

 Volume 2 – Appendix**KDC Parkside**
Dallas, Texas

February 17, 2020

Kimley-Horn and Associates, Inc.
Dallas, Texas

Project #068176077
Registered Firm F-928

Kimley»Horn

APPENDIX A

A. Roadway Characteristics

The following signalized intersections were evaluated as part of this study:

- McKinney Avenue at Harwood Street
- Cedar Springs Road at Harwood Street
- McKinney Avenue at Olive Street
- Cedar Springs Road at Akard St/St. Paul St
- St. Paul Street at McKinney Avenue
- Akard Street at McKinney Avenue
- Woodall Rogers Freeway (SB) at St. Paul Street
- Woodall Rogers Freeway (NB) at St. Paul St
- Woodall Rogers Freeway (SB) at Akard St
- Woodall Rogers Freeway (NB) at Akard Street
- Woodall Rogers Freeway (SB) at Field Street
- Woodall Rogers Freeway (NB) at Field Street
- Woodall Rogers Freeway (SB) at Harwood Street
- Woodall Rogers Freeway (NB) at Harwood St
- Woodall Rogers Freeway (SB) at Olive Street
- Woodall Rogers Freeway (NB) at Olive Street
- Woodall Rogers Freeway (SB) at Pearl Street
- Woodall Rogers Freeway (NB) at Pearl Street

The major study area roadways are described below.

Cedar Springs Road – is a six-lane divided road that runs north-south from the uptown area to the intersection at Bowen Street, where it turns to run northwest towards Love Field Airport. South of Olive Street, Cedar Springs Road serves as a northbound one-way 5-lane road. In the project vicinity, Cedar Springs Road intersects Akard Street, St. Paul Street, Ashland Street, and Harwood Street. On the City of Dallas, TX Thoroughfare Plan, Cedar Springs Road is classified as a minor arterial. The speed limit near the site is assumed to be 30 mph.

McKinney Avenue – is a four-lane undivided road that runs northeast-southwest from the uptown area to the Katy Trail. In the project vicinity, McKinney Avenue intersects St. Paul Street, Akard Street, Harwood Street, and Woodall Rodgers Freeway. The Dallas trolley car runs along McKinney Avenue from Blackburn Street to St. Paul Street. On the City of Dallas, TX Thoroughfare Plan, McKinney Avenue is designated as a minor arterial. The speed limit near the site is 30 mph.

Woodall Rodgers Freeway – is a six-lane divided road that runs northeast-southwest from North Central Expressway to Hunt Hill Bridge, where it terminates. In the project vicinity, the Woodall Rodgers Freeway frontage road has intersections with Akard Street

and St. Paul Street, both northbound and southbound. On the City of Dallas, TX Thoroughfare Plan, Woodall Rodgers Freeway is not classified. The speed limit near the site is 30 mph.

Akard Street – is a six-lane undivided road that runs northwest-southeast from Olive Street to Pacific Avenue where it transitions into Ervay Street. In the project vicinity Akard Street has intersections with Ashland Street, Cedar Springs Road/St. Paul Street, McKinney Avenue, and Woodall Rodgers Freeway. On the City of Dallas, TX Thoroughfare Plan, Akard Street is classified as a principal arterial. The speed limit near the site is assumed to be 30 mph.

Harwood Street – is a four-lane undivided road that runs east-west. Harwood Street has intersections with McKinney Avenue, Cedar Springs Road, and Woodall Rodgers Freeway, among other local streets. On the City of Dallas, TX Thoroughfare Plan, Harwood Street is classified as a principal arterial in the project vicinity. The speed limit near the site is assumed to be 30 mph.

St. Paul Street – is a three-lane one-way road that runs east/southeast. St. Paul Street has intersections with Cedar Springs Road, Akard Street, and Woodall Rodgers Freeway, among other local streets. The Dallas trolley car runs along St. Paul Street from McKinney Avenue to Federal Street. On the City of Dallas, TX Thoroughfare Plan, St. Paul is classified as a principal arterial in the project vicinity. The speed limit near the site is assumed to be 30 mph.

Exhibit 3 illustrates the existing intersection geometry used for the traffic analysis.

APPENDIX B

A. Analysis Methodology

Capacity analysis results are listed in terms of Level of Service (LOS). LOS is a qualitative term describing operating conditions a driver will experience while traveling on a particular street or highway during a specific time interval. It ranges from A (very little delay) to F (long delays and congestion). **Table** shows the definition of level of service for signalized and unsignalized intersections.

Table 8 – Level of Service Definitions

Level of Service	Signalized Intersection Average Total Delay (sec/veh)	Unsignalized Intersection Average Total Delay (sec/veh)
A	≤10	≤10
B	>10 and ≤20	>10 and ≤15
C	>20 and ≤35	>15 and ≤25
D	>35 and ≤55	>25 and ≤35
E	>55 and ≤80	>35 and ≤50
F	>80	>50

Definitions provided from the Highway Capacity Manual, Special Report 209, Transportation Research Board, 2010.

Study area intersections were analyzed based on average total delay analysis for signalized and unsignalized intersections. For the unsignalized analysis, the level of service (LOS) for a two-way stop-controlled intersection is defined for each movement. Unlike signalized intersections which define LOS for each approach and for the intersection as a whole, LOS for two-way stop-controlled intersections is not defined as a whole.

Signal timings for the signalized intersections are based on Dallas, TX “As Fine-Tuned” Synchro files. Timing adjustments were made in the future scenarios to accommodate changes in traffic volumes due to background growth and site traffic, replicating how City staff will periodically review signal operations in the future.

Calculations for the level of service at the key intersections identified for study are provided in **Volume 2** of this report. The analyses assumed the lane geometry and intersection control shown in **Exhibit 3**.

The peak hour factors (PHF) for the existing traffic is known from the counts collected at the site or for the City’s signal timing efforts. PHF for the future traffic and the site-generated traffic is unknown, so where this occurred the PHF was assumed to be 0.92. The traffic does not grow the most in the peak 15-minute period but rather spreads out to fill the entire peak hour, so as traffic increases, the PHF approaches 1.

TRAFFIC COUNTS AND HISTORICAL DATA

St. Paul Street						
Record	Year	Link Start	Link End	Source	24-Hour Volume	Annual Growth Rate
1	2004	McKinney Avenue	Woodall Rogers Freeway	TxDOT	3,930	-
2	2014	McKinney Avenue	Woodall Rogers Freeway	TxDOT	5,559	3.5%
3	2019	Cedar Springs Road/Akard Street	McKinney Avenue	KHA	6,155	2.1%
Average Growth 2004 - 2014:						3.1%

Cedar Springs Road						
Record	Year	Link Start	Link End	Source	24-Hour Volume	Annual Growth Rate
1	2014	Ashland Street	Akard Street	TxDOT	8,288	-

Akard Street						
Record	Year	Link Start	Link End	Source	24-Hour Volume	Annual Growth Rate
1	2004	Cedar Springs Road	McKinney Avenue	TxDOT	9,980	-
2	2009	Cedar Springs Road	McKinney Avenue	TxDOT	10,280	0.6%
3	2014	Cedar Springs Road	McKinney Avenue	TxDOT	13,370	5.4%
Average Growth 2004 - 2014:						3.0%

Harwood Street						
Record	Year	Link Start	Link End	Source	24-Hour Volume	Annual Growth Rate
1	2004	McKinney Avenue	Woodall Rogers Freeway	TxDOT	5,350	-
2	2009	McKinney Avenue	Woodall Rogers Freeway	TxDOT	4,210	-4.7%
3	2014	McKinney Avenue	Woodall Rogers Freeway	TxDOT	1,768	-15.9%
4	2019	McKinney Avenue	Woodall Rogers Freeway	KHA	2,946	10.8%
Average Growth 2004 - 2014:						-5.2%

Woodall Rogers Freeway (Northbound)						
Record	Year	Link Start	Link End	Source	24-Hour Volume	Annual Growth Rate
1	2009	Field Street	Akard Street	TxDOT	5,370	-
2	2014	Field Street	Akard Street	TxDOT	5,691	1.2%
3	2015	Field Street	Akard Street	TxDOT	5,957	4.7%
4	2016	Field Street	Akard Street	TxDOT	6,521	9.5%
5	2017	Field Street	Akard Street	TxDOT	7,119	9.2%
Average Growth 2015 - 2017:						3.2%

Woodall Rogers Freeway (Southbound)						
Record	Year	Link Start	Link End	Source	24-Hour Volume	Annual Growth Rate
1	2013	Maple Routh Connection	Pearl Street	TxDOT	9,990	-
2	2014	Maple Routh Connection	Pearl Street	TxDOT	12,031	20.4%
3	2015	Maple Routh Connection	Pearl Street	TxDOT	12,385	2.9%
4	2017	Maple Routh Connection	Pearl Street	TxDOT	13,458	4.2%
5	2018	Maple Routh Connection	Pearl Street	TxDOT	12,611	-6.3%
6	2019	Field Street	Pearl Street	KHA	10,128	-19.7%
Average Growth 2015 - 2018:						0.8%

Moody Street						
Record	Year	Link Start	Link End	Source	24-Hour Volume	Annual Growth Rate
1	2011	Harry Hines Boulevard	McKinnon Street	TxDOT	6,052	-
2	2013	Harry Hines Boulevard	McKinnon Street	TxDOT	11,890	40.2%
3	2014	Harry Hines Boulevard	McKinnon Street	TxDOT	9,845	-17.2%
4	2015	Harry Hines Boulevard	McKinnon Street	TxDOT	7,284	-26.0%
5	2016	Harry Hines Boulevard	McKinnon Street	TxDOT	9,230	26.7%
6	2017	Harry Hines Boulevard	McKinnon Street	TxDOT	18,147	96.6%
7	2018	Harry Hines Boulevard	McKinnon Street	TxDOT	9,230	-49.1%
Average Growth 2013 - 2015:						7.5%

Average Annual Growth Rate 2.1%

1. McKinney Avenue at Olive Street - TMC

Tue Oct 8, 2019

Full Length (6:30 AM-8:30 AM, 4:30 PM-6:30 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703602, Location: 32.791592, -96.803304



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg	Olive Street		Olive Street					McKinney Avenue					McKinney Avenue					
Direction	Eastbound		Westbound					Northbound					Southbound					
Time	App	Ped*	L	T	R	App	Ped*	L	T	U	App	Ped*	T	R	U	App	Ped*	Int
2019-10-08 6:30AM	0	4	6	114	19	139	2	4	9	0	13	2	14	9	0	23	2	175
6:45AM	0	8	8	170	38	216	2	1	10	0	11	1	26	9	0	35	0	262
Hourly Total	0	12	14	284	57	355	4	5	19	0	24	3	40	18	0	58	2	437
7:00AM	0	7	4	134	31	169	9	2	15	0	17	10	29	15	0	44	5	230
7:15AM	0	11	5	214	43	262	6	1	31	0	32	7	25	10	0	35	3	329
7:30AM	0	18	16	156	52	224	11	4	28	0	32	15	53	19	0	72	7	328
7:45AM	0	21	17	158	69	244	15	8	47	0	55	19	60	11	0	71	8	370
Hourly Total	0	57	42	662	195	899	41	15	121	0	136	51	167	55	0	222	23	1257
8:00AM	0	23	25	147	59	231	15	5	47	0	52	18	71	30	0	101	4	384
8:15AM	0	38	24	140	52	216	22	7	52	0	59	29	82	21	0	103	11	378
Hourly Total	0	61	49	287	111	447	37	12	99	0	111	47	153	51	0	204	15	762
4:30PM	0	23	15	182	81	278	9	8	79	0	87	16	46	22	0	68	7	433
4:45PM	0	11	15	160	64	239	14	6	82	0	88	20	46	23	0	69	2	396
Hourly Total	0	34	30	342	145	517	23	14	161	0	175	36	92	45	0	137	9	829
5:00PM	0	30	17	180	93	290	21	5	94	0	99	22	56	18	0	74	7	463
5:15PM	0	23	21	171	66	258	20	8	79	1	88	18	69	23	0	92	8	438
5:30PM	0	18	13	154	71	238	19	12	92	0	104	24	56	23	0	79	4	421
5:45PM	0	15	17	140	80	237	9	9	84	0	93	24	63	28	0	91	3	421
Hourly Total	0	86	68	645	310	1023	69	34	349	1	384	88	244	92	0	336	22	1743
6:00PM	0	13	19	149	77	245	16	8	88	0	96	32	84	24	0	108	6	449
6:15PM	0	51	15	163	75	253	20	9	88	0	97	46	56	32	0	88	14	438
Hourly Total	0	64	34	312	152	498	36	17	176	0	193	78	140	56	0	196	20	887
Total	0	314	237	2532	970	3739	210	97	925	1	1023	303	836	317	0	1153	91	5915
% Approach	-	-	6.3%	67.7%	25.9%	-	-	9.5%	90.4%	0.1%	-	-	72.5%	27.5%	0%	-	-	-
% Total	0%	-	4.0%	42.8%	16.4%	63.2%	-	1.6%	15.6%	0%	17.3%	-	14.1%	5.4%	0%	19.5%	-	-
Lights	0	-	233	2521	948	3702	-	97	897	1	995	-	798	312	0	1110	-	5807
% Lights	-	-	98.3%	99.6%	97.7%	99.0%	-	100%	97.0%	100%	97.3%	-	95.5%	98.4%	0%	96.3%	-	98.2%
Articulated Trucks	0	-	0	0	2	2	-	0	1	0	1	-	1	1	0	2	-	5
% Articulated Trucks	-	-	0%	0%	0.2%	0.1%	-	0%	0.1%	0%	0.1%	-	0.1%	0.3%	0%	0.2%	-	0.1%
Buses and Single-Unit Trucks	0	-	4	11	20	35	-	0	27	0	27	-	37	4	0	41	-	103
% Buses and Single-Unit Trucks	-	-	1.7%	0.4%	2.1%	0.9%	-	0%	2.9%	0%	2.6%	-	4.4%	1.3%	0%	3.6%	-	1.7%
Pedestrians	-	302	-	-	-	-	206	-	-	-	-	289	-	-	-	-	89	
% Pedestrians	-	96.2%	-	-	-	-	98.1%	-	-	-	-	95.4%	-	-	-	-	97.8%	-
Bicycles on Crosswalk	-	12	-	-	-	-	4	-	-	-	-	14	-	-	-	-	2	
% Bicycles on Crosswalk	-	3.8%	-	-	-	-	1.9%	-	-	-	-	4.6%	-	-	-	-	2.2%	

