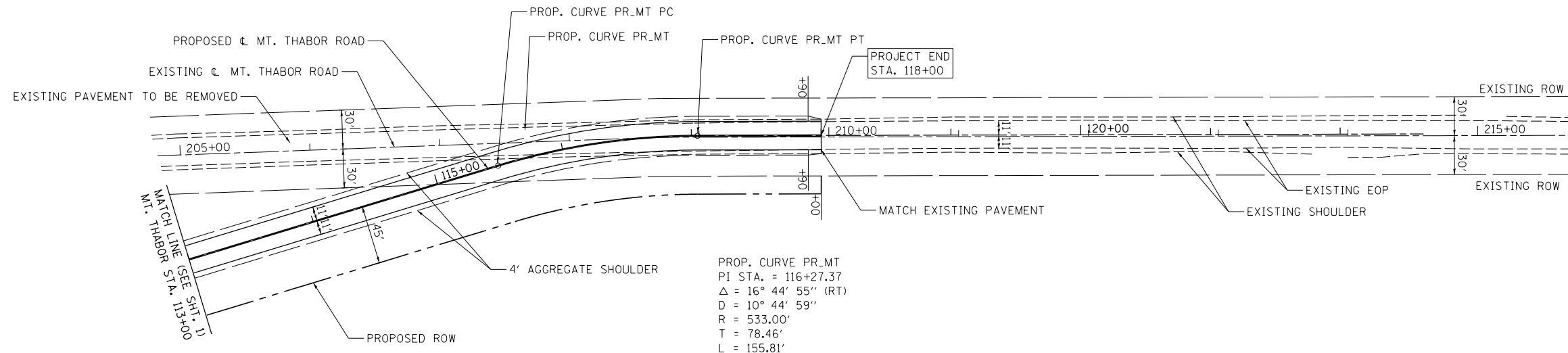
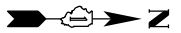
PREPARED BY: 118 SOUTH CLINTON STREET
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 CHICAGO, ILLINOIS 60661
 T: 312.648.9900
 F: 312.648.0204
 PROJ. MGR. RON PROJ. ENG. JSH

INTERSECTION DESIGN STUDY
 FAP ROUTE 335 IL ROUTE 176
 ROUTE WITH MT. THABOR/HALIGUS ROAD

SEC. NO. _____
 SCALE 1"=50' COUNTY McHENRY
 SJN : _____ PROJ. NO. P-91-577-11

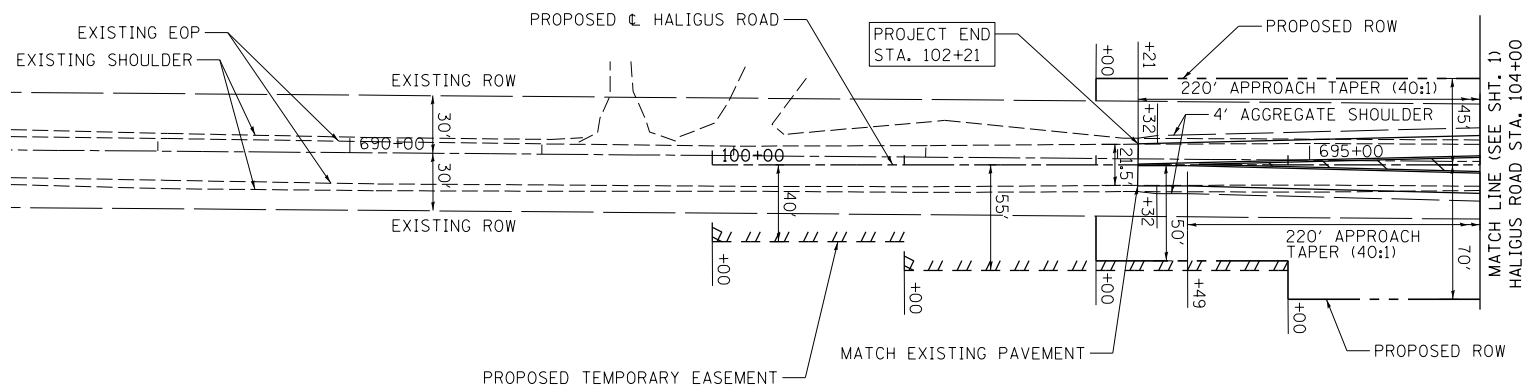
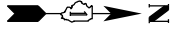
I.D.S. SHEET 2 OF 11

Exhibit E-6



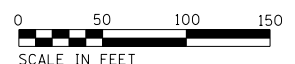
PROP. CURVE PR_MT
 PI STA. = 116+27.37
 Δ = 16° 44' 55" (RT)
 D = 10° 44' 59"
 R = 533.00'
 T = 78.46'
 L = 155.81'
 E = 5.74'
 e = 4.0%
 T.R. = 38'
 S.E. RUN = 76'
 P.C. STA. = 115+48.90
 P.T. STA. = 117+04.71

MT. THABOR ROAD



HALIGUS ROAD

**PRELIMINARY
 SUBJECT TO CHANGE**

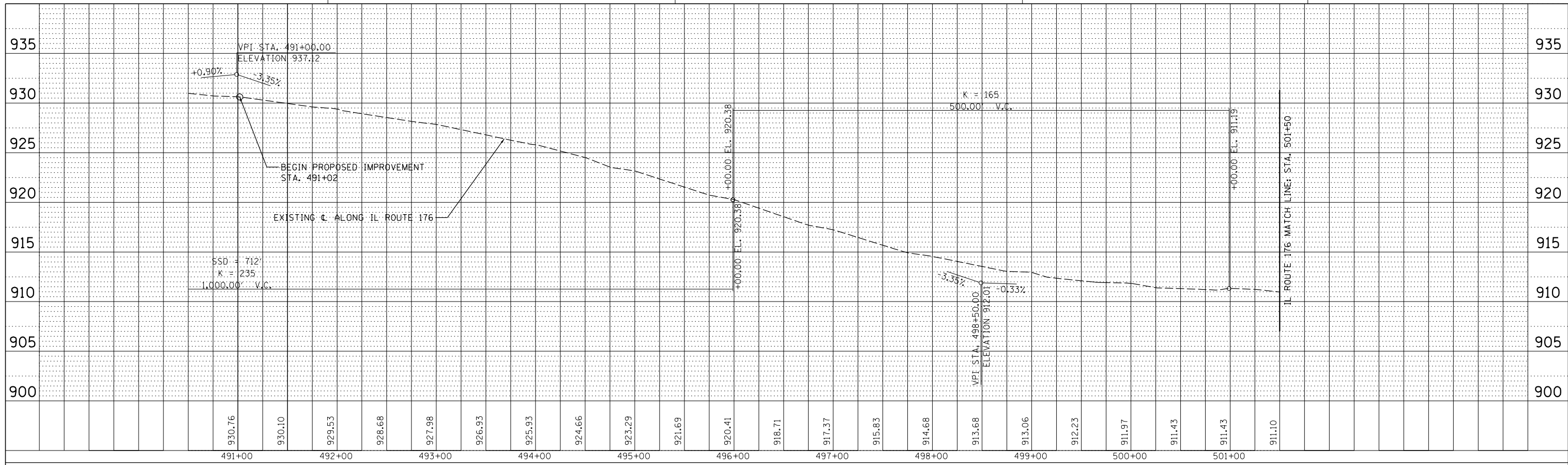


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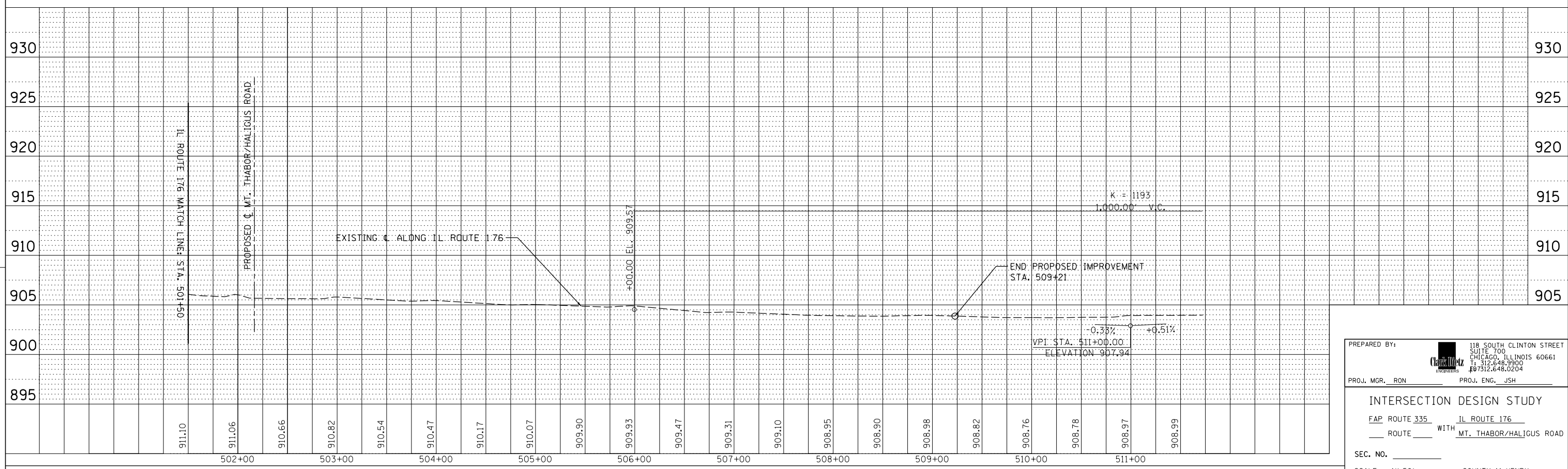
INTERSECTION DESIGN STUDY
 FAP ROUTE 335 IL ROUTE 176
 WITH MT. THABOR/HALIGUS ROAD
 SEC. NO. _____
 SCALE 1"=50' COUNTY McHENRY
 SJN : _____ PROJ. NO. P-91-577-11
 I.D.S. SHEET 3 OF 11

PLOT DATE = 7/27/2015
 FILE NAME = 10132064+rt+td+2.dgn
 PLOT SCALE = 100,00000 / in.
 USER NAME = User:VPakrosms

PLOT DATE = 7/24/2015
 FILE NAME = I:\13264\13264-145-3.dgn
 PLOT SCALE = 1/8" = 1'-0"
 USER NAME = User:VPakrasnis



**PRELIMINARY
 SUBJECT TO CHANGE**

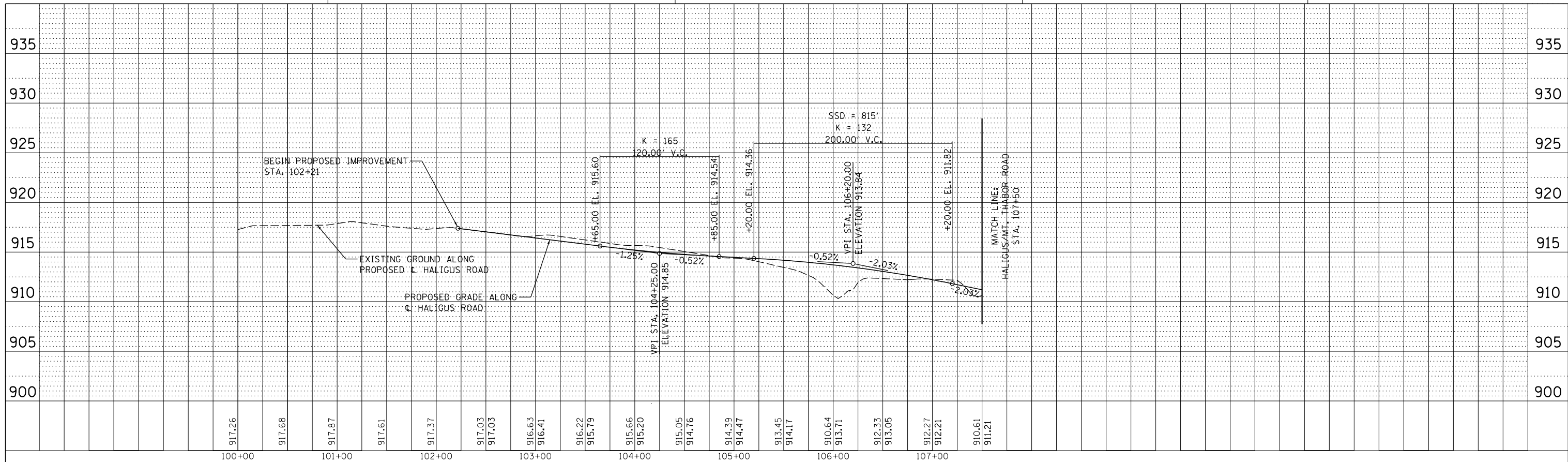


PREPARED BY: 118 SOUTH CLINTON STREET
 SUITE 700
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 F: 312.648.0204
 PROJ. MGR. RON PROJ. ENG. JSH

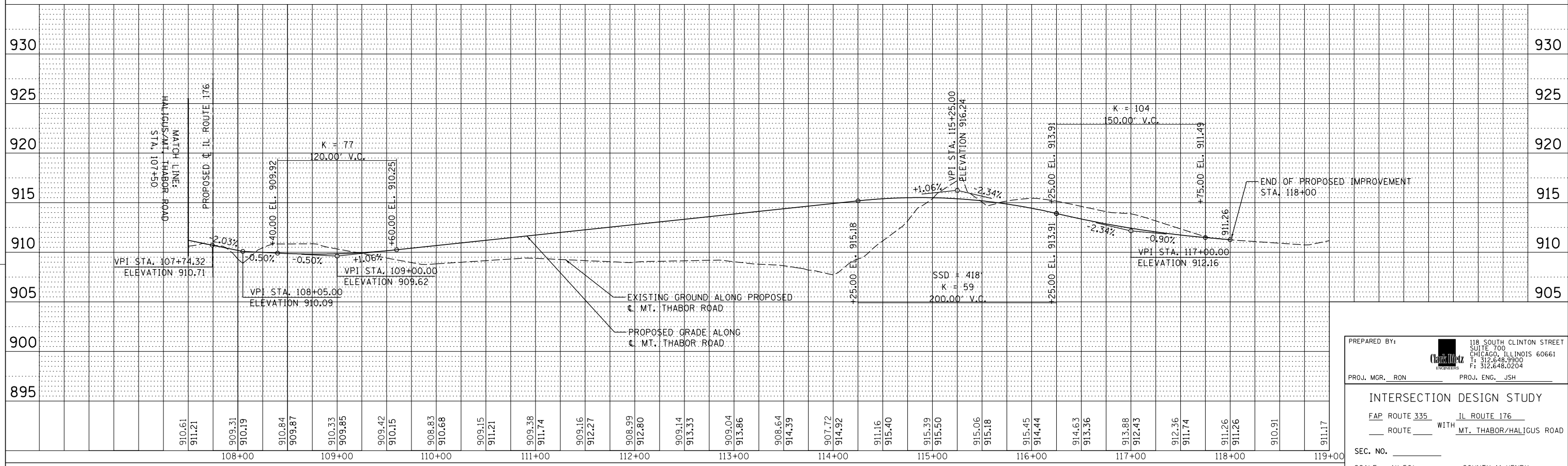
INTERSECTION DESIGN STUDY
 FAP ROUTE 335 IL ROUTE 176
 WITH MT. THABOR/HALIGUS ROAD
 SEC. NO. _____
 SCALE 1"=50' COUNTY McHENRY
 SJN : _____ PROJ. NO. P-91-577-11
 I.D.S. SHEET 4 OF 11

Exhibit E-6

PLOT DATE = 7/24/2015
 FILE NAME = 1013264.dwg
 PLOT SCALE = 100.0000 / in.
 USER NAME = User:VPakrasnis



**PRELIMINARY
 SUBJECT TO CHANGE**

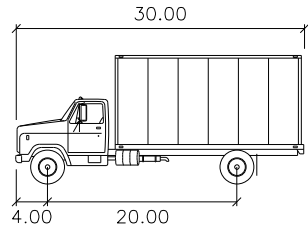


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 PROJ. MGR. RON PROJ. ENG. JSH

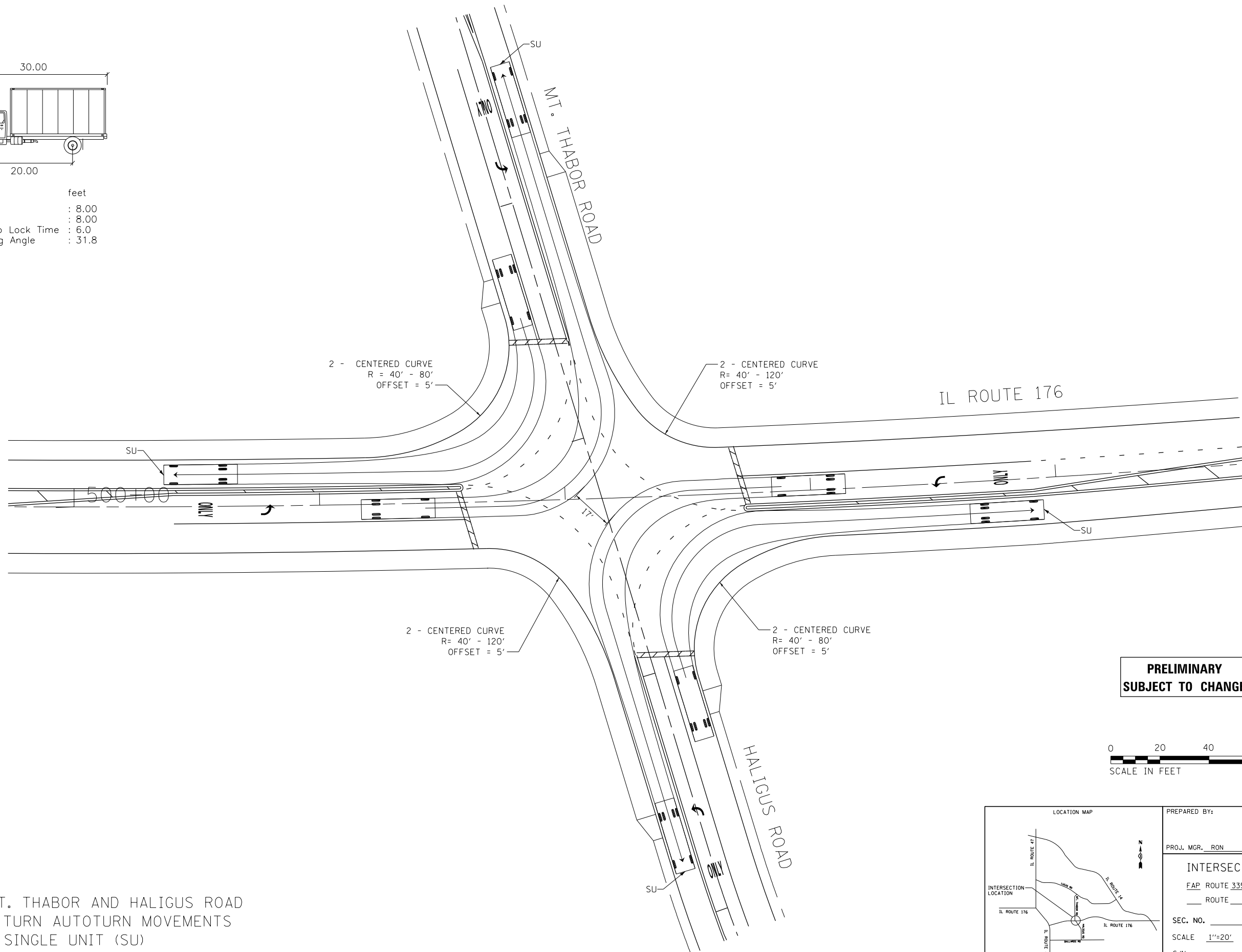
INTERSECTION DESIGN STUDY
 FAP ROUTE 335 IL ROUTE 176
 WITH MT. THABOR/HALIGUS ROAD
 SEC. NO. _____
 SCALE 1"=50' COUNTY McHENRY
 SJN : _____ PROJ. NO. P-91-577-11
 I.D.S. SHEET 5 OF 11

Exhibit E-6

PLOT DATE = 7/24/2015
 FILE NAME = 01132064.rvt-ids-4.dgn
 PLOT SCALE = 40.0000 / in.
 USER NAME = User:VPakrosnis



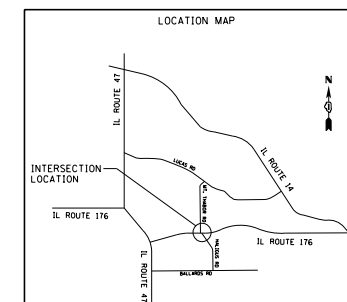
SU feet
 Width : 8.00
 Track : 8.00
 Lock to Lock Time : 6.0
 Steering Angle : 31.8