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

1. McKinney Avenue at Olive Street - TMC

Tue Oct 8, 2019

Full Length (6:30 AM-8:30 AM, 4:30 PM-6:30 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

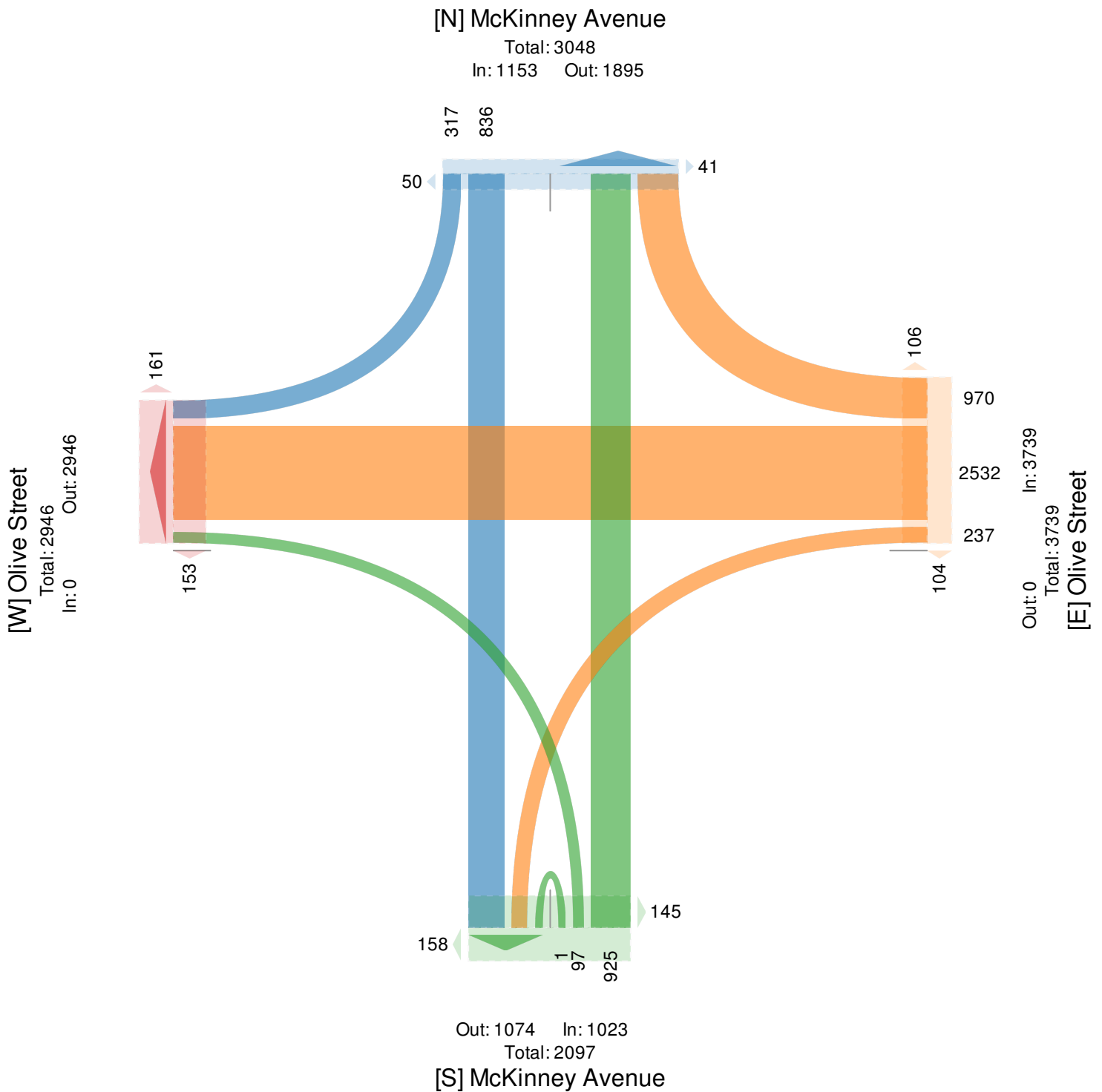
All Movements

ID: 703602, Location: 32.791592, -96.803304

CJ Hensch & Associates, Inc.

Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US



1. McKinney Avenue at Olive Street - TMC

Tue Oct 8, 2019

AM Peak (7:30 AM - 8:30 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703602, Location: 32.791592, -96.803304



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg	Olive Street		Olive Street					McKinney Avenue					McKinney Avenue					
Direction	Eastbound		Westbound					Northbound					Southbound					
Time	App	Ped*	L	T	R	App	Ped*	L	T	U	App	Ped*	T	R	U	App	Ped*	Int
2019-10-08 7:30AM	0	18	16	156	52	224	11	4	28	0	32	15	53	19	0	72	7	328
7:45AM	0	21	17	158	69	244	15	8	47	0	55	19	60	11	0	71	8	370
8:00AM	0	23	25	147	59	231	15	5	47	0	52	18	71	30	0	101	4	384
8:15AM	0	38	24	140	52	216	22	7	52	0	59	29	82	21	0	103	11	378
Total	0	100	82	601	232	915	63	24	174	0	198	81	266	81	0	347	30	1460
% Approach	-	-	9.0%	65.7%	25.4%	-	-	12.1%	87.9%	0%	-	-	76.7%	23.3%	0%	-	-	-
% Total	0%	-	5.6%	41.2%	15.9%	62.7%	-	1.6%	11.9%	0%	13.6%	-	18.2%	5.5%	0%	23.8%	-	-
PHF	-	-	0.820	0.951	0.841	0.938	-	0.750	0.837	-	0.839	-	0.811	0.675	-	0.842	-	0.951
Lights	0	-	81	598	225	904	-	24	164	0	188	-	251	77	0	328	-	1420
% Lights	-	-	98.8%	99.5%	97.0%	98.8%	-	100%	94.3%	0%	94.9%	-	94.4%	95.1%	0%	94.5%	-	97.3%
Articulated Trucks	0	-	0	0	0	0	-	0	0	0	0	-	1	1	0	2	-	2
% Articulated Trucks	-	-	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0.4%	1.2%	0%	0.6%	-	0.1%
Buses and Single-Unit Trucks	0	-	1	3	7	11	-	0	10	0	10	-	14	3	0	17	-	38
% Buses and Single-Unit Trucks	-	-	1.2%	0.5%	3.0%	1.2%	-	0%	5.7%	0%	5.1%	-	5.3%	3.7%	0%	4.9%	-	2.6%
Pedestrians	-	97	-	-	-	-	63	-	-	-	-	78	-	-	-	-	30	
% Pedestrians	-	97.0%	-	-	-	-	100%	-	-	-	-	96.3%	-	-	-	-	100%	-
Bicycles on Crosswalk	-	3	-	-	-	-	0	-	-	-	-	3	-	-	-	-	0	
% Bicycles on Crosswalk	-	3.0%	-	-	-	-	0%	-	-	-	-	3.7%	-	-	-	-	0%	

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

1. McKinney Avenue at Olive Street - TMC

Tue Oct 8, 2019

AM Peak (7:30 AM - 8:30 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

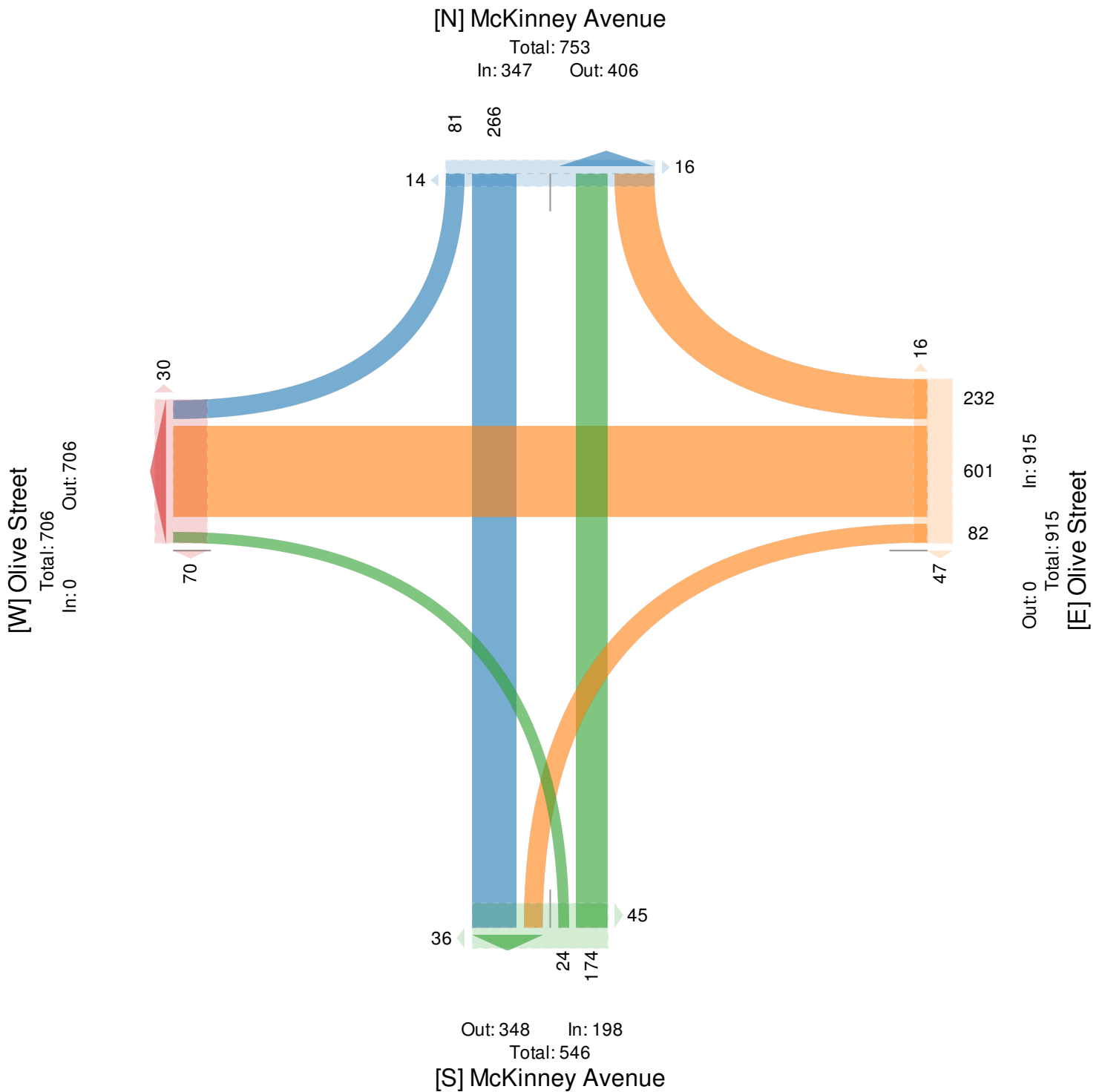
All Movements

ID: 703602, Location: 32.791592, -96.803304



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5215 Sycamore Ave.,
Pasadena, TX, 77503, US



1. McKinney Avenue at Olive Street - TMC

Tue Oct 8, 2019

PM Peak (5 PM - 6 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703602, Location: 32.791592, -96.803304



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg	Olive Street		McKinney Avenue						McKinney Avenue												
Direction	Eastbound		Westbound						Northbound						Southbound						
Time	App	Ped*	L	T	R	App	Ped*	L	T	U	App	Ped*	T	R	U	App	Ped*	Int			
2019-10-08 5:00PM	0	30	17	180	93	290	21	5	94	0	99	22	56	18	0	74	7	463			
5:15PM	0	23	21	171	66	258	20	8	79	1	88	18	69	23	0	92	8	438			
5:30PM	0	18	13	154	71	238	19	12	92	0	104	24	56	23	0	79	4	421			
5:45PM	0	15	17	140	80	237	9	9	84	0	93	24	63	28	0	91	3	421			
Total	0	86	68	645	310	1023	69	34	349	1	384	88	244	92	0	336	22	1743			
% Approach	-	-	6.6%	63.0%	30.3%	-	-	8.9%	90.9%	0.3%	-	-	72.6%	27.4%	0%	-	-	-			
% Total	0%	-	3.9%	37.0%	17.8%	58.7%	-	2.0%	20.0%	0.1%	22.0%	-	14.0%	5.3%	0%	19.3%	-	-			
PHF	-	-	0.810	0.896	0.833	0.882	-	0.708	0.928	0.250	0.923	-	0.884	0.821	-	0.913	-	0.941			
Lights	0	-	66	644	305	1015	-	34	343	1	378	-	235	92	0	327	-	1720			
% Lights	-	-	97.1%	99.8%	98.4%	99.2%	-	100%	98.3%	100%	98.4%	-	96.3%	100%	0%	97.3%	-	98.7%			
Articulated Trucks	0	-	0	0	0	0	-	0	1	0	1	-	0	0	0	0	-	1			
% Articulated Trucks	-	-	0%	0%	0%	0%	-	0%	0.3%	0%	0.3%	-	0%	0%	0%	0%	-	0.1%			
Buses and Single-Unit Trucks	0	-	2	1	5	8	-	0	5	0	5	-	9	0	0	9	-	22			
% Buses and Single-Unit Trucks	-	-	2.9%	0.2%	1.6%	0.8%	-	0%	1.4%	0%	1.3%	-	3.7%	0%	0%	2.7%	-	1.3%			
Pedestrians	-	80	-	-	-	-	68	-	-	-	-	86	-	-	-	-	21				
% Pedestrians	-	93.0%	-	-	-	-	98.6%	-	-	-	-	97.7%	-	-	-	-	95.5%	-			
Bicycles on Crosswalk	-	6	-	-	-	-	1	-	-	-	-	2	-	-	-	-	1				
% Bicycles on Crosswalk	-	7.0%	-	-	-	-	1.4%	-	-	-	-	2.3%	-	-	-	-	4.5%				