PRELIMINARY
SUBJECT TO CHANGE

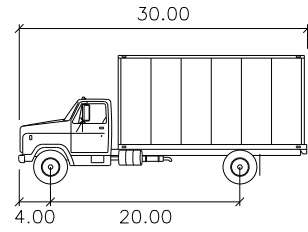


IL ROUTE 176, MT. THABOR AND HALIGUS ROAD
 LEFT AND RIGHT TURN AUTOTURN MOVEMENTS
 DESIGN VEHICLE: SINGLE UNIT (SU)

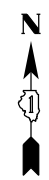
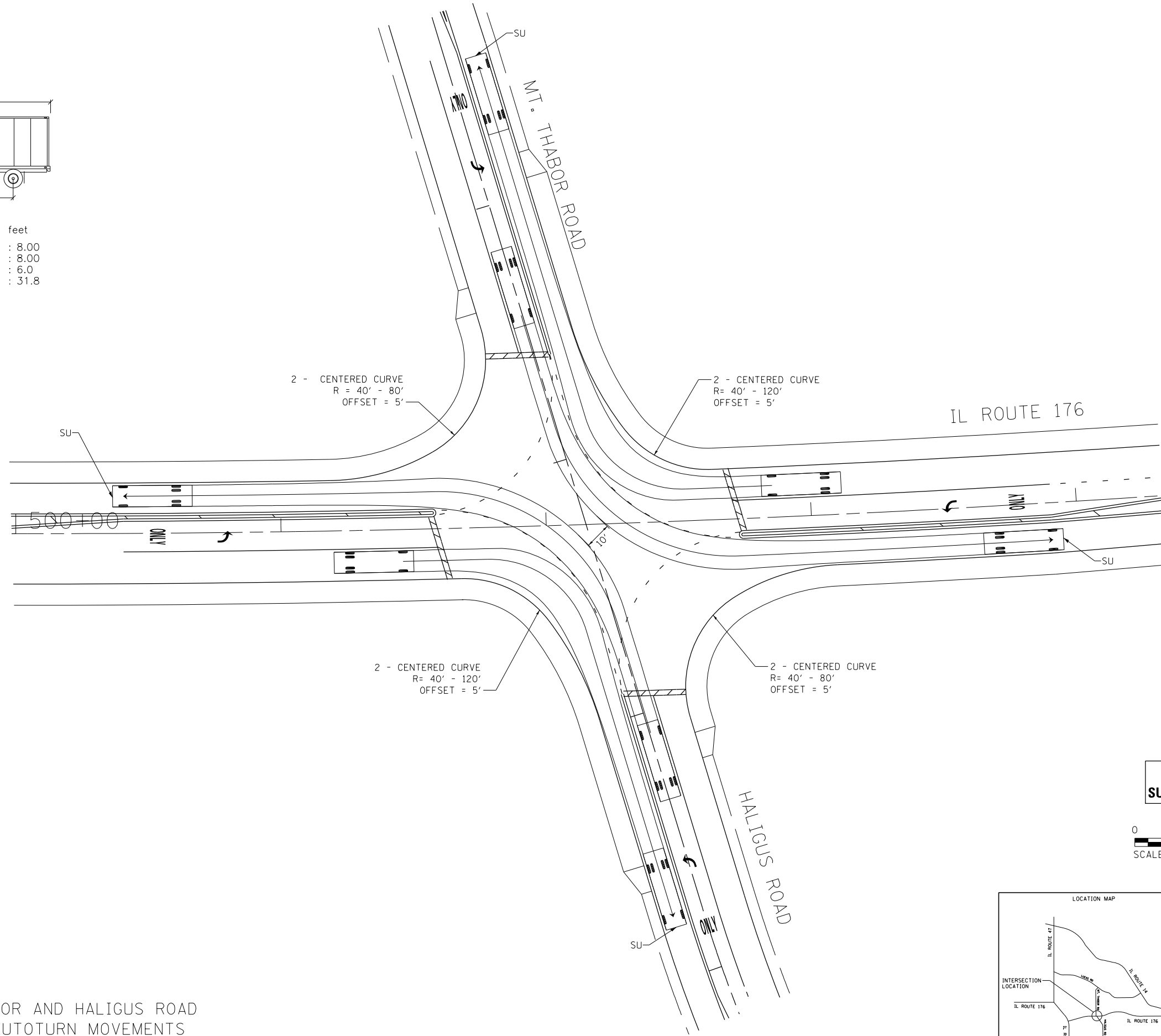


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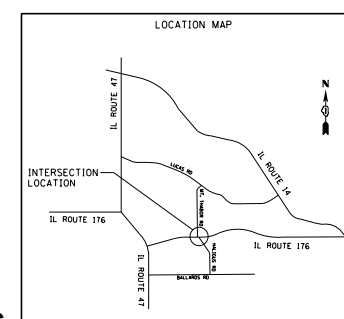
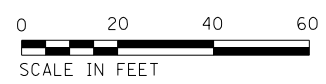
INTERSECTION DESIGN STUDY
 FAP ROUTE 335 IL ROUTE 176
 ___ ROUTE ___ WITH MT. THABOR/HALIGUS ROAD
 SEC. NO. _____
 SCALE 1"=20' COUNTY McHENRY
 SJN : _____ PROJ. NO. P-91-577-11



SU feet
 Width : 8.00
 Track : 8.00
 Lock to Lock Time : 6.0
 Steering Angle : 31.8



**PRELIMINARY
 SUBJECT TO CHANGE**



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 F: 312.648.0204

PROJ. MGR. RON PROJ. ENG. JSH

INTERSECTION DESIGN STUDY
 FAP ROUTE 335 IL ROUTE 176
 _____ ROUTE _____ WITH _____
 _____ MT. THABOR/HALIGUS ROAD

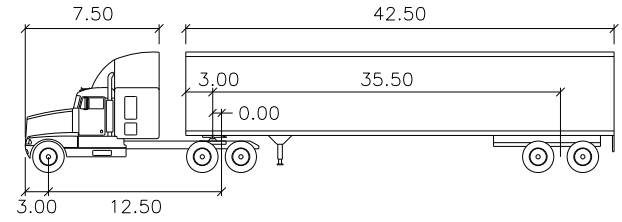
SEC. NO. _____
 SCALE 1"=20' COUNTY McHENRY
 SJN : _____ PROJ. NO. P-91-577-11

I.D.S. SHEET 7 OF 11

Exhibit E-6

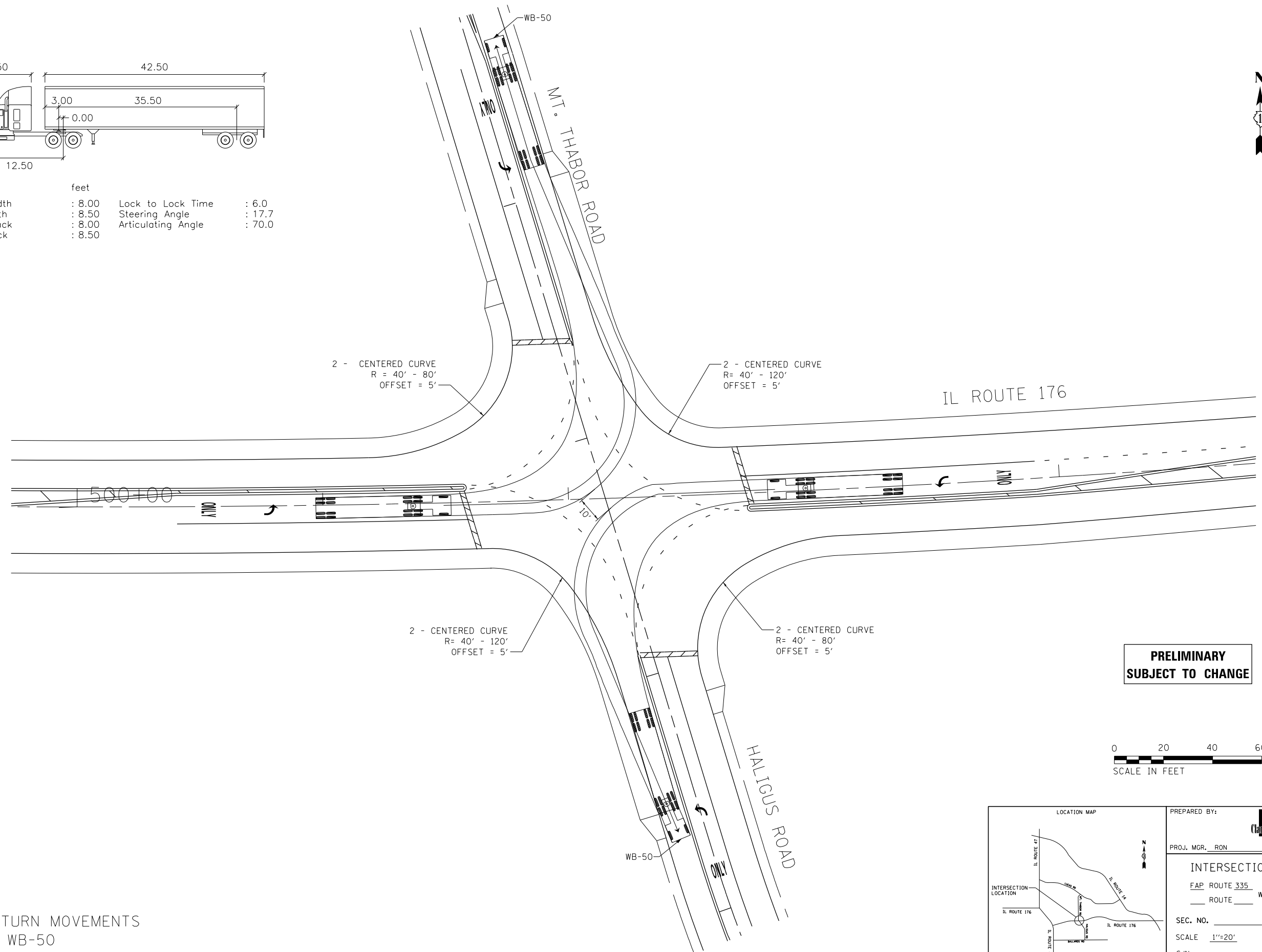
IL ROUTE 176, MT. THABOR AND HALIGUS ROAD
 RIGHT AND LEFT TURN AUTOTURN MOVEMENTS
 DESIGN VEHICLE: SINGLE UNIT (SU)