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

1. McKinney Avenue at Olive Street - TMC

Tue Oct 8, 2019

PM Peak (5 PM - 6 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

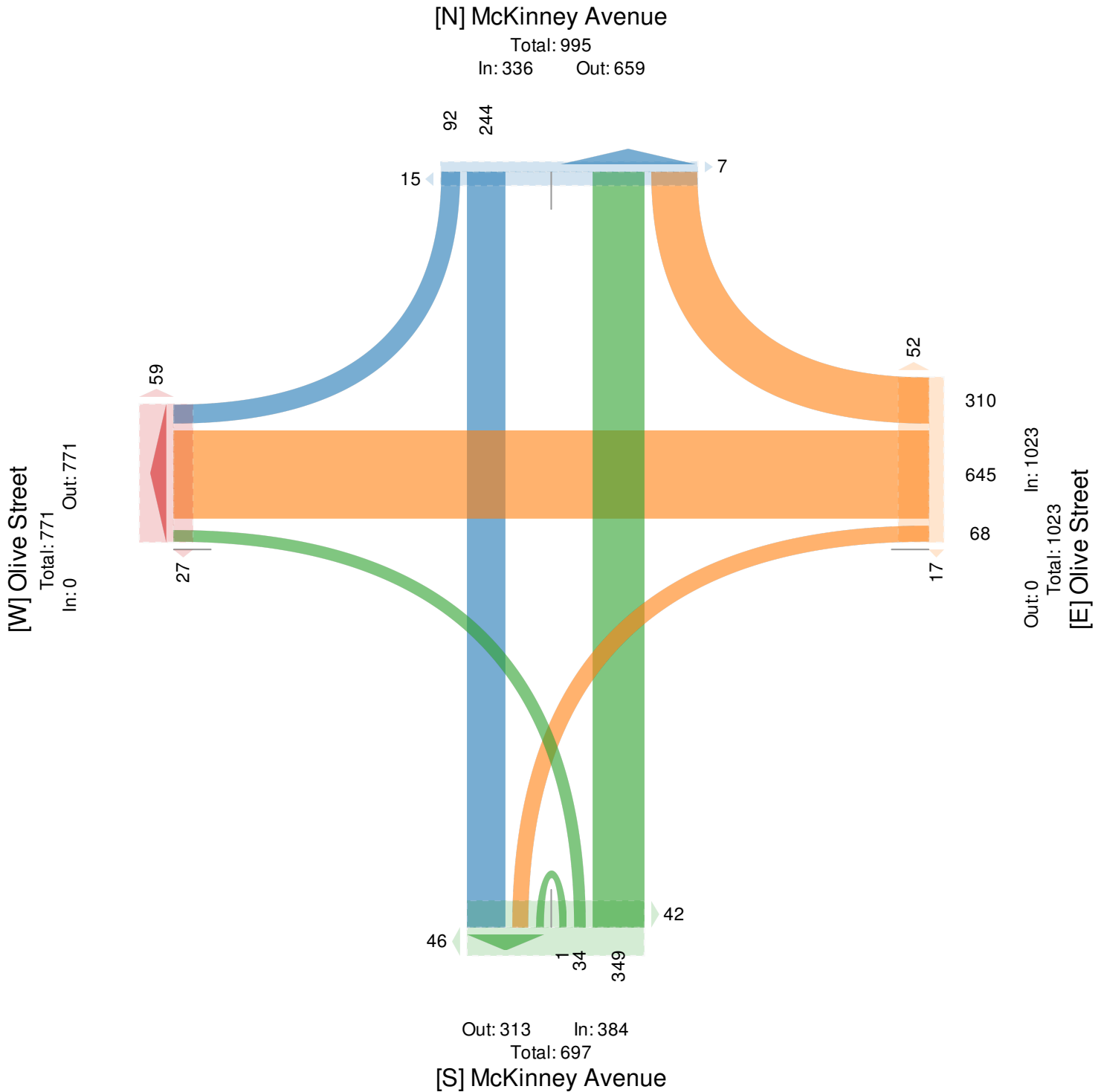
All Movements

ID: 703602, Location: 32.791592, -96.803304

CJ Hensch &
Associates, Inc.

Provided by: C. J. Hensch & Associates
Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US



2. Olive Street at Woodall Rogers SBFR - TMC

Tue Oct 8, 2019

Full Length (6:30 AM-8:30 AM, 4:30 PM-6:30 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703603, Location: 32.789957, -96.801577



Provided by: C. J. Hensch &
Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	Olive Street Eastbound		Olive Street Westbound				Woodall Rogers SBFR Northbound		Woodall Rogers SBFR Southbound				
Time	App	Ped*	L	T	App	Ped*	App	Ped*	T	R	App	Ped*	Int
2019-10-08 6:30AM	0	6	21	110	131	3	0	3	68	42	110	0	241
6:45AM	0	10	26	176	202	3	0	2	79	50	129	1	331
Hourly Total	0	16	47	286	333	6	0	5	147	92	239	1	572
7:00AM	0	8	26	138	164	8	0	5	108	57	165	2	329
7:15AM	0	7	25	181	206	7	0	7	134	97	231	11	437
7:30AM	0	10	32	177	209	2	0	10	143	77	220	9	429
7:45AM	0	10	32	181	213	3	0	15	195	68	263	5	476
Hourly Total	0	35	115	677	792	20	0	37	580	299	879	27	1671
8:00AM	0	12	55	188	243	4	0	16	189	83	272	5	515
8:15AM	0	7	55	165	220	1	0	15	229	88	317	4	537
Hourly Total	0	19	110	353	463	5	0	31	418	171	589	9	1052
4:30PM	0	11	60	158	218	8	0	6	99	19	118	8	336
4:45PM	0	11	59	146	205	6	0	9	89	20	109	1	314
Hourly Total	0	22	119	304	423	14	0	15	188	39	227	9	650
5:00PM	0	14	61	144	205	7	0	23	89	27	116	10	321
5:15PM	0	10	63	146	209	8	0	19	117	40	157	2	366
5:30PM	0	21	67	126	193	12	0	26	113	21	134	10	327
5:45PM	0	19	65	139	204	7	0	13	107	23	130	6	334
Hourly Total	0	64	256	555	811	34	0	81	426	111	537	28	1348
6:00PM	0	20	78	132	210	15	0	17	101	27	128	14	338
6:15PM	0	28	63	148	211	31	0	38	131	40	171	14	382
Hourly Total	0	48	141	280	421	46	0	55	232	67	299	28	720
Total	0	204	788	2455	3243	125	0	224	1991	779	2770	102	6013
% Approach	-	-	24.3%	75.7%	-	-	-	-	71.9%	28.1%	-	-	-
% Total	0%	-	13.1%	40.8%	53.9%	-	0%	-	33.1%	13.0%	46.1%	-	-
Lights	0	-	774	2425	3199	-	0	-	1973	769	2742	-	5941
% Lights	-	-	98.2%	98.8%	98.6%	-	-	-	99.1%	98.7%	99.0%	-	98.8%
Articulated Trucks	0	-	3	3	6	-	0	-	1	0	1	-	7
% Articulated Trucks	-	-	0.4%	0.1%	0.2%	-	-	-	0.1%	0%	0%	-	0.1%
Buses and Single-Unit Trucks	0	-	11	27	38	-	0	-	17	10	27	-	65
% Buses and Single-Unit Trucks	-	-	1.4%	1.1%	1.2%	-	-	-	0.9%	1.3%	1.0%	-	1.1%
Pedestrians	-	186	-	-	-	122	-	196	-	-	-	96	
% Pedestrians	-	91.2%	-	-	-	97.6%	-	87.5%	-	-	-	94.1%	-
Bicycles on Crosswalk	-	18	-	-	-	3	-	28	-	-	-	6	
% Bicycles on Crosswalk	-	8.8%	-	-	-	2.4%	-	12.5%	-	-	-	5.9%	-

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru

2. Olive Street at Woodall Rogers SBFR - TMC

Tue Oct 8, 2019

Full Length (6:30 AM-8:30 AM, 4:30 PM-6:30 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703603, Location: 32.789957, -96.801577

CJ Hensch &
Associates, Inc.

Provided by: C. J. Hensch & Associates
Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US

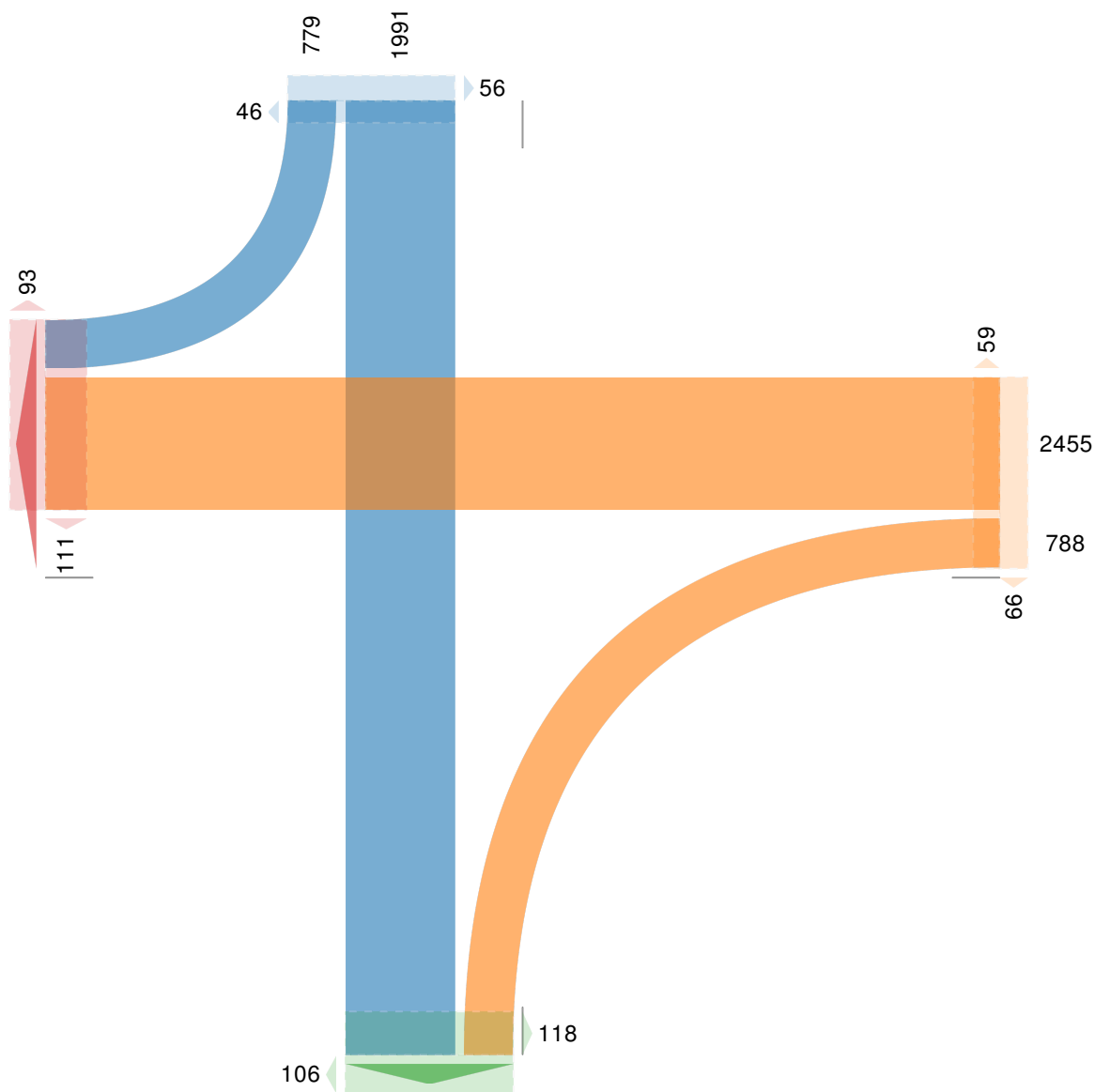
[N] Woodall Rogers SBFR

Total: 2770

In: 2770

Out: 0

[W] Olive Street
Total: 3234
In: 0
Out: 3234



Out: 0 In: 3243
Total: 3243
[E] Olive Street

Out: 2779 In: 0
Total: 2779
[S] Woodall Rogers SBFR

2. Olive Street at Woodall Rogers SBFR - TMC

Tue Oct 8, 2019

AM Peak (7:30 AM - 8:30 AM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703603, Location: 32.789957, -96.801577