PLOT DATE = 7/24/2015
 FILE NAME = 0113204.dwg
 PLOT SCALE = 40.0000 / in.
 USER NAME = User:VPakrosms

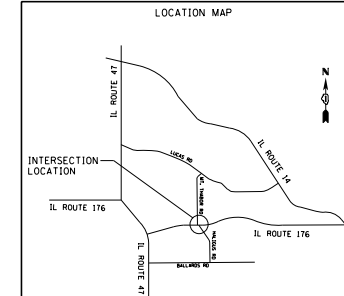


WB-50 feet

Tractor Width	: 8.00	Lock to Lock Time	: 6.0
Trailer Width	: 8.50	Steering Angle	: 17.7
Tractor Track	: 8.00	Articulating Angle	: 70.0
Trailer Track	: 8.50		



**PRELIMINARY
SUBJECT TO CHANGE**



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PROJ. MGR. RON PROJ. ENG. JSH

INTERSECTION DESIGN STUDY

FAP ROUTE 335 IL ROUTE 176
____ ROUTE ____ WITH ____ MT. THABOR/HALIGUS ROAD

SEC. NO. _____

SCALE 1"=20' COUNTY McHENRY

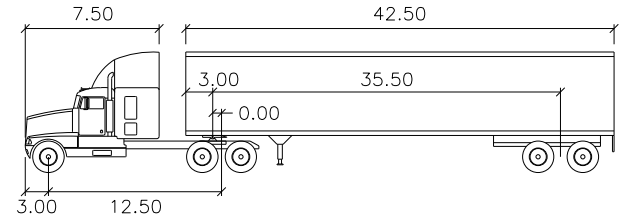
SJN : _____ PROJ. NO. P-91-577-11

I.D.S. SHEET 8 OF 11

Exhibit E-6

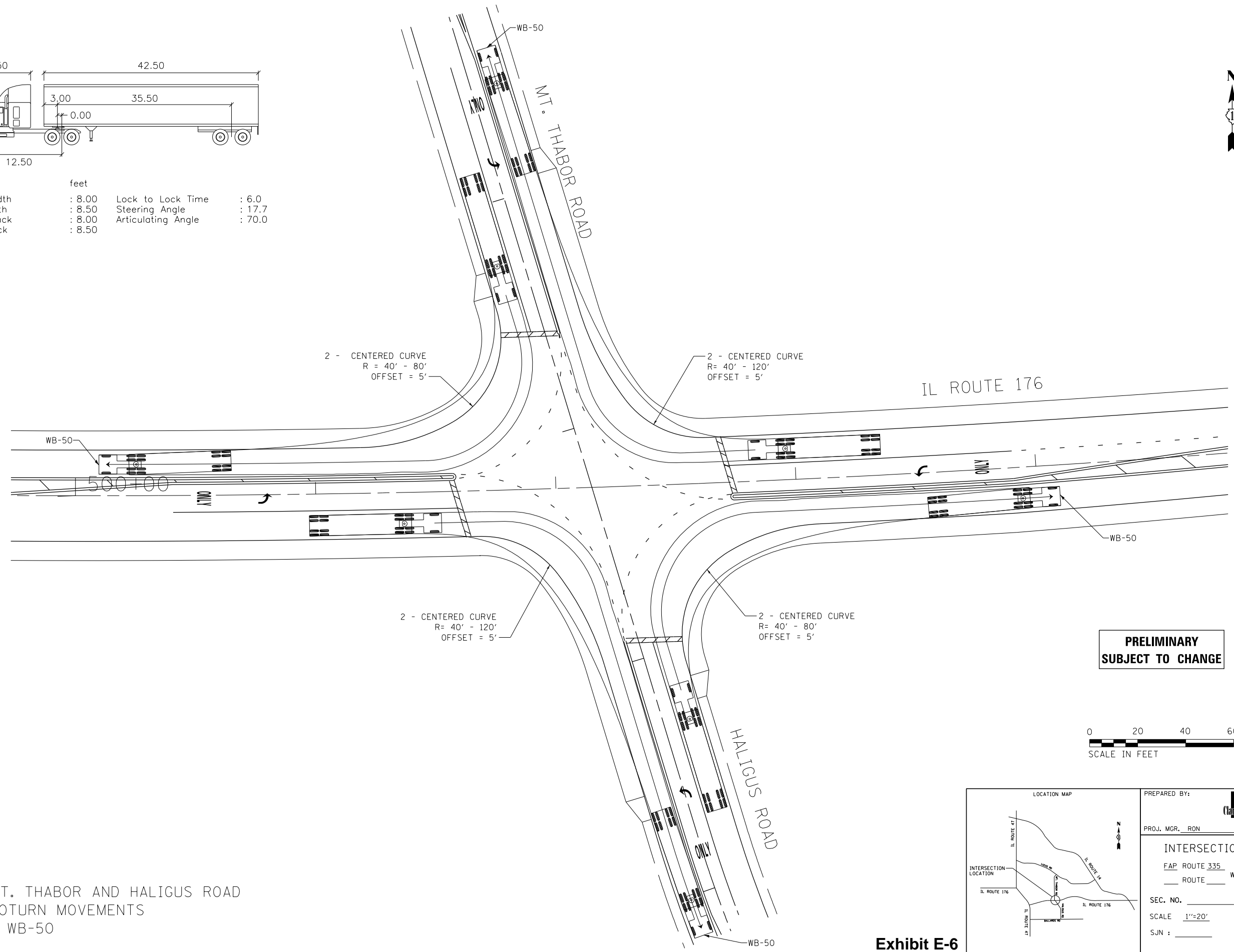
IL ROUTE 176
LEFT TURN AUTOTURN MOVEMENTS
DESIGN VEHICLE: WB-50

PLOT DATE = 7/24/2015
FILE NAME = 0113264.dwg
PLOT SCALE = 40.00000 / 1" = 20'
USER NAME = User:VPakrosnis



WB-50 feet

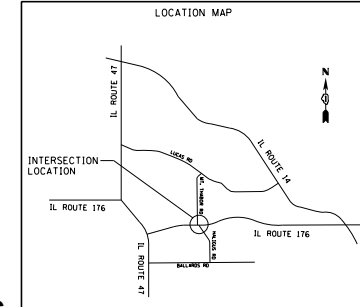
Tractor Width	: 8.00	Lock to Lock Time	: 6.0
Trailer Width	: 8.50	Steering Angle	: 17.7
Tractor Track	: 8.00	Articulating Angle	: 70.0
Trailer Track	: 8.50		



**PRELIMINARY
SUBJECT TO CHANGE**



IL ROUTE 176, MT. THABOR AND HALIGUS ROAD
RIGHT TURN AUTOTURN MOVEMENTS
DESIGN VEHICLE: WB-50



PREPARED BY: 118 SOUTH CLINTON STREET
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F: 312.648.0204

PROJ. MGR. RON PROJ. ENG. JSH

INTERSECTION DESIGN STUDY

FAP ROUTE 335 IL ROUTE 176
ROUTE WITH MT. THABOR/HALIGUS ROAD

SEC. NO. _____

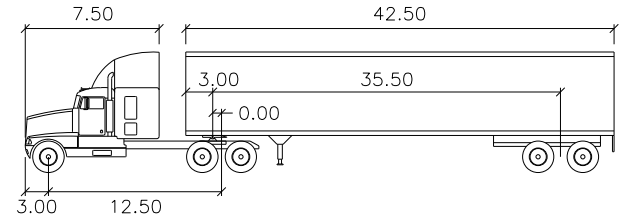
SCALE 1"=20' COUNTY McHENRY

SJN : _____ PROJ. NO. P-91-577-11

I.D.S. SHEET 9 OF 11

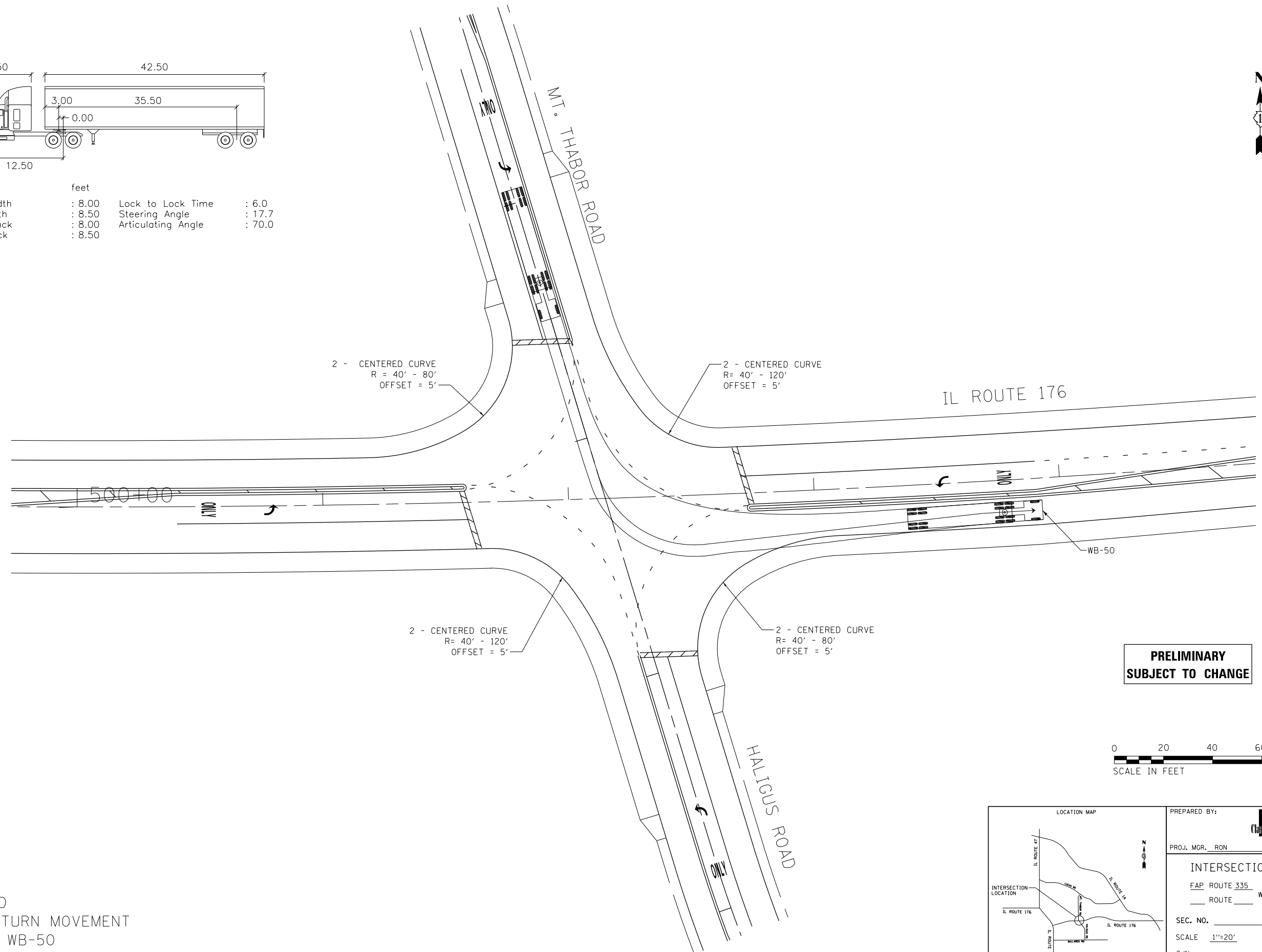
Exhibit E-6

PLOT DATE = 7/24/2015
FILE NAME = 0113204.dwg
PLOT SCALE = 40.0000 / 1" = 20'
USER NAME = User:VPakrosnis

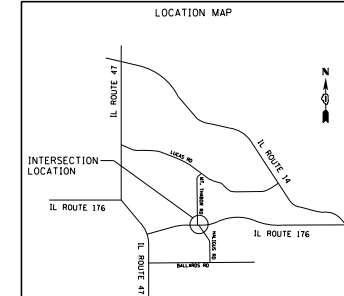


WB-50 feet

Tractor Width	: 8.00	Lock to Lock Time	: 6.0
Trailer Width	: 8.50	Steering Angle	: 17.7
Tractor Track	: 8.00	Articulating Angle	: 70.0
Trailer Track	: 8.50		



**PRELIMINARY
SUBJECT TO CHANGE**



PREPARED BY: 118 SOUTH CLINTON STREET
SUITE 700
CHICAGO, ILLINOIS 60661
T: 312.648.9900
F: 312.648.0204

PROJ. MGR. RON PROJ. ENG. JSH

INTERSECTION DESIGN STUDY

FAP ROUTE 335 IL ROUTE 176
ROUTE WITH MT. THABOR/HALIGUS ROAD

SEC. NO. _____

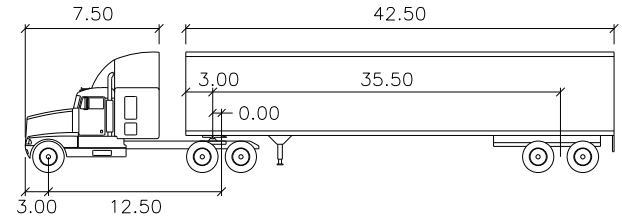
SCALE 1"=20' COUNTY McHENRY

SJN : _____ PROJ. NO. P-91-577-11

MT. THABOR ROAD
LEFT TURN AUTOTURN MOVEMENT
DESIGN VEHICLE: WB-50

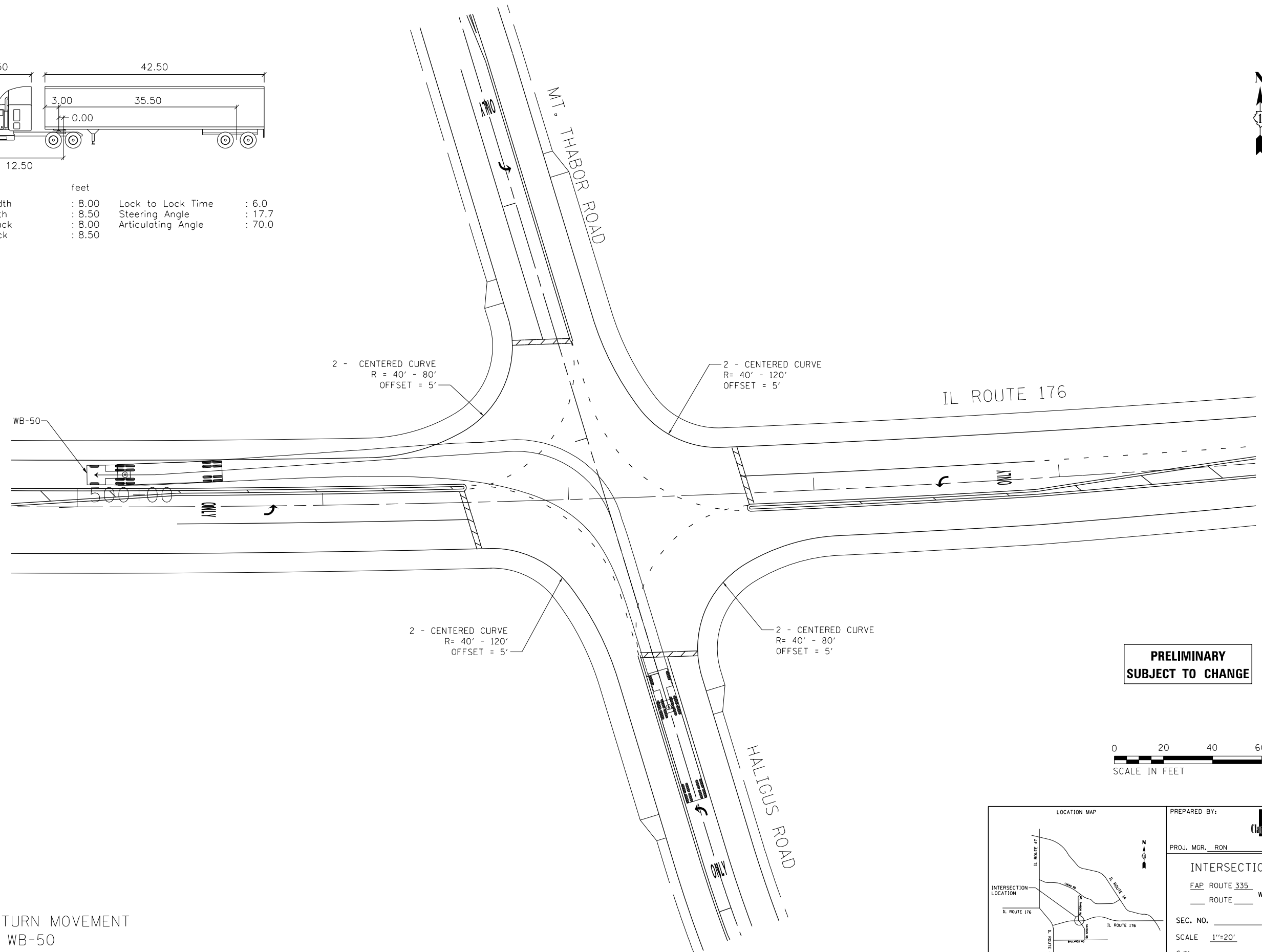
Exhibit E-6

PLOT DATE = 7/24/2015
FILE NAME = 0113204.dwg
PLOT SCALE = 40.0000 / 1" =
USER NAME = User:VPakrasnis

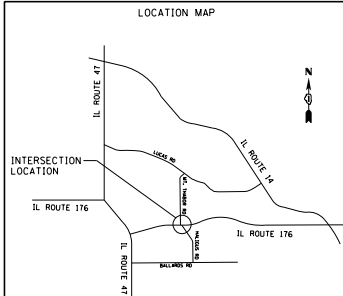


WB-50 feet

Tractor Width	: 8.00	Lock to Lock Time	: 6.0
Trailer Width	: 8.50	Steering Angle	: 17.7
Tractor Track	: 8.00	Articulating Angle	: 70.0
Trailer Track	: 8.50		



**PRELIMINARY
SUBJECT TO CHANGE**



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SUITE 700
CHICAGO, ILLINOIS 60661
T: 312.648.9900
F: 312.648.0204

PROJ. MGR. RON PROJ. ENG. JSH

INTERSECTION DESIGN STUDY

FAP ROUTE 335 IL ROUTE 176
____ ROUTE ____ WITH MT. THABOR/HALIGUS ROAD

SEC. NO. _____

SCALE 1"=20' COUNTY McHENRY

SJN : _____ PROJ. NO. P-91-577-11

I.D.S. SHEET 11 OF 11

HALIGUS ROAD
LEFT TURN AUTOTURN MOVEMENT
DESIGN VEHICLE: WB-50

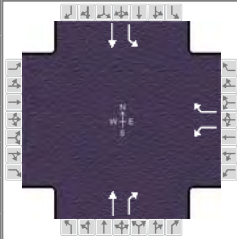
Exhibit E-6

PLOT DATE = 7/24/2015
FILE NAME = 0113204.dwg
PLOT SCALE = 40.0000 / 1" = 20'
USER NAME = User:VPakrosnis

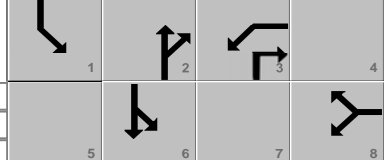


Appendix D – HCS 2010 Reports – Existing Traffic/Conditions

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information		
Agency	TranSystems			Duration, h	0.25	
Analyst	M. McDonald	Analysis Date	Feb 3, 2016	Area Type	Other	
Jurisdiction	Crystal Lake	Time Period	AM	PHF	0.95	
Urban Street	IL Rte 47	Analysis Year	2013	Analysis Period	1 > 7:00	
Intersection	IL Rte 47 and IL Rte 176	File Name	Exist IL 47 AM.xus			
Project Description	Existing AM					

Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h				95		235		530	150	340	575	

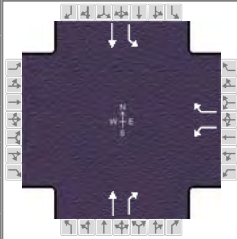
Signal Information													
Cycle, s	100.0	Reference Phase	2										
Offset, s	0	Reference Point	End	Green	14.5	49.0	21.0	0.0	0.0	0.0			
Uncoordinated	No	Simult. Gap E/W	On	Yellow	3.5	4.0	4.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	2.0	2.0	0.0	0.0	0.0			

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		2	1	6
Case Number				9.0		7.3	1.0	4.0
Phase Duration, s				27.0		55.0	18.0	73.0
Change Period, (Y+R _c), s				6.0		6.0	3.5	6.0
Max Allow Headway (MAH), s				8.1		0.0	7.9	0.0
Queue Clearance Time (g _s), s				17.4			11.4	
Green Extension Time (g _e), s				3.6		0.0	3.1	0.0
Phase Call Probability				1.00			1.00	
Max Out Probability				0.34			0.59	