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	Olive Street Eastbound		Olive Street Westbound				Woodall Rogers SBFR Northbound		Woodall Rogers SBFR Southbound				
Time	App	Ped*	L	T	App	Ped*	App	Ped*	T	R	App	Ped*	Int
2019-10-08 7:30AM	0	10	32	177	209	2	0	10	143	77	220	9	429
7:45AM	0	10	32	181	213	3	0	15	195	68	263	5	476
8:00AM	0	12	55	188	243	4	0	16	189	83	272	5	515
8:15AM	0	7	55	165	220	1	0	15	229	88	317	4	537
Total	0	39	174	711	885	10	0	56	756	316	1072	23	1957
% Approach	-	-	19.7%	80.3%	-	-	-	-	70.5%	29.5%	-	-	-
% Total	0%	-	8.9%	36.3%	45.2%	-	0%	-	38.6%	16.1%	54.8%	-	-
PHF	-	-	0.791	0.945	0.910	-	-	-	0.825	0.898	0.845	-	0.911
Lights	0	-	171	703	874	-	0	-	747	312	1059	-	1933
% Lights	-	-	98.3%	98.9%	98.8%	-	-	-	98.8%	98.7%	98.8%	-	98.8%
Articulated Trucks	0	-	0	0	0	-	0	-	1	0	1	-	1
% Articulated Trucks	-	-	0%	0%	0%	-	-	-	0.1%	0%	0.1%	-	0.1%
Buses and Single-Unit Trucks	0	-	3	8	11	-	0	-	8	4	12	-	23
% Buses and Single-Unit Trucks	-	-	1.7%	1.1%	1.2%	-	-	-	1.1%	1.3%	1.1%	-	1.2%
Pedestrians	-	37	-	-	-	9	-	52	-	-	-	20	
% Pedestrians	-	94.9%	-	-	-	90.0%	-	92.9%	-	-	-	87.0%	-
Bicycles on Crosswalk	-	2	-	-	-	1	-	4	-	-	-	3	
% Bicycles on Crosswalk	-	5.1%	-	-	-	10.0%	-	7.1%	-	-	-	13.0%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru

2. Olive Street at Woodall Rogers SBFR - TMC

Tue Oct 8, 2019

AM Peak (7:30 AM - 8:30 AM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703603, Location: 32.789957, -96.801577



Provided by: C. J. Hensch & Associates
Inc.

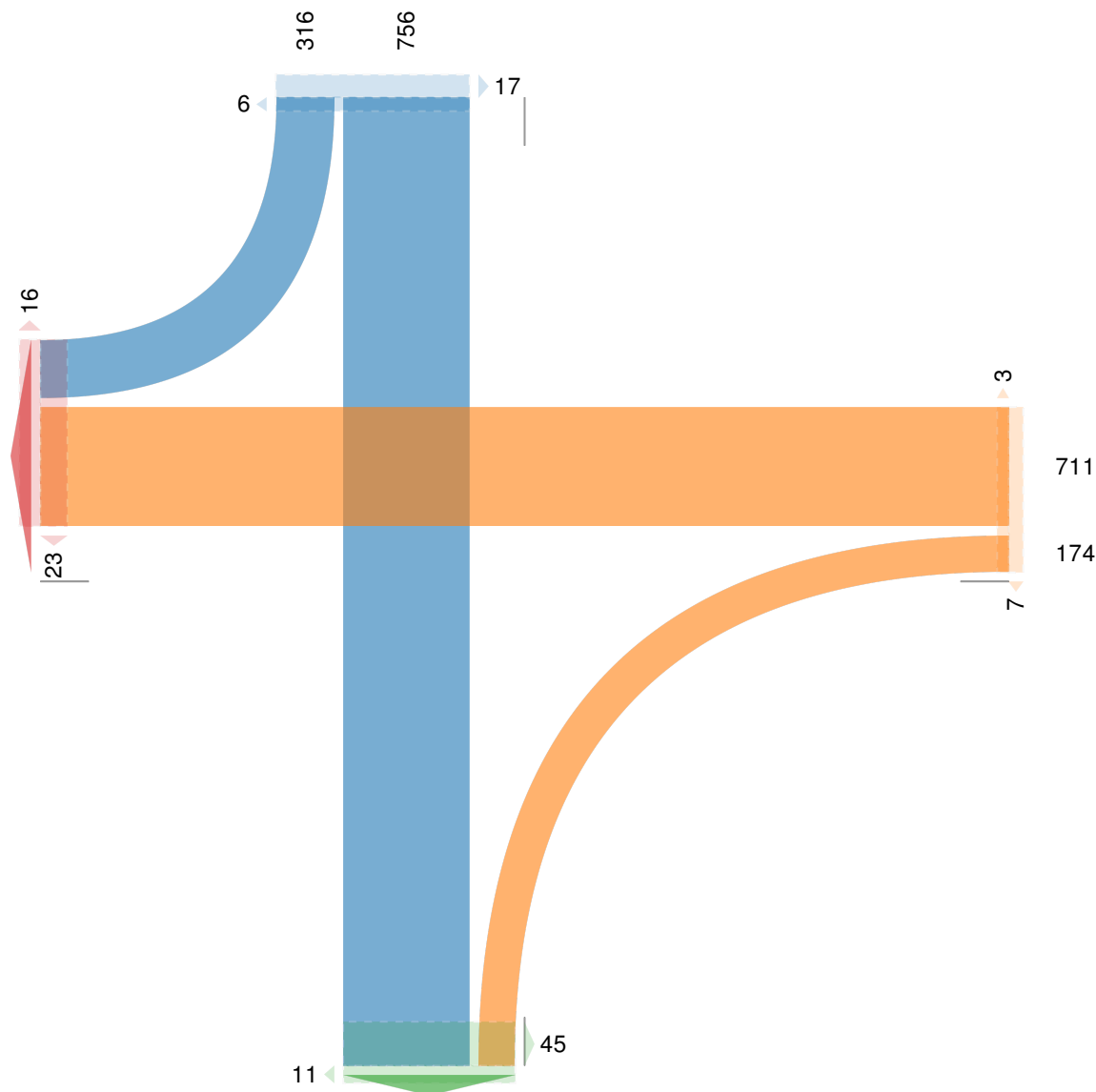
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

[N] Woodall Rogers SBFR

Total: 1072
In: 1072 Out: 0

[W] Olive Street

Total: 1027
In: 0 Out: 1027



[S] Woodall Rogers SBFR

Out: 930 In: 0
Total: 930

2. Olive Street at Woodall Rogers SBFR - TMC

Tue Oct 8, 2019

PM Peak (5:30 PM - 6:30 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703603, Location: 32.789957, -96.801577



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	Olive Street Eastbound		Olive Street Westbound				Woodall Rogers SBFR Northbound		Woodall Rogers SBFR Southbound				
Time	App	Ped*	L	T	App	Ped*	App	Ped*	T	R	App	Ped*	Int
2019-10-08 5:30PM	0	21	67	126	193	12	0	26	113	21	134	10	327
5:45PM	0	19	65	139	204	7	0	13	107	23	130	6	334
6:00PM	0	20	78	132	210	15	0	17	101	27	128	14	338
6:15PM	0	28	63	148	211	31	0	38	131	40	171	14	382
Total	0	88	273	545	818	65	0	94	452	111	563	44	1381
% Approach	-	-	33.4%	66.6%	-	-	-	-	80.3%	19.7%	-	-	-
% Total	0%	-	19.8%	39.5%	59.2%	-	0%	-	32.7%	8.0%	40.8%	-	-
PHF	-	-	0.875	0.921	0.969	-	-	-	0.863	0.694	0.823	-	0.904
Lights	0	-	269	540	809	-	0	-	448	111	559	-	1368
% Lights	-	-	98.5%	99.1%	98.9%	-	-	-	99.1%	100%	99.3%	-	99.1%
Articulated Trucks	0	-	1	1	2	-	0	-	0	0	0	-	2
% Articulated Trucks	-	-	0.4%	0.2%	0.2%	-	-	-	0%	0%	0%	-	0.1%
Buses and Single-Unit Trucks	0	-	3	4	7	-	0	-	4	0	4	-	11
% Buses and Single-Unit Trucks	-	-	1.1%	0.7%	0.9%	-	-	-	0.9%	0%	0.7%	-	0.8%
Pedestrians	-	81	-	-	-	63	-	82	-	-	-	44	
% Pedestrians	-	92.0%	-	-	-	96.9%	-	87.2%	-	-	-	100%	-
Bicycles on Crosswalk	-	7	-	-	-	2	-	12	-	-	-	0	
% Bicycles on Crosswalk	-	8.0%	-	-	-	3.1%	-	12.8%	-	-	-	0%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru

2. Olive Street at Woodall Rogers SBFR - TMC

Tue Oct 8, 2019

PM Peak (5:30 PM - 6:30 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703603, Location: 32.789957, -96.801577



Provided by: C. J. Hensch & Associates
Inc.

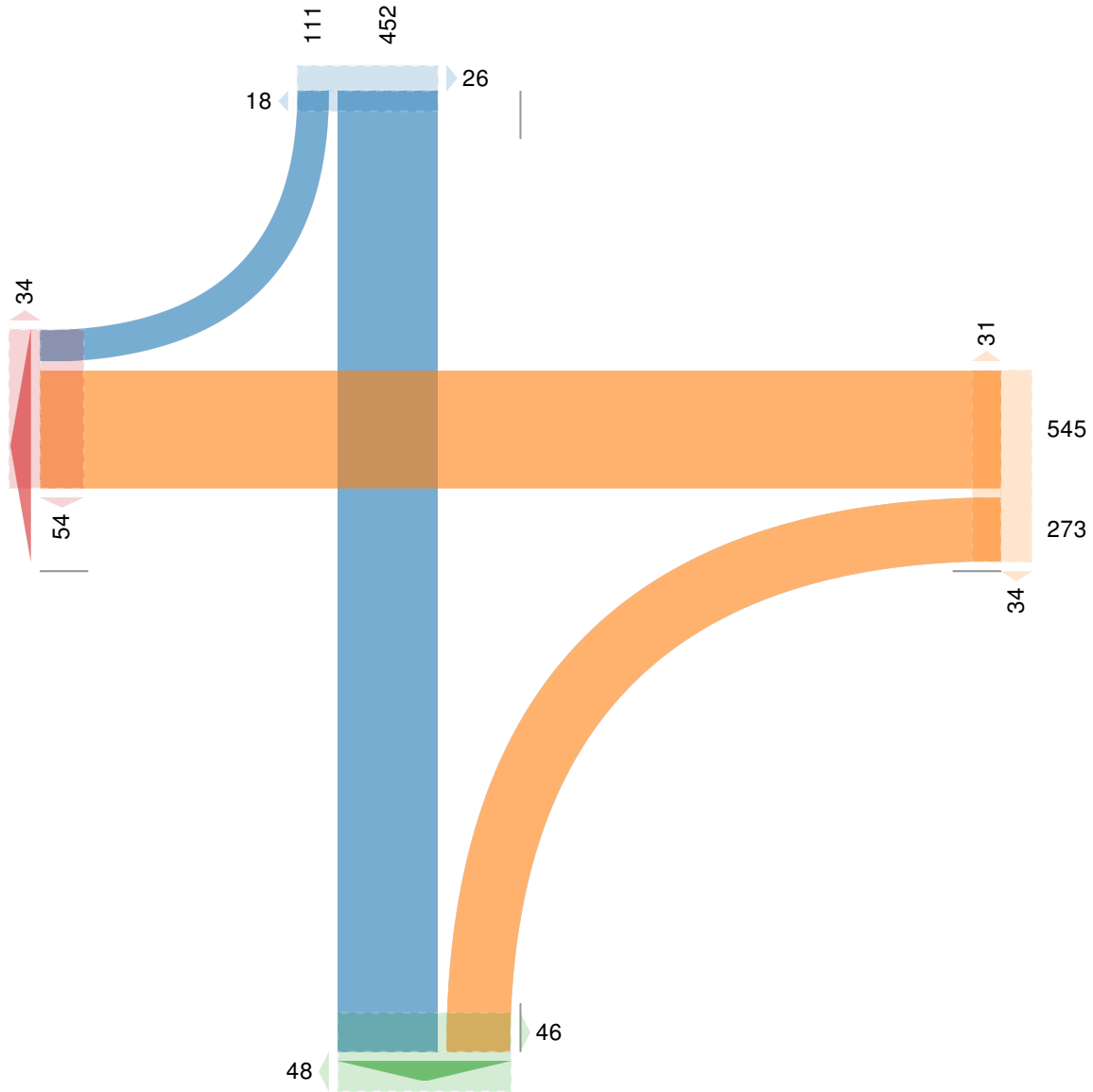
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

[N] Woodall Rogers SBFR

Total: 563

In: 563 Out: 0

[W] Olive Street
Total: 656
In: 0 Out: 656



Out: 0 In: 818
Total: 818
[E] Olive Street

Out: 725 In: 0
Total: 725
[S] Woodall Rogers SBFR

3. Olive Street at Woodall Rogers NBFR - TMC

Tue Oct 8, 2019

Full Length (6:30 AM-8:30 AM, 4:30 PM-6:30 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703604, Location: 32.789409, -96.800973