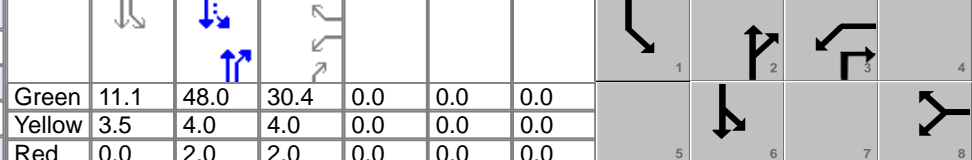
Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3		18		2	12	1		6
Adjusted Flow Rate (v), veh/h				100		247		558	158	358		605
Adjusted Saturation Flow Rate (s), veh/h/ln				1707		1519		1835	1477	1675		1852
Queue Service Time (g _s), s				4.9		15.4		22.3	3.6	9.4		16.0
Cycle Queue Clearance Time (g _c), s				4.9		15.4		22.3	3.6	9.4		16.0
Green Ratio (g/C)				0.21		0.21		0.49	0.70	0.66		0.67
Capacity (c), veh/h				358		318		900	1034	529		1241
Volume-to-Capacity Ratio (X)				0.279		0.777		0.620	0.153	0.676		0.488
Available Capacity (c _a), veh/h				546		486		900	1034	664		1241
Back of Queue (Q), veh/ln (95 th percentile)				3.8		11.1		13.8	1.5	6.3		8.8
Queue Storage Ratio (RQ) (95 th percentile)				0.21		0.60		0.00	0.18	0.65		0.00
Uniform Delay (d ₁), s/veh				33.2		37.3		18.7	5.0	12.9		8.1
Incremental Delay (d ₂), s/veh				1.9		16.9		3.2	0.3	6.8		1.4
Initial Queue Delay (d ₃), s/veh				0.0		0.0		0.0	0.0	0.0		0.0
Control Delay (d), s/veh				35.1		54.2		21.9	5.3	19.7		9.4
Level of Service (LOS)				D		D		C	A	B		A
Approach Delay, s/veh / LOS	0.0			48.7		D	18.2		B	13.2		B
Intersection Delay, s/veh / LOS				21.1				C				

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.3	B	0.7	A
Bicycle LOS Score / LOS				F	1.7	A	2.1	B

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information		
Agency	TranSystems			Duration, h	0.25	
Analyst	M. McDonald	Analysis Date	Feb 3, 2016	Area Type	Other	
Jurisdiction	Crystal Lake	Time Period	PM	PHF	0.95	
Urban Street	IL Rte 47	Analysis Year	2013	Analysis Period	1 > 7:00	
Intersection	IL Rte 47 and IL Rte 176	File Name	Exist IL 47 PM.xus			
Project Description	Existing PM					

Demand Information	EB			WB			NB			SB			
	L	T	R	L	T	R	L	T	R	L	T	R	
Approach Movement													
Demand (v), veh/h				160		390			710	135	285	640	

Signal Information														
Cycle, s	105.0	Reference Phase	2	Green	11.1	48.0	30.4	0.0	0.0	0.0				
Offset, s	0	Reference Point	End	Yellow	3.5	4.0	4.0	0.0	0.0	0.0				
Uncoordinated	No	Simult. Gap E/W	On	Red	0.0	2.0	2.0	0.0	0.0	0.0				
Force Mode	Fixed	Simult. Gap N/S	On											

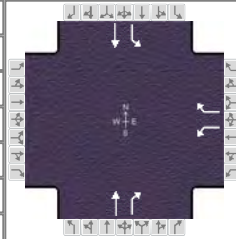
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		2	1	6
Case Number				9.0		7.3	1.0	4.0
Phase Duration, s				36.4		54.0	14.6	68.6
Change Period, (Y+R _c), s				6.0		6.0	3.5	6.0
Max Allow Headway (MAH), s				8.1		0.0	7.9	0.0
Queue Clearance Time (g _s), s				29.6			12.9	
Green Extension Time (g _e), s				0.8		0.0	0.0	0.0
Phase Call Probability				1.00			1.00	
Max Out Probability				1.00			1.00	

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3		18	2	12		1	6	
Adjusted Flow Rate (v), veh/h				168		411	747	142		300	674	
Adjusted Saturation Flow Rate (s), veh/h/ln				1707		1519	1835	1477		1675	1852	
Queue Service Time (g _s), s				8.2		27.6	39.2	2.8		10.9	24.3	
Cycle Queue Clearance Time (g _c), s				8.2		27.6	39.2	2.8		10.9	24.3	
Green Ratio (g/C)				0.29		0.29	0.46	0.75		0.58	0.60	
Capacity (c), veh/h				495		440	839	1103		302	1104	
Volume-to-Capacity Ratio (X)				0.340		0.933	0.891	0.129		0.994	0.610	
Available Capacity (c _a), veh/h				504		448	839	1103		302	1104	
Back of Queue (Q), veh/ln (95 th percentile)				6.1		18.8	25.1	1.1		12.4	14.0	
Queue Storage Ratio (RQ) (95 th percentile)				0.33		1.03	0.00	0.13		1.27	0.00	
Uniform Delay (d ₁), s/veh				29.4		36.3	26.1	3.7		25.5	13.5	
Incremental Delay (d ₂), s/veh				1.9		28.9	13.7	0.2		50.4	2.5	
Initial Queue Delay (d ₃), s/veh				0.0		0.0	0.0	0.0		0.0	0.0	
Control Delay (d), s/veh				31.2		65.2	39.8	4.0		75.9	16.0	
Level of Service (LOS)				C		E	D	A		E	B	
Approach Delay, s/veh / LOS	0.0			55.3		E	34.1	C		34.5	C	
Intersection Delay, s/veh / LOS				39.3						D		

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.3	B	0.7	A
Bicycle LOS Score / LOS				F	2.0	A	2.1	B

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	TranSystems			Duration, h	0.25		
Analyst	M. McDonald	Analysis Date	Feb 3, 2016	Area Type	Other		
Jurisdiction	Crystal Lake	Time Period	AM	PHF	0.95		
Urban Street	IL Rte 47	Analysis Year	2013	Analysis Period	1 > 7:00		
Intersection	IL Rte 47 and IL Rte 176	File Name	Exist IL 47 AM_WB RT Overlap.xus				
Project Description	Existing AM						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h				95		235		530	150	340	575	

Signal Information															
Cycle, s	100.0	Reference Phase	2												
Offset, s	0	Reference Point	End												
Uncoordinated	No	Simult. Gap E/W	On	Green	15.5	54.0	15.0	0.0	0.0	0.0					
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.5	4.0	4.0	0.0	0.0	0.0					
				Red	0.0	2.0	2.0	0.0	0.0	0.0					

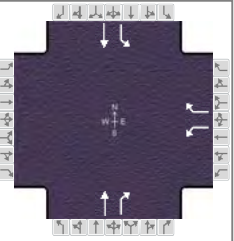
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		2	1	6
Case Number				9.0		7.3	1.0	4.0
Phase Duration, s				21.0		60.0	19.0	79.0
Change Period, (Y+R _c), s				6.0		6.0	3.5	6.0
Max Allow Headway (MAH), s				8.1		0.0	7.9	0.0
Queue Clearance Time (g _s), s				15.5			9.7	
Green Extension Time (g _e), s				0.0		0.0	5.8	0.0
Phase Call Probability				1.00			1.00	
Max Out Probability				1.00			0.01	

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3		18		2	12	1		6
Adjusted Flow Rate (v), veh/h				100		247		558	158	358		605
Adjusted Saturation Flow Rate (s), veh/h/ln				1707		1519		1835	1477	1675		1852
Queue Service Time (g _s), s				5.3		13.5		20.1	3.7	7.7		13.1
Cycle Queue Clearance Time (g _c), s				5.3		13.5		20.1	3.7	7.7		13.1
Green Ratio (g/C)				0.15		0.31		0.54	0.69	0.71		0.73
Capacity (c), veh/h				256		463		991	1019	603		1352
Volume-to-Capacity Ratio (X)				0.391		0.534		0.563	0.155	0.593		0.448
Available Capacity (c _a), veh/h				256		463		991	1019	1189		1352
Back of Queue (Q), veh/ln (95 th percentile)				4.3		8.8		12.2	1.6	4.5		6.4
Queue Storage Ratio (RQ) (95 th percentile)				0.24		0.48		0.00	0.19	0.46		0.00
Uniform Delay (d ₁), s/veh				38.4		28.8		15.2	5.4	9.6		5.4
Incremental Delay (d ₂), s/veh				4.4		4.4		2.3	0.3	4.3		1.1
Initial Queue Delay (d ₃), s/veh				0.0		0.0		0.0	0.0	0.0		0.0
Control Delay (d), s/veh				42.8		33.2		17.5	5.7	13.8		6.5
Level of Service (LOS)				D		C		B	A	B		A
Approach Delay, s/veh / LOS	0.0			36.0		D	14.9		B	9.2		A
Intersection Delay, s/veh / LOS				15.8						B		

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.3	B	0.7	A
Bicycle LOS Score / LOS				F	1.7	A	2.1	B

HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	TranSystems			Duration, h	0.25		
Analyst	M. McDonald	Analysis Date	Feb 3, 2016	Area Type	Other		
Jurisdiction	Crystal Lake	Time Period	PM	PHF	0.95		
Urban Street	IL Rte 47	Analysis Year	2013	Analysis Period	1 > 7:00		
Intersection	IL Rte 47 and IL Rte 176	File Name	Exist IL 47 PM_WB RT Overlap.xus				
Project Description	Existing PM						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h				160		390		710	135	285	640	

Signal Information															
Cycle, s	90.0	Reference Phase	2												
Offset, s	0	Reference Point	End												
Uncoordinated	No	Simult. Gap E/W	On	Green	12.2	46.3	16.0	0.0	0.0	0.0					
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.5	4.0	4.0	0.0	0.0	0.0					
				Red	0.0	2.0	2.0	0.0	0.0	0.0					

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase				8		2	1	6
Case Number				9.0		7.3	1.0	4.0
Phase Duration, s				22.0		52.3	15.7	68.0
Change Period, (Y+R _c), s				6.0		6.0	3.5	6.0
Max Allow Headway (MAH), s				8.1		0.0	7.9	0.0
Queue Clearance Time (g _s), s				18.0			8.4	
Green Extension Time (g _e), s				0.0		0.0	3.8	0.0
Phase Call Probability				1.00			1.00	
Max Out Probability				1.00			0.07	

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement				3		18		2	12	1		6
Adjusted Flow Rate (v), veh/h				168		411		747	142	300		674
Adjusted Saturation Flow Rate (s), veh/h/ln				1707		1519		1835	1477	1675		1852
Queue Service Time (g _s), s				8.1		16.0		30.0	3.0	6.4		16.0
Cycle Queue Clearance Time (g _c), s				8.1		16.0		30.0	3.0	6.4		16.0
Green Ratio (g/C)				0.18		0.31		0.51	0.69	0.67		0.69
Capacity (c), veh/h				303		476		943	1022	428		1276
Volume-to-Capacity Ratio (X)				0.555		0.862		0.792	0.139	0.700		0.528
Available Capacity (c _a), veh/h				303		476		943	1022	769		1276
Back of Queue (Q), veh/ln (95 th percentile)				6.6		14.9		17.7	1.2	6.8		8.0
Queue Storage Ratio (RQ) (95 th percentile)				0.36		0.82		0.00	0.14	0.69		0.00
Uniform Delay (d ₁), s/veh				33.8		29.1		17.9	4.7	15.6		6.8
Incremental Delay (d ₂), s/veh				7.1		18.2		6.8	0.3	9.2		1.6
Initial Queue Delay (d ₃), s/veh				0.0		0.0		0.0	0.0	0.0		0.0
Control Delay (d), s/veh				40.9		47.3		24.7	5.0	24.8		8.4
Level of Service (LOS)				D		D		C	A	C		A
Approach Delay, s/veh / LOS	0.0			45.4		D	21.6	C		13.4		B
Intersection Delay, s/veh / LOS				24.0				C				

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.3	B	2.3	B	0.7	A
Bicycle LOS Score / LOS				F	2.0	A	2.1	B

HCS+: Unsignalized Intersections Release 5.6

Phone:
E-Mail:

Fax:

-----TWO-WAY STOP CONTROL(TWSC) ANALYSIS-----

Analyst: M. McDonald
 Agency/Co.: TranSystems
 Date Performed: 2/3/2016
 Analysis Time Period: Existing AM
 Intersection: IL Rte 176 and Bryn Mawr Ln
 Jurisdiction: IDOT/Crystal Lake
 Units: U. S. Customary
 Analysis Year: 2016
 Project ID: Bryn Mawr Phase II Subdivision
 East/West Street: IL Rte 176
 North/South Street: Bryn Mawr Lane
 Intersection Orientation: EW Study period (hrs): 0.25

-----Vehicle Volumes and Adjustments-----

Major Street Movements	1 L	2 T	3 R	4 L	5 T	6 R
Volume	5	443			293	10
Peak-Hour Factor, PHF	0.95	0.95			0.95	0.95
Peak-15 Minute Volume	1	117			77	3
Hourly Flow Rate, HFR	5	466			308	10
Percent Heavy Vehicles	40	--	--		--	--
Median Type/Storage	Undivided			/		
RT Channelized?						Yes
Lanes	1	1			1	1
Configuration	L	T			T	R
Upstream Signal?		Yes			Yes	

Minor Street Movements	7 L	8 T	9 R	10 L	11 T	12 R
Volume				25		6
Peak Hour Factor, PHF				0.95		0.95
Peak-15 Minute Volume				7		2
Hourly Flow Rate, HFR				26		6
Percent Heavy Vehicles				0		0
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage				/		/
RT Channelized?						No
Lanes				1		1
Configuration				L		R

-----Pedestrian Volumes and Adjustments-----

Movements	13	14	15	16
Flow (ped/hr)	0	0	0	0

Lane Width (ft)	12.0	12.0	12.0	12.0
Walking Speed (ft/sec)	4.0	4.0	4.0	4.0
Percent Blockage	0	0	0	0

Upstream Signal Data

	Prog. Flow vph	Sat Flow vph	Arrival Type	Green Time sec	Cycle Length sec	Prog. Speed mph	Distance to Signal feet
S2 Left-Turn	0	1700	3	0	120	55	4000
Through	0	1700	3	0	120	55	4000
S5 Left-Turn	0	1700	3	0	90	55	1415
Through	0	1700	3	0	90	55	1415

Worksheet 3-Data for Computing Effect of Delay to Major Street Vehicles

Movement 2 Movement 5

Shared ln volume, major th vehicles:
 Shared ln volume, major rt vehicles:
 Sat flow rate, major th vehicles:
 Sat flow rate, major rt vehicles:
 Number of major street through lanes:

Worksheet 4-Critical Gap and Follow-up Time Calculation

Critical Gap Calculation

Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(c,base)	4.1					7.1		6.2
t(c,hv)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
P(hv)	40					0		0
t(c,g)			0.20	0.20	0.10	0.20	0.20	0.10
Percent Grade			0.00	0.00	0.00	0.00	0.00	0.00
t(3,lt)	0.00					0.70		0.00
t(c,T): 1-stage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2-stage	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
t(c) 1-stage	4.5					6.4		6.2
2-stage								

Follow-Up Time Calculations

Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(f,base)	2.20					3.50		3.30
t(f,HV)	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
P(HV)	40					0		0
t(f)	2.6					3.5		3.3

Worksheet 5-Effect of Upstream Signals

Computation 1-Queue Clearance Time at Upstream Signal

	Movement 2		Movement 5	
V prog	V(t)	V(l,prot)	V(t)	V(l,prot)
	0	0	0	0

Total Saturation Flow Rate, s (vph)	1700	1700	1700	1700
Arrival Type	3	3	3	3
Effective Green, g (sec)	0	0	0	0
Cycle Length, C (sec)	120	120	90	90
Rp (from Exhibit 16-11)	1.000	1.000	1.000	1.000
Proportion vehicles arriving on green P	0.000	0.000	0.000	0.000
g(q1)	0.0	0.0	0.0	0.0
g(q2)	0.0	0.0	0.0	0.0
g(q)	0.0	0.0	0.0	0.0

Computation 2-Proportion of TWSC Intersection Time blocked

	Movement 2		Movement 5	
	V(t)	V(l,prot)	V(t)	V(l,prot)
alpha		0.550		0.550
beta		0.645		0.645
Travel time, t(a) (sec)		49.474		17.502
Smoothing Factor, F		0.054		0.139
Proportion of conflicting flow, f	1.000	1.000	1.000	1.000
Max platooned flow, V(c,max)	0	0	0	0
Min platooned flow, V(c,min)	1000	1000	1000	1000
Duration of blocked period, t(p)	0.0	0.0	0.0	0.0
Proportion time blocked, p		0.000		0.000

Computation 3-Platoon Event Periods

	Result
p(2)	0.000
p(5)	0.000
p(dom)	0.000
p(subo)	0.000
Constrained or unconstrained?	U

Proportion

unblocked for minor movements, p(x)	(1)	(2)	(3)
	Single-stage Process	Two-Stage Stage I	Process Stage II
p(1)	1.000		
p(4)			
p(7)			
p(8)			
p(9)			
p(10)	1.000		
p(11)			
p(12)	1.000		

Computation 4 and 5

Single-Stage Process

Movement	1	4	7	8	9	10	11	12
	L	L	L	T	R	L	T	R
V c,x	308					784		308
s	1500					1500		1500
Px	1.000					1.000		1.000
V c,u,x	308					784		308
C r,x	1065					365		737
C plat,x	1065					365		737

Two-Stage Process

7 8 10 11

V(c,x)							
s				1500		1500	
P(x)							
V(c,u,x)							

C(r,x)							
C(plat,x)							

Worksheet 6-Impedance and Capacity Equations

Step 1: RT from Minor St.				9			12
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Conflicting Flows							308
Potential Capacity							737
Pedestrian Impedance Factor				1.00			1.00
Movement Capacity							737
Probability of Queue free St.				1.00			0.99

Step 2: LT from Major St.				4			1
---------------------------	--	--	--	---	--	--	---

Conflicting Flows							308
Potential Capacity							1065
Pedestrian Impedance Factor				1.00			1.00
Movement Capacity							1065
Probability of Queue free St.				1.00			1.00
Maj L-Shared Prob Q free St.							

Step 3: TH from Minor St.				8			11
---------------------------	--	--	--	---	--	--	----

Conflicting Flows							
Potential Capacity							
Pedestrian Impedance Factor				1.00			1.00
Cap. Adj. factor due to Impeding mvmnt				1.00			1.00
Movement Capacity							
Probability of Queue free St.				1.00			1.00

Step 4: LT from Minor St.				7			10
---------------------------	--	--	--	---	--	--	----

Conflicting Flows							784
Potential Capacity							365
Pedestrian Impedance Factor				1.00			1.00
Maj. L, Min T Impedance factor				1.00			
Maj. L, Min T Adj. Imp Factor.				1.00			
Cap. Adj. factor due to Impeding mvmnt				0.99			1.00
Movement Capacity							363

Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance

Step 3: TH from Minor St.				8			11
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Part 1 - First Stage							
Conflicting Flows							
Potential Capacity							
Pedestrian Impedance Factor							
Cap. Adj. factor due to Impeding mvmnt							
Movement Capacity							
Probability of Queue free St.							