Provided by: C. J. Hensch &
Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	Olive Street Eastbound		Olive Street Westbound				Woodall Rogers NBFR Northbound				Woodall Rogers NBFR Southbound		
Time	App	Ped*	T	R	App	Ped*	L	T	App	Ped*	App	Ped*	Int
2019-10-08 6:30AM	0	0	125	124	249	0	14	51	65	4	0	1	314
6:45AM	0	9	187	133	320	1	16	59	75	3	0	2	395
Hourly Total	0	9	312	257	569	1	30	110	140	7	0	3	709
7:00AM	0	4	160	147	307	5	12	74	86	2	0	2	393
7:15AM	0	6	202	169	371	2	8	86	94	1	0	2	465
7:30AM	0	4	194	180	374	2	18	95	113	6	0	0	487
7:45AM	0	3	194	202	396	2	18	135	153	6	0	4	549
Hourly Total	0	17	750	698	1448	11	56	390	446	15	0	8	1894
8:00AM	0	5	229	188	417	3	22	89	111	9	0	6	528
8:15AM	0	8	204	223	427	1	21	94	115	4	0	4	542
Hourly Total	0	13	433	411	844	4	43	183	226	13	0	10	1070
4:30PM	0	5	209	82	291	6	4	152	156	6	0	2	447
4:45PM	0	4	179	90	269	5	22	179	201	15	0	1	470
Hourly Total	0	9	388	172	560	11	26	331	357	21	0	3	917
5:00PM	0	9	194	77	271	5	11	171	182	15	0	6	453
5:15PM	0	6	196	98	294	1	16	168	184	25	0	2	478
5:30PM	0	12	182	63	245	3	9	167	176	21	0	9	421
5:45PM	0	9	189	75	264	2	15	169	184	8	0	2	448
Hourly Total	0	36	761	313	1074	11	51	675	726	69	0	19	1800
6:00PM	0	7	193	67	260	7	17	168	185	16	0	2	445
6:15PM	0	6	195	65	260	7	17	170	187	10	0	3	447
Hourly Total	0	13	388	132	520	14	34	338	372	26	0	5	892
Total	0	97	3032	1983	5015	52	240	2027	2267	151	0	48	7282
% Approach	-	-	60.5%	39.5%	-	-	10.6%	89.4%	-	-	-	-	-
% Total	0%	-	41.6%	27.2%	68.9%	-	3.3%	27.8%	31.1%	-	0%	-	-
Lights	0	-	2985	1943	4928	-	235	1995	2230	-	0	-	7158
% Lights	-	-	98.4%	98.0%	98.3%	-	97.9%	98.4%	98.4%	-	-	-	98.3%
Articulated Trucks	0	-	5	5	10	-	0	13	13	-	0	-	23
% Articulated Trucks	-	-	0.2%	0.3%	0.2%	-	0%	0.6%	0.6%	-	-	-	0.3%
Buses and Single-Unit Trucks	0	-	42	35	77	-	5	19	24	-	0	-	101
% Buses and Single-Unit Trucks	-	-	1.4%	1.8%	1.5%	-	2.1%	0.9%	1.1%	-	-	-	1.4%
Pedestrians	-	95	-	-	-	48	-	-	-	131	-	45	-
% Pedestrians	-	97.9%	-	-	-	92.3%	-	-	-	86.8%	-	93.8%	-
Bicycles on Crosswalk	-	2	-	-	-	4	-	-	-	20	-	3	-
% Bicycles on Crosswalk	-	2.1%	-	-	-	7.7%	-	-	-	13.2%	-	6.3%	-

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru

3. Olive Street at Woodall Rogers NBFR - TMC

Tue Oct 8, 2019

Full Length (6:30 AM-8:30 AM, 4:30 PM-6:30 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703604, Location: 32.789409, -96.800973



Provided by: C. J. Hensch & Associates
Inc.

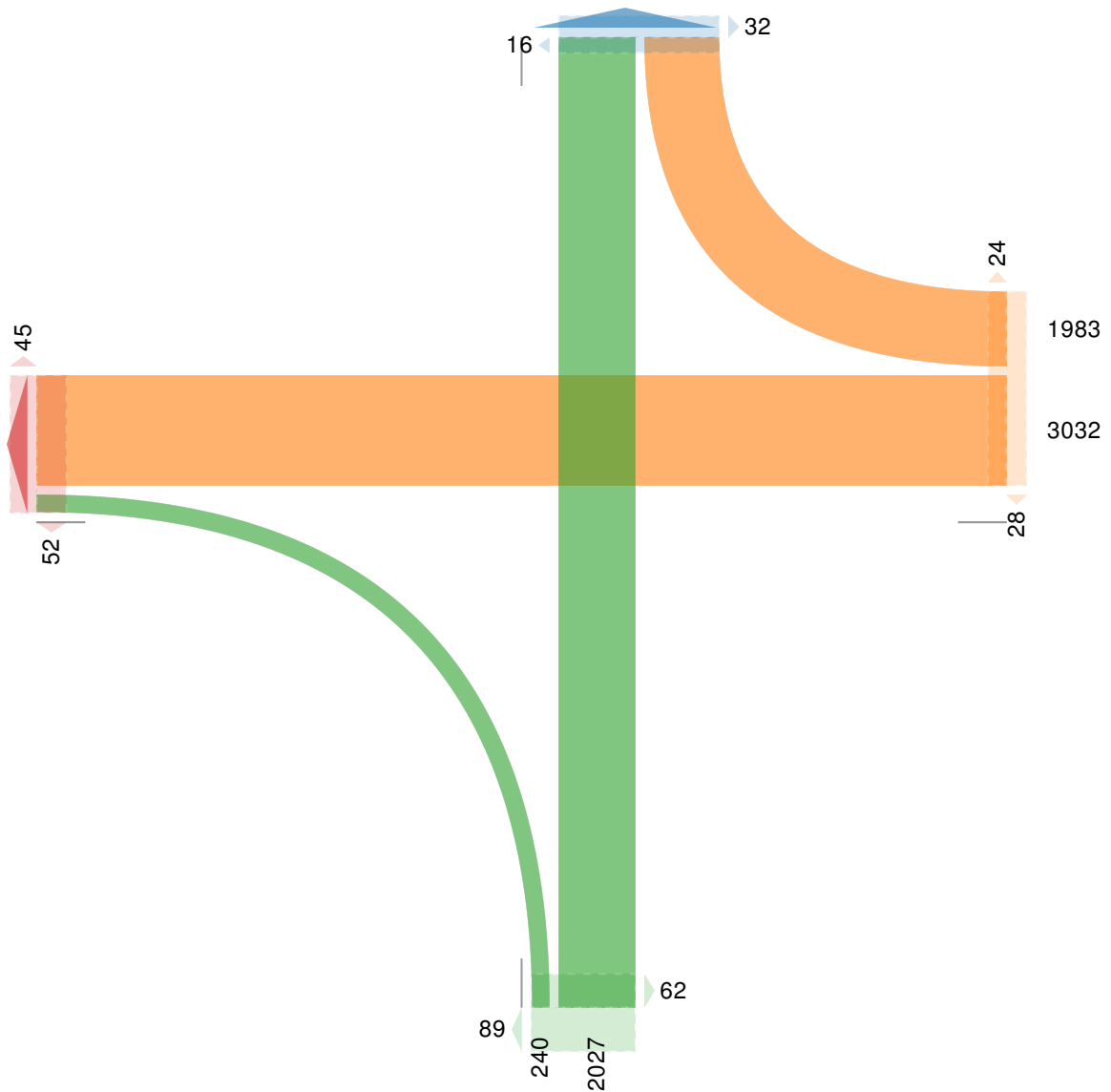
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

[N] Woodall Rogers NBFR

Total: 4010
In: 0 Out: 4010

[W] Olive Street

Total: 3272
In: 0 Out: 3272



[S] Woodall Rogers NBFR

Out: 0 In: 2267
Total: 2267

3. Olive Street at Woodall Rogers NBFR - TMC

Tue Oct 8, 2019

AM Peak (7:30 AM - 8:30 AM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703604, Location: 32.789409, -96.800973



Provided by: C. J. Hensch &
Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	Olive Street Eastbound		Olive Street Westbound		Woodall Rogers NBFR Northbound				Woodall Rogers NBFR Southbound		
Time	App	Ped*	T	R	App	Ped*	L	T	App	Ped*	Int
2019-10-08 7:30AM	0	4	194	180	374	2	18	95	113	6	487
7:45AM	0	3	194	202	396	2	18	135	153	6	549
8:00AM	0	5	229	188	417	3	22	89	111	9	528
8:15AM	0	8	204	223	427	1	21	94	115	4	542
Total	0	20	821	793	1614	8	79	413	492	25	2106
% Approach	-	-	50.9%	49.1%	-	-	16.1%	83.9%	-	-	-
% Total	0%	-	39.0%	37.7%	76.6%	-	3.8%	19.6%	23.4%	-	0%
PHF	-	-	0.896	0.889	0.945	-	0.898	0.765	0.804	-	0.959
Lights	0	-	809	772	1581	-	77	406	483	-	2064
% Lights	-	-	98.5%	97.4%	98.0%	-	97.5%	98.3%	98.2%	-	98.0%
Articulated Trucks	0	-	0	4	4	-	0	2	2	-	6
% Articulated Trucks	-	-	0%	0.5%	0.2%	-	0%	0.5%	0.4%	-	0.3%
Buses and Single-Unit Trucks	0	-	12	17	29	-	2	5	7	-	36
% Buses and Single-Unit Trucks	-	-	1.5%	2.1%	1.8%	-	2.5%	1.2%	1.4%	-	1.7%
Pedestrians	-	18	-	-	-	8	-	-	-	25	11
% Pedestrians	-	90.0%	-	-	-	100%	-	-	-	100%	78.6%
Bicycles on Crosswalk	-	2	-	-	-	0	-	-	-	0	3
% Bicycles on Crosswalk	-	10.0%	-	-	-	0%	-	-	-	0%	21.4%

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru

3. Olive Street at Woodall Rogers NBFR - TMC

Tue Oct 8, 2019

AM Peak (7:30 AM - 8:30 AM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703604, Location: 32.789409, -96.800973

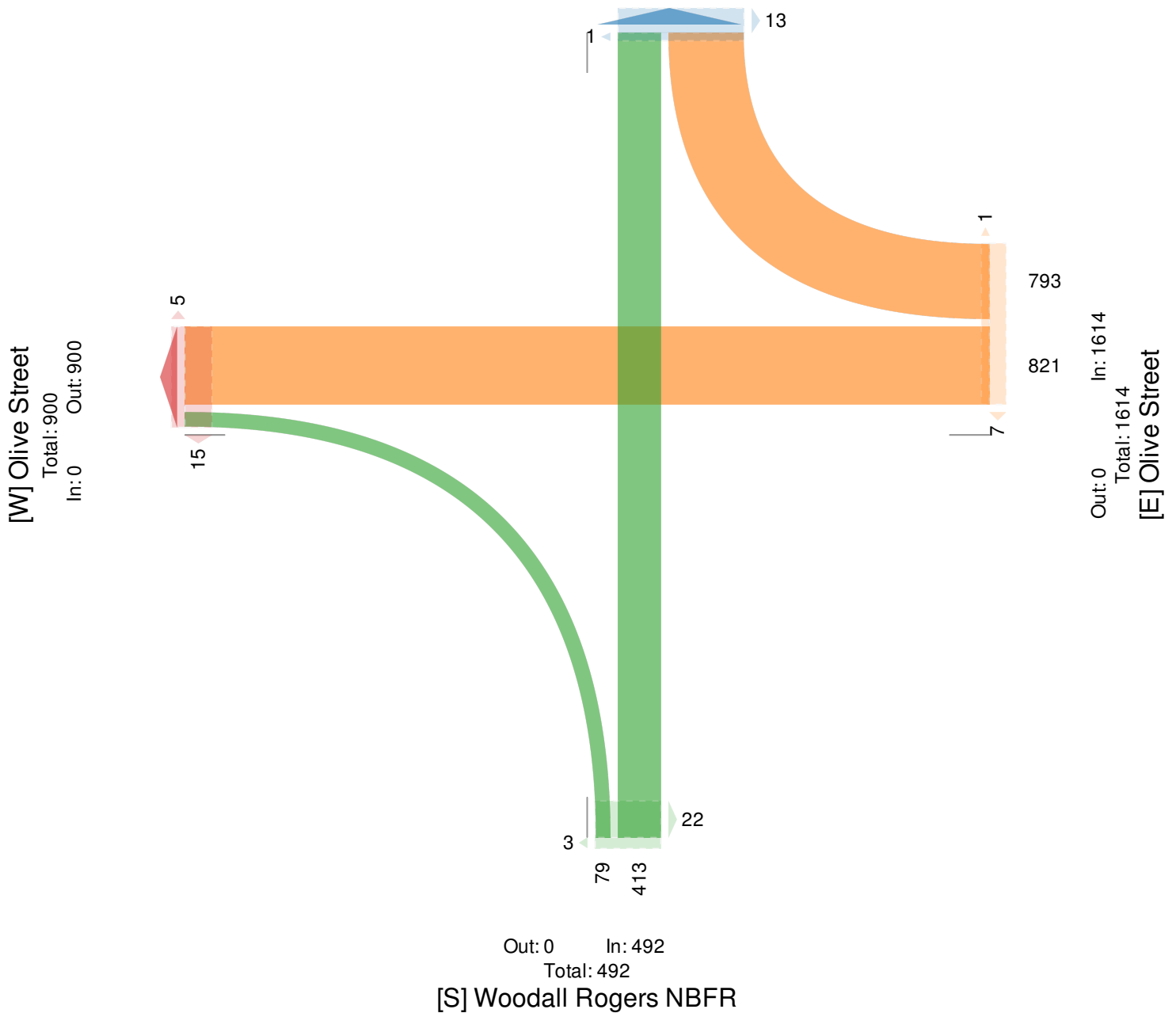


Provided by: C. J. Hensch & Associates
Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US

[N] Woodall Rogers NBFR

Total: 1206
In: 0 Out: 1206



3. Olive Street at Woodall Rogers NBFR - TMC

Tue Oct 8, 2019

PM Peak (4:30 PM - 5:30 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703604, Location: 32.789409, -96.800973