Part 2 - Second Stage
 Conflicting Flows
 Potential Capacity
 Pedestrian Impedance Factor
 Cap. Adj. factor due to Impeding mvmnt
 Movement Capacity

Part 3 - Single Stage
 Conflicting Flows
 Potential Capacity
 Pedestrian Impedance Factor 1.00 1.00
 Cap. Adj. factor due to Impeding mvmnt 1.00 1.00
 Movement Capacity

Result for 2 stage process:
 a
 y
 C t
 Probability of Queue free St. 1.00 1.00

Step 4: LT from Minor St. 7 10

Part 1 - First Stage
 Conflicting Flows
 Potential Capacity
 Pedestrian Impedance Factor
 Cap. Adj. factor due to Impeding mvmnt
 Movement Capacity

Part 2 - Second Stage
 Conflicting Flows
 Potential Capacity
 Pedestrian Impedance Factor
 Cap. Adj. factor due to Impeding mvmnt
 Movement Capacity

Part 3 - Single Stage
 Conflicting Flows 784
 Potential Capacity 365
 Pedestrian Impedance Factor 1.00 1.00
 Maj. L, Min T Impedance factor 1.00
 Maj. L, Min T Adj. Imp Factor. 1.00
 Cap. Adj. factor due to Impeding mvmnt 0.99 1.00
 Movement Capacity 363

Results for Two-stage process:
 a
 y
 C t 363

Worksheet 8-Shared Lane Calculations

Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (vph)				26		6
Movement Capacity (vph)				363		737
Shared Lane Capacity (vph)						

Worksheet 9-Computation of Effect of Flared Minor Street Approaches

Movement	7 L	8 T	9 R	10 L	11 T	12 R
C sep				363		737
Volume				26		6
Delay						
Q sep						
Q sep +1 round (Qsep +1)						
n max						
C sh						
SUM C sep						
n						
C act						

Worksheet 10-Delay, Queue Length, and Level of Service

Movement	1 L	4	7	8	9	10 L	11	12 R
v (vph)	5					26		6
C(m) (vph)	1065					363		737
v/c	0.00					0.07		0.01
95% queue length	0.01					0.23		0.02
Control Delay	8.4					15.7		9.9
LOS	A					C		A
Approach Delay							14.6	
Approach LOS							B	

Worksheet 11-Shared Major LT Impedance and Delay

	Movement 2	Movement 5
p(oj)	1.00	1.00
v(i1), Volume for stream 2 or 5		
v(i2), Volume for stream 3 or 6		
s(i1), Saturation flow rate for stream 2 or 5		
s(i2), Saturation flow rate for stream 3 or 6		
P*(oj)		
d(M,LT), Delay for stream 1 or 4	8.4	
N, Number of major street through lanes		
d(rank,1) Delay for stream 2 or 5		

HCS+: Unsignalized Intersections Release 5.6

Phone:
E-Mail:

Fax:

-----TWO-WAY STOP CONTROL(TWSC) ANALYSIS-----

Analyst: M. McDonald
 Agency/Co.: TranSystems
 Date Performed: 2/3/2016
 Analysis Time Period: Existing PM
 Intersection: IL Rte 176 and Bryn Mawr Ln
 Jurisdiction:
 Units: U. S. Customary
 Analysis Year: 2016
 Project ID: Bryn Mawr Phase II Subdivision
 East/West Street: IL Rte 176
 North/South Street: Bryn Mawr Lane
 Intersection Orientation: EW Study period (hrs): 0.25

-----Vehicle Volumes and Adjustments-----

Major Street Movements	1 L	2 T	3 R	4 L	5 T	6 R
Volume	13	387			405	28
Peak-Hour Factor, PHF	0.95	0.95			0.95	0.95
Peak-15 Minute Volume	3	102			107	7
Hourly Flow Rate, HFR	13	407			426	29
Percent Heavy Vehicles	0	--	--		--	--
Median Type/Storage	Undivided			/		
RT Channelized?						Yes
Lanes	1	1			1	1
Configuration	L	T			T	R
Upstream Signal?		Yes			Yes	

Minor Street Movements	7 L	8 T	9 R	10 L	11 T	12 R
Volume				11		5
Peak Hour Factor, PHF				0.95		0.95
Peak-15 Minute Volume				3		1
Hourly Flow Rate, HFR				11		5
Percent Heavy Vehicles				0		0
Percent Grade (%)		0			0	
Flared Approach: Exists?/Storage				/		/
RT Channelized?						No
Lanes				1		1
Configuration				L		R

-----Pedestrian Volumes and Adjustments-----

Movements	13	14	15	16
Flow (ped/hr)	0	0	0	0

Lane Width (ft)	12.0	12.0	12.0	12.0
Walking Speed (ft/sec)	4.0	4.0	4.0	4.0
Percent Blockage	0	0	0	0

Upstream Signal Data

	Prog. Flow vph	Sat Flow vph	Arrival Type	Green Time sec	Cycle Length sec	Prog. Speed mph	Distance to Signal feet
S2 Left-Turn	0	1700	3	0	120	55	4000
Through	0	1700	3	0	120	55	4000
S5 Left-Turn	0	1700	3	0	90	55	1415
Through	0	1700	3	0	90	55	1415

Worksheet 3-Data for Computing Effect of Delay to Major Street Vehicles

Movement 2 Movement 5

Shared ln volume, major th vehicles:
 Shared ln volume, major rt vehicles:
 Sat flow rate, major th vehicles:
 Sat flow rate, major rt vehicles:
 Number of major street through lanes:

Worksheet 4-Critical Gap and Follow-up Time Calculation

Critical Gap Calculation

Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(c,base)	4.1					7.1		6.2
t(c,hv)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
P(hv)	0					0		0
t(c,g)			0.20	0.20	0.10	0.20	0.20	0.10
Percent Grade			0.00	0.00	0.00	0.00	0.00	0.00
t(3,lt)	0.00					0.70		0.00
t(c,T): 1-stage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2-stage	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
t(c) 1-stage	4.1					6.4		6.2
2-stage								

Follow-Up Time Calculations

Movement	1 L	4 L	7 L	8 T	9 R	10 L	11 T	12 R
t(f,base)	2.20					3.50		3.30
t(f,HV)	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
P(HV)	0					0		0
t(f)	2.2					3.5		3.3

Worksheet 5-Effect of Upstream Signals

Computation 1-Queue Clearance Time at Upstream Signal

	Movement 2		Movement 5	
V prog	V(t)	V(l,prot)	V(t)	V(l,prot)
	0	0	0	0

Total Saturation Flow Rate, s (vph)	1700	1700	1700	1700
Arrival Type	3	3	3	3
Effective Green, g (sec)	0	0	0	0
Cycle Length, C (sec)	120	120	90	90
Rp (from Exhibit 16-11)	1.000	1.000	1.000	1.000
Proportion vehicles arriving on green P	0.000	0.000	0.000	0.000
g(q1)	0.0	0.0	0.0	0.0
g(q2)	0.0	0.0	0.0	0.0
g(q)	0.0	0.0	0.0	0.0

Computation 2-Proportion of TWSC Intersection Time blocked

	Movement 2		Movement 5	
	V(t)	V(l,prot)	V(t)	V(l,prot)
alpha		0.550		0.550
beta		0.645		0.645
Travel time, t(a) (sec)		49.474		17.502
Smoothing Factor, F		0.054		0.139
Proportion of conflicting flow, f	1.000	1.000	1.000	1.000
Max platooned flow, V(c,max)	0	0	0	0
Min platooned flow, V(c,min)	1000	1000	1000	1000
Duration of blocked period, t(p)	0.0	0.0	0.0	0.0
Proportion time blocked, p		0.000		0.000

Computation 3-Platoon Event Periods

	Result
p(2)	0.000
p(5)	0.000
p(dom)	0.000
p(subo)	0.000
Constrained or unconstrained?	U

Proportion

unblocked for minor movements, p(x)	(1)	(2)	(3)
	Single-stage Process	Two-Stage Stage I	Process Stage II
p(1)	1.000		
p(4)			
p(7)			
p(8)			
p(9)			
p(10)	1.000		
p(11)			
p(12)	1.000		

Computation 4 and 5

Single-Stage Process

Movement	1	4	7	8	9	10	11	12
	L	L	L	T	R	L	T	R
V c,x		426				859		426
s		1500				1500		1500
Px		1.000				1.000		1.000
V c,u,x		426				859		426
C r,x		1144				329		633
C plat,x		1144				329		633

Two-Stage Process

7	8	10	11
---	---	----	----

V(c,x)
 s 1500 1500
 P(x)
 V(c,u,x)

C(r,x)
 C(plat,x)

Worksheet 6-Impedance and Capacity Equations

Step 1: RT from Minor St. 9 12

Conflicting Flows 426
 Potential Capacity 633
 Pedestrian Impedance Factor 1.00 1.00
 Movement Capacity 633
 Probability of Queue free St. 1.00 0.99

Step 2: LT from Major St. 4 1

Conflicting Flows 426
 Potential Capacity 1144
 Pedestrian Impedance Factor 1.00 1.00
 Movement Capacity 1144
 Probability of Queue free St. 1.00 0.99
 Maj L-Shared Prob Q free St.

Step 3: TH from Minor St. 8 11

Conflicting Flows
 Potential Capacity
 Pedestrian Impedance Factor 1.00 1.00
 Cap. Adj. factor due to Impeding mvmnt 0.99 0.99
 Movement Capacity
 Probability of Queue free St. 1.00 1.00

Step 4: LT from Minor St. 7 10

Conflicting Flows 859
 Potential Capacity 329
 Pedestrian Impedance Factor 1.00 1.00
 Maj. L, Min T Impedance factor 0.99
 Maj. L, Min T Adj. Imp Factor. 0.99
 Cap. Adj. factor due to Impeding mvmnt 0.98 0.99
 Movement Capacity 325

Worksheet 7-Computation of the Effect of Two-stage Gap Acceptance

Step 3: TH from Minor St. 8 11

Part 1 - First Stage
 Conflicting Flows
 Potential Capacity
 Pedestrian Impedance Factor
 Cap. Adj. factor due to Impeding mvmnt
 Movement Capacity
 Probability of Queue free St.

Part 2 - Second Stage
 Conflicting Flows
 Potential Capacity
 Pedestrian Impedance Factor
 Cap. Adj. factor due to Impeding mvmnt
 Movement Capacity

Part 3 - Single Stage
 Conflicting Flows
 Potential Capacity
 Pedestrian Impedance Factor 1.00 1.00
 Cap. Adj. factor due to Impeding mvmnt 0.99 0.99
 Movement Capacity

Result for 2 stage process:

a
 Y
 C t
 Probability of Queue free St. 1.00 1.00

Step 4: LT from Minor St. 7 10

Part 1 - First Stage
 Conflicting Flows
 Potential Capacity
 Pedestrian Impedance Factor
 Cap. Adj. factor due to Impeding mvmnt
 Movement Capacity

Part 2 - Second Stage
 Conflicting Flows
 Potential Capacity
 Pedestrian Impedance Factor
 Cap. Adj. factor due to Impeding mvmnt
 Movement Capacity

Part 3 - Single Stage
 Conflicting Flows 859
 Potential Capacity 329
 Pedestrian Impedance Factor 1.00 1.00
 Maj. L, Min T Impedance factor 0.99
 Maj. L, Min T Adj. Imp Factor. 0.99
 Cap. Adj. factor due to Impeding mvmnt 0.98 0.99
 Movement Capacity 325

Results for Two-stage process:

a
 Y
 C t 325

Worksheet 8-Shared Lane Calculations

Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (vph)				11		5
Movement Capacity (vph)				325		633
Shared Lane Capacity (vph)						