Provided by: C. J. Hensch &
Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	Olive Street Eastbound		Olive Street Westbound				Woodall Rogers NBFR Northbound				Woodall Rogers NBFR Southbound		
Time	App	Ped*	T	R	App	Ped*	L	T	App	Ped*	App	Ped*	Int
2019-10-08 4:30PM	0	5	209	82	291	6	4	152	156	6	0	2	447
4:45PM	0	4	179	90	269	5	22	179	201	15	0	1	470
5:00PM	0	9	194	77	271	5	11	171	182	15	0	6	453
5:15PM	0	6	196	98	294	1	16	168	184	25	0	2	478
Total	0	24	778	347	1125	17	53	670	723	61	0	11	1848
% Approach	-	-	69.2%	30.8%	-	-	7.3%	92.7%	-	-	-	-	-
% Total	0%	-	42.1%	18.8%	60.9%	-	2.9%	36.3%	39.1%	-	0%	-	-
PHF	-	-	0.931	0.885	0.957	-	0.602	0.936	0.899	-	-	-	0.967
Lights	0	-	768	343	1111	-	53	666	719	-	0	-	1830
% Lights	-	-	98.7%	98.8%	98.8%	-	100%	99.4%	99.4%	-	-	-	99.0%
Articulated Trucks	0	-	1	0	1	-	0	1	1	-	0	-	2
% Articulated Trucks	-	-	0.1%	0%	0.1%	-	0%	0.1%	0.1%	-	-	-	0.1%
Buses and Single-Unit Trucks	0	-	9	4	13	-	0	3	3	-	0	-	16
% Buses and Single-Unit Trucks	-	-	1.2%	1.2%	1.2%	-	0%	0.4%	0.4%	-	-	-	0.9%
Pedestrians	-	24	-	-	-	16	-	-	-	48	-	11	
% Pedestrians	-	100%	-	-	-	94.1%	-	-	-	78.7%	-	100%	-
Bicycles on Crosswalk	-	0	-	-	-	1	-	-	-	13	-	0	
% Bicycles on Crosswalk	-	0%	-	-	-	5.9%	-	-	-	21.3%	-	0%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru

3. Olive Street at Woodall Rogers NBFR - TMC

Tue Oct 8, 2019

PM Peak (4:30 PM - 5:30 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703604, Location: 32.789409, -96.800973

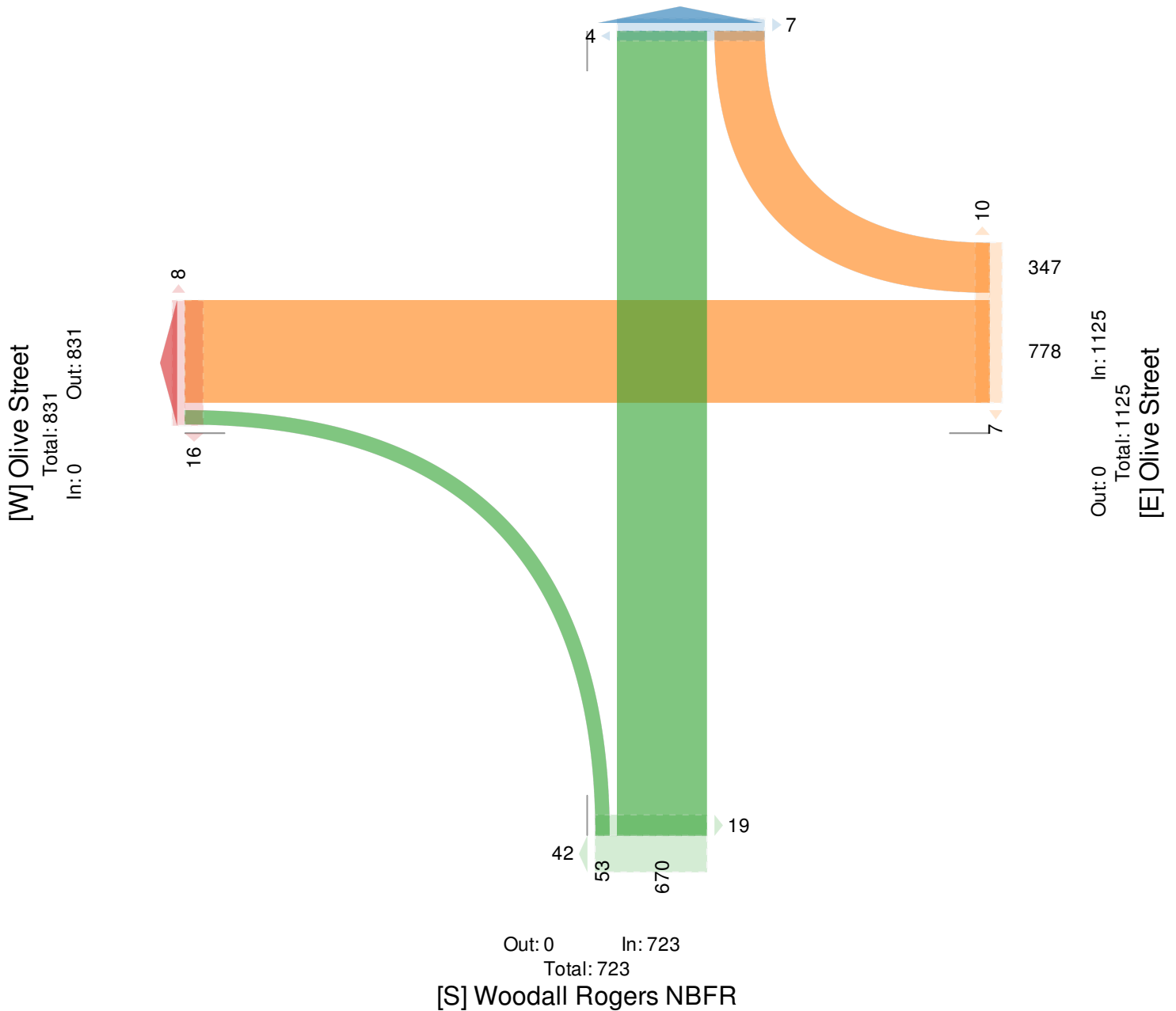


Provided by: C. J. Hensch & Associates
Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US

[N] Woodall Rogers NBFR

Total: 1017
In: 0 Out: 1017



4. Pearl Street at Woodall Rogers SBFR - TMC

Tue Oct 8, 2019

Full Length (6:30 AM-8:30 AM, 4:30 PM-6:30 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703605, Location: 32.790763, -96.800554



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg	N Pearl Street					N Pearl Street					Woodall Rogers SBFR	Woodall Rogers SBFR						
Direction	Eastbound					Westbound					Northbound		Southbound					
Time	T	R	U	App	Ped*	L	T	U	App	Ped*	App	Ped*	L	T	R	App	Ped*	Int
2019-10-08 6:30AM	80	5	1	86	5	18	211	0	229	0	0	1	12	88	184	284	8	599
6:45AM	127	8	0	135	7	17	210	0	227	0	0	0	16	102	181	299	7	661
Hourly Total	207	13	1	221	12	35	421	0	456	0	0	1	28	190	365	583	15	1260
7:00AM	142	14	0	156	6	15	224	0	239	0	0	0	10	139	182	331	7	726
7:15AM	206	14	0	220	8	34	217	0	251	0	0	2	18	182	163	363	20	834
7:30AM	184	14	1	199	10	30	214	0	244	0	0	0	23	188	142	353	21	796
7:45AM	222	20	0	242	16	22	232	0	254	0	0	2	32	215	166	413	26	909
Hourly Total	754	62	1	817	40	101	887	0	988	0	0	4	83	724	653	1460	74	3265
8:00AM	246	24	0	270	16	30	203	0	233	0	0	1	42	231	172	445	22	948
8:15AM	200	26	0	226	15	39	227	0	266	0	0	1	43	254	157	454	26	946
Hourly Total	446	50	0	496	31	69	430	0	499	0	0	2	85	485	329	899	48	1894
4:30PM	360	32	1	393	2	36	192	0	228	0	0	14	15	53	60	128	23	749
4:45PM	385	27	0	412	8	27	208	0	235	4	0	2	26	65	54	145	15	792
Hourly Total	745	59	1	805	10	63	400	0	463	4	0	16	41	118	114	273	38	1541
5:00PM	394	32	1	427	23	36	200	0	236	0	0	5	21	46	51	118	20	781
5:15PM	403	53	0	456	14	41	193	0	234	0	0	4	18	74	44	136	24	826
5:30PM	367	43	0	410	17	45	225	0	270	0	0	2	18	51	45	114	13	794
5:45PM	355	39	0	394	16	35	219	0	254	0	0	3	28	60	61	149	20	797
Hourly Total	1519	167	1	1687	70	157	837	0	994	0	0	14	85	231	201	517	77	3198
6:00PM	376	42	1	419	14	33	199	0	232	0	0	4	18	59	70	147	10	798
6:15PM	376	44	0	420	30	38	196	0	234	2	0	4	20	91	84	195	38	849
Hourly Total	752	86	1	839	44	71	395	0	466	2	0	8	38	150	154	342	48	1647
Total	4423	437	5	4865	207	496	3370	0	3866	6	0	45	360	1898	1816	4074	300	12805
% Approach	90.9%	9.0%	0.1%	-	-	12.8%	87.2%	0%	-	-	-	-	8.8%	46.6%	44.6%	-	-	-
% Total	34.5%	3.4%	0%	38.0%	-	3.9%	26.3%	0%	30.2%	-	0%	-	2.8%	14.8%	14.2%	31.8%	-	-
Lights	4324	421	5	4750	-	491	3268	0	3759	-	0	-	348	1887	1808	4043	-	12552
% Lights	97.8%	96.3%	100%	97.6%	-	99.0%	97.0%	0%	97.2%	-	-	-	96.7%	99.4%	99.6%	99.2%	-	98.0%
Articulated Trucks	10	1	0	11	-	1	2	0	3	-	0	-	1	0	1	2	-	16
% Articulated Trucks	0.2%	0.2%	0%	0.2%	-	0.2%	0.1%	0%	0.1%	-	-	-	0.3%	0%	0.1%	0%	-	0.1%
Buses and Single-Unit Trucks	89	15	0	104	-	4	100	0	104	-	0	-	11	11	7	29	-	237
% Buses and Single-Unit Trucks	2.0%	3.4%	0%	2.1%	-	0.8%	3.0%	0%	2.7%	-	-	-	3.1%	0.6%	0.4%	0.7%	-	1.9%
Pedestrians	-	-	-	-	199	-	-	-	-	6	-	41	-	-	-	-	290	-
% Pedestrians	-	-	-	-	96.1%	-	-	-	-	100%	-	91.1%	-	-	-	-	96.7%	-
Bicycles on Crosswalk	-	-	-	-	8	-	-	-	-	0	-	4	-	-	-	-	10	-
% Bicycles on Crosswalk	-	-	-	-	3.9%	-	-	-	-	0%	-	8.9%	-	-	-	-	3.3%	-

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

4. Pearl Street at Woodall Rogers SBFR - TMC

Tue Oct 8, 2019

Full Length (6:30 AM-8:30 AM, 4:30 PM-6:30 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703605, Location: 32.790763, -96.800554



Provided by: C. J. Hensch & Associates
Inc.

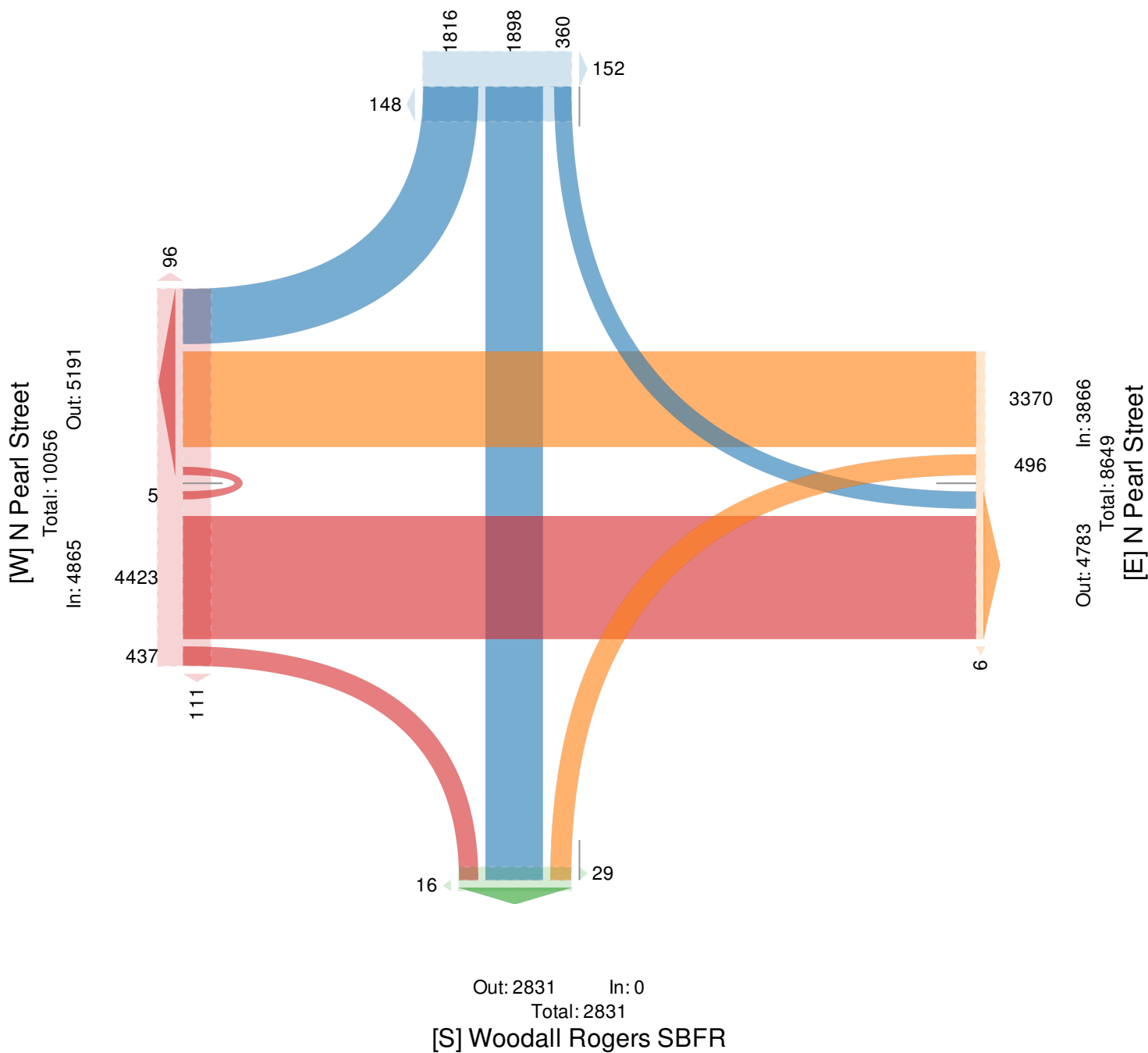
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

[N] Woodall Rogers SBFR

Total: 4074

In: 4074

Out: 0



4. Pearl Street at Woodall Rogers SBFR - TMC

Tue Oct 8, 2019

AM Peak (7:30 AM - 8:30 AM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703605, Location: 32.790763, -96.800554



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg	N Pearl Street					N Pearl Street					Woodall Rogers SBFR		Woodall Rogers SBFR					
Direction	Eastbound					Westbound					Northbound		Southbound					
Time	T	R	U	App	Ped*	L	T	U	App	Ped*	App	Ped*	L	T	R	App	Ped*	Int
2019-10-08 7:30AM	184	14	1	199	10	30	214	0	244	0	0	0	23	188	142	353	21	796
7:45AM	222	20	0	242	16	22	232	0	254	0	0	2	32	215	166	413	26	909
8:00AM	246	24	0	270	16	30	203	0	233	0	0	1	42	231	172	445	22	948
8:15AM	200	26	0	226	15	39	227	0	266	0	0	1	43	254	157	454	26	946
Total	852	84	1	937	57	121	876	0	997	0	0	4	140	888	637	1665	95	3599
% Approach	90.9%	9.0%	0.1%	-	-	12.1%	87.9%	0%	-	-	-	-	8.4%	53.3%	38.3%	-	-	-
% Total	23.7%	2.3%	0%	26.0%	-	3.4%	24.3%	0%	27.7%	-	0%	-	3.9%	24.7%	17.7%	46.3%	-	-
PHF	0.866	0.808	0.250	0.868	-	0.776	0.944	-	0.937	-	-	-	0.814	0.874	0.926	0.917	-	0.949
Lights	824	75	1	900	-	119	846	0	965	-	0	-	137	886	634	1657	-	3522
% Lights	96.7%	89.3%	100%	96.1%	-	98.3%	96.6%	0%	96.8%	-	-	-	97.9%	99.8%	99.5%	99.5%	-	97.9%
Articulated Trucks	4	0	0	4	-	1	1	0	2	-	0	-	1	0	1	2	-	8
% Articulated Trucks	0.5%	0%	0%	0.4%	-	0.8%	0.1%	0%	0.2%	-	-	-	0.7%	0%	0.2%	0.1%	-	0.2%
Buses and Single-Unit Trucks	24	9	0	33	-	1	29	0	30	-	0	-	2	2	2	6	-	69
% Buses and Single-Unit Trucks	2.8%	10.7%	0%	3.5%	-	0.8%	3.3%	0%	3.0%	-	-	-	1.4%	0.2%	0.3%	0.4%	-	1.9%
Pedestrians	-	-	-	-	55	-	-	-	-	0	-	3	-	-	-	-	92	-
% Pedestrians	-	-	-	-	96.5%	-	-	-	-	-	-	75.0%	-	-	-	-	96.8%	-
Bicycles on Crosswalk	-	-	-	-	2	-	-	-	-	0	-	1	-	-	-	-	3	-
% Bicycles on Crosswalk	-	-	-	-	3.5%	-	-	-	-	-	-	25.0%	-	-	-	-	3.2%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

4. Pearl Street at Woodall Rogers SBFR - TMC

Tue Oct 8, 2019

AM Peak (7:30 AM - 8:30 AM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703605, Location: 32.790763, -96.800554

CJ Hensch &
Associates, Inc.

Provided by: C. J. Hensch & Associates
Inc.

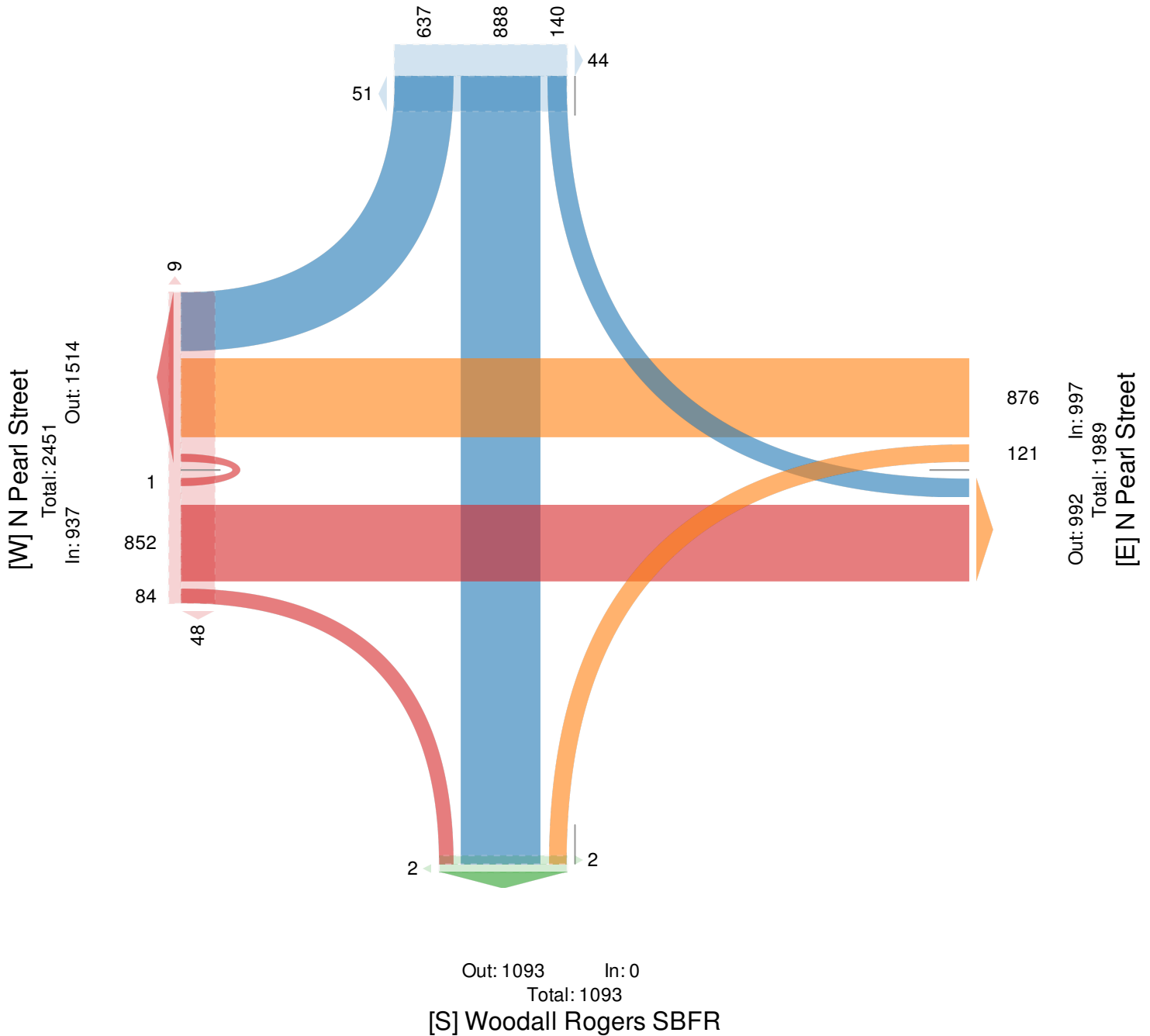
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

[N] Woodall Rogers SBFR

Total: 1665

In: 1665

Out: 0



4. Pearl Street at Woodall Rogers SBFR - TMC

Tue Oct 8, 2019

PM Peak (5:30 PM - 6:30 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703605, Location: 32.790763, -96.800554



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg	N Pearl Street					N Pearl Street					Woodall Rogers SBFR		Woodall Rogers SBFR					
Direction	Eastbound					Westbound					Northbound		Southbound					
Time	T	R	U	App	Ped*	L	T	U	App	Ped*	App	Ped*	L	T	R	App	Ped*	Int
2019-10-08 5:30PM	367	43	0	410	17	45	225	0	270	0	0	2	18	51	45	114	13	794
5:45PM	355	39	0	394	16	35	219	0	254	0	0	3	28	60	61	149	20	797
6:00PM	376	42	1	419	14	33	199	0	232	0	0	4	18	59	70	147	10	798
6:15PM	376	44	0	420	30	38	196	0	234	2	0	4	20	91	84	195	38	849
Total	1474	168	1	1643	77	151	839	0	990	2	0	13	84	261	260	605	81	3238
% Approach	89.7%	10.2%	0.1%	-	-	15.3%	84.7%	0%	-	-	-	-	13.9%	43.1%	43.0%	-	-	-
% Total	45.5%	5.2%	0%	50.7%	-	4.7%	25.9%	0%	30.6%	-	0%	-	2.6%	8.1%	8.0%	18.7%	-	-
PHF	0.980	0.955	0.250	0.978	-	0.839	0.932	-	0.917	-	-	-	0.750	0.717	0.774	0.776	-	0.953
Lights	1457	167	1	1625	-	150	824	0	974	-	0	-	80	257	260	597	-	3196
% Lights	98.8%	99.4%	100%	98.9%	-	99.3%	98.2%	0%	98.4%	-	-	-	95.2%	98.5%	100%	98.7%	-	98.7%
Articulated Trucks	1	0	0	1	-	0	0	0	0	-	0	-	0	0	0	0	-	1
% Articulated Trucks	0.1%	0%	0%	0.1%	-	0%	0%	0%	0%	-	-	-	0%	0%	0%	0%	-	0%
Buses and Single-Unit Trucks	16	1	0	17	-	1	15	0	16	-	0	-	4	4	0	8	-	41
% Buses and Single-Unit Trucks	1.1%	0.6%	0%	1.0%	-	0.7%	1.8%	0%	1.6%	-	-	-	4.8%	1.5%	0%	1.3%	-	1.3%
Pedestrians	-	-	-	-	73	-	-	-	-	2	-	11	-	-	-	-	77	
% Pedestrians	-	-	-	-	94.8%	-	-	-	-	100%	-	84.6%	-	-	-	-	95.1%	-
Bicycles on Crosswalk	-	-	-	-	4	-	-	-	-	0	-	2	-	-	-	-	4	
% Bicycles on Crosswalk	-	-	-	-	5.2%	-	-	-	-	0%	-	15.4%	-	-	-	-	4.9%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

4. Pearl Street at Woodall Rogers SBFR - TMC

Tue Oct 8, 2019

PM Peak (5:30 PM - 6:30 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703605, Location: 32.790763, -96.800554



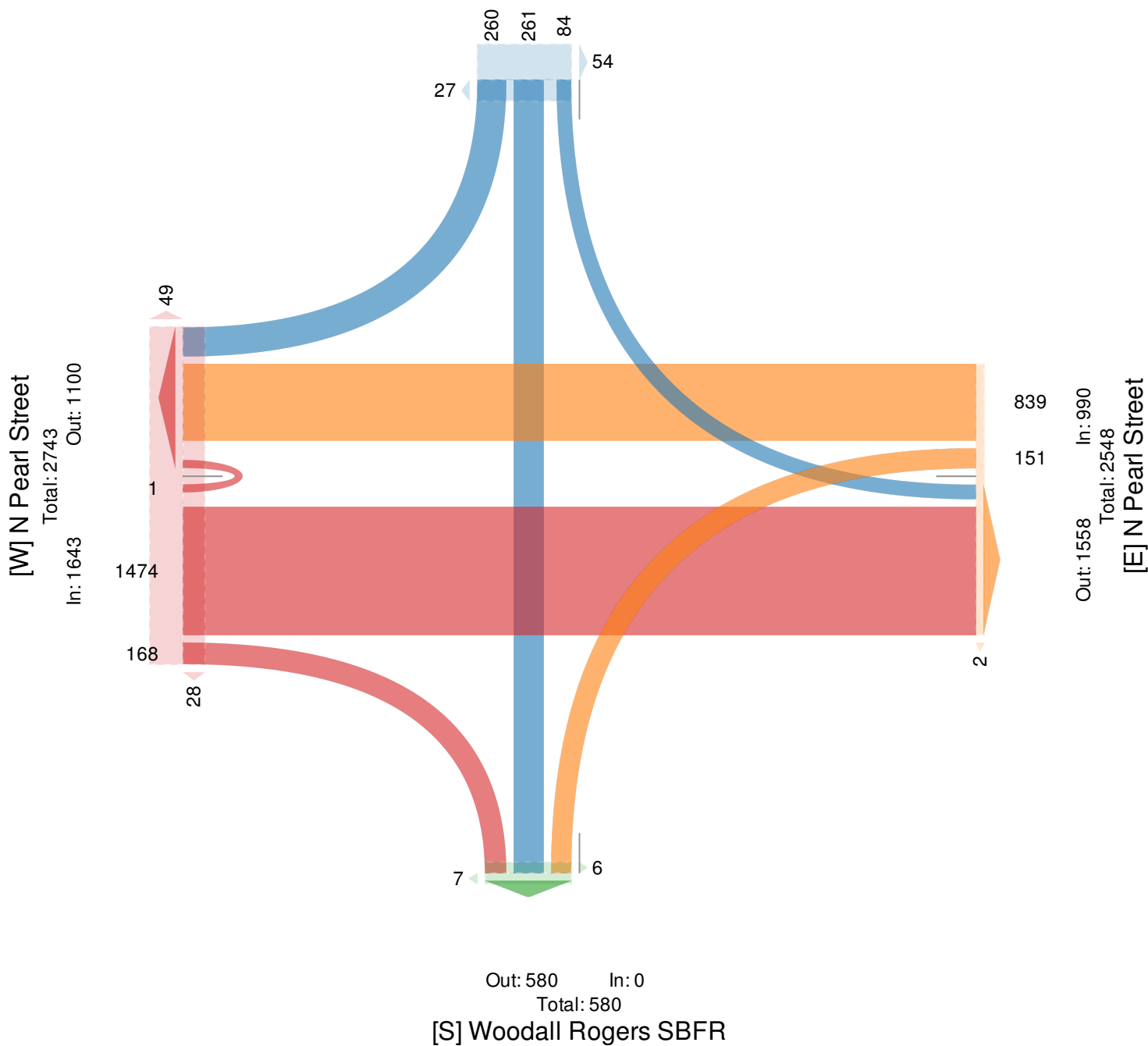
Provided by: C. J. Hensch & Associates
Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US

[N] Woodall Rogers SBFR

Total: 605

In: 605 Out: 0



5. Pearl Street at Woodall Rogers NBFR - TMC

Tue Oct 8, 2019

Full Length (6:30 AM-8:30 AM, 4:30 PM-6:30 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703606, Location: 32.790255, -96.799966



Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg	Pearl Street					Pearl Street					Woodall Rogers NBFR					Woodall Rogers NBFR		
Direction	Eastbound					Westbound					Northbound					Southbound		
Time	L	T	U	App	Ped*	T	R	U	App	Ped*	L	T	R	App	Ped*	App	Ped*	Int
2019-10-08 6:30AM	33	62	0	95	0	200	3	0	203	3	26	96	63	185	1	0	11	483
6:45AM	40	107	0	147	0	188	5	0	193	3	38	91	68	197	4	0	9	537
Hourly Total	73	169	0	242	0	388	8	0	396	6	64	187	131	382	5	0	20	1020
7:00AM	52	102	0	154	0	200	10	1	211	1	34	103	76	213	0	0	6	578
7:15AM	72	151	0	223	0	212	7	0	219	7	31	147	88	266	5	0	23	708
7:30AM	76	139	0	215	0	217	13	0	230	1	30	145	85	260	2	0	17	705
7:45AM	78	175	0	253	0	209	16	0	225	2	46	189	91	326	2	0	34	804
Hourly Total	278	567	0	845	0	838	46	1	885	11	141	584	340	1065	9	0	80	2795
8:00AM	69	214	0	283	0	186	11	0	197	4	46	153	81	280	3	0	17	760
8:15AM	58	193	0	251	0	220	11	0	231	12	53	187	90	330	3	0	21	812
Hourly Total	127	407	0	534	0	406	22	0	428	16	99	340	171	610	6	0	38	1572
4:30PM	148	238	1	387	0	210	40	0	250	14	29	177	19	225	19	0	16	862
4:45PM	158	260	0	418	0	205	22	1	228	8	38	209	36	283	3	0	14	929
Hourly Total	306	498	1	805	0	415	62	1	478	22	67	386	55	508	22	0	30	1791
5:00PM	150	265	0	415	1	212	40	1	253	10	30	172	30	232	11	0	17	900
5:15PM	151	260	0	411	0	205	32	0	237	8	35	211	21	267	10	0	28	915
5:30PM	166	219	0	385	0	246	39	0	285	6	31	186	24	241	6	0	14	911
5:45PM	151	229	0	380	0	250	46	4	300	7	32	186	25	243	9	0	16	923
Hourly Total	618	973	0	1591	1	913	157	5	1075	31	128	755	100	983	36	0	75	3649
6:00PM	153	224	2	379	0	225	29	1	255	8	20	185	27	232	11	0	15	866
6:15PM	172	224	0	396	0	213	33	1	247	10	33	192	21	246	5	0	34	889
Hourly Total	325	448	2	775	0	438	62	2	502	18	53	377	48	478	16	0	49	1755
Total	1727	3062	3	4792	1	3398	357	9	3764	104	552	2629	845	4026	94	0	292	12582
% Approach	36.0%	63.9%	0.1%	-	-	90.3%	9.5%	0.2%	-	-	13.7%	65.3%	21.0%	-	-	-	-	-
% Total	13.7%	24.3%	0%	38.1%	-	27.0%	2.8%	0.1%	29.9%	-	4.4%	20.9%	6.7%	32.0%	-	0%	-	-
Lights	1697	2978	3	4678	-	3296	351	9	3656	-	546	2597	820	3963	-	0	-	12297
% Lights	98.3%	97.3%	100%	97.6%	-	97.0%	98.3%	100%	97.1%	-	98.9%	98.8%	97.0%	98.4%	-	-	-	97.7%
Articulated Trucks	13	0	0	13	-	3	0	0	3	-	3	11	5	19	-	0	-	35
% Articulated Trucks	0.8%	0%	0%	0.3%	-	0.1%	0%	0%	0.1%	-	0.5%	0.4%	0.6%	0.5%	-	-	-	0.3%
Buses and Single-Unit Trucks	17	84	0	101	-	99	6	0	105	-	3	21	20	44	-	0	-	250
% Buses and Single-Unit Trucks	1.0%	2.7%	0%	2.1%	-	2.9%	1.7%	0%	2.8%	-	0.5%	0.8%	2.4%	1.1%	-	-	-	2.0%
Pedestrians	-	-	-	-	1	-	-	-	-	101	-	-	-	-	88	-	288	-
% Pedestrians	-	-	-	-	100%	-	-	-	-	97.1%	-	-	-	-	93.6%	-	98.6%	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	3	-	-	-	-	6	-	4	-
% Bicycles on Crosswalk	-	-	-	-	0%	-	-	-	-	2.9%	-	-	-	-	6.4%	-	1.4%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

5. Pearl Street at Woodall Rogers NBFR - TMC

Tue Oct 8, 2019

Full Length (6:30 AM-8:30 AM, 4:30 PM-6:30 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703606, Location: 32.790255, -96.799966

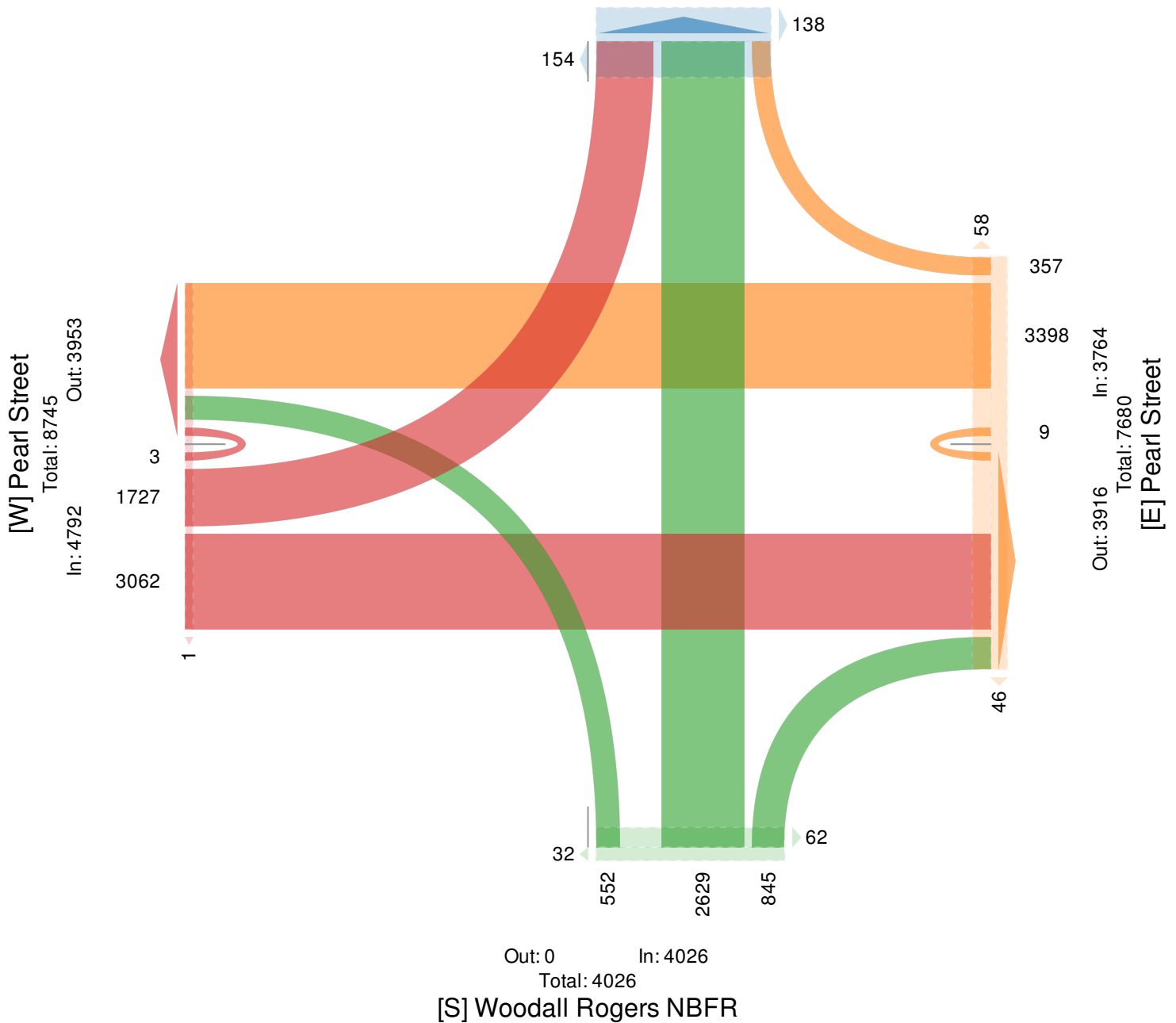


Provided by: C. J. Hensch & Associates
Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US

[N] Woodall Rogers NBFR

Total: 4713
In: 0 Out: 4713



5. Pearl Street at Woodall Rogers NBFR - TMC

Tue Oct 8, 2019

AM Peak (7:30 AM - 8:30 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703606, Location: 32.790255, -96.799966



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg	Pearl Street					Pearl Street					Woodall Rogers NBFR					Woodall Rogers NBFR		
Direction	Eastbound					Westbound					Northbound					Southbound		
Time	L	T	U	App	Ped*	T	R	U	App	Ped*	L	T	R	App	Ped*	App	Ped*	Int
2019-10-08 7:30AM	76	139	0	215	0	217	13	0	230	1	30	145	85	260	2	0	17	705
7:45AM	78	175	0	253	0	209	16	0	225	2	46	189	91	326	2	0	34	804
8:00AM	69	214	0	283	0	186	11	0	197	4	46	153	81	280	3	0	17	760
8:15AM	58	193	0	251	0	220	11	0	231	12	53	187	90	330	3	0	21	812
Total	281	721	0	1002	0	832	51	0	883	19	175	674	347	1196	10	0	89	3081
% Approach	28.0%	72.0%	0%	-	-	94.2%	5.8%	0%	-	-	14.6%	56.4%	29.0%	-	-	-	-	-
% Total	9.1%	23.4%	0%	32.5%	-	27.0%	1.7%	0%	28.7%	-	5.7%	21.9%	11.3%	38.8%	-	0%	-	-
PHF	0.901	0.842	-	0.885	-	0.945	0.797	-	0.956	-	0.825	0.892	0.953	0.906	-	-	-	0.949
Lights	268	703	0	971	-	803	48	0	851	-	173	663	336	1172	-	0	-	2994
% Lights	95.4%	97.5%	0%	96.9%	-	96.5%	94.1%	0%	96.4%	-	98.9%	98.4%	96.8%	98.0%	-	-	-	97.2%
Articulated Trucks	5	0	0	5	-	1	0	0	1	-	1	3	3	7	-	0	-	13
% Articulated Trucks	1.8%	0%	0%	0.5%	-	0.1%	0%	0%	0.1%	-	0.6%	0.4%	0.9%	0.6%	-	-	-	0.4%
Buses and Single-Unit Trucks	8	18	0	26	-	28	3	0	31	-	1	8	8	17	-	0	-	74
% Buses and Single-Unit Trucks	2.8%	2.5%	0%	2.6%	-	3.4%	5.9%	0%	3.5%	-	0.6%	1.2%	2.3%	1.4%	-	-	-	2.4%
Pedestrians	-	-	-	-	0	-	-	-	-	19	-	-	-	-	8	-	89	
% Pedestrians	-	-	-	-	-	-	-	-	-	100%	-	-	-	-	80.0%	-	100%	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	2	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	0%	-	-	-	-	20.0%	-	0%	

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

5. Pearl Street at Woodall Rogers NBFR - TMC

Tue Oct 8, 2019

AM Peak (7:30 AM - 8:30 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703606, Location: 32.790255, -96.799966

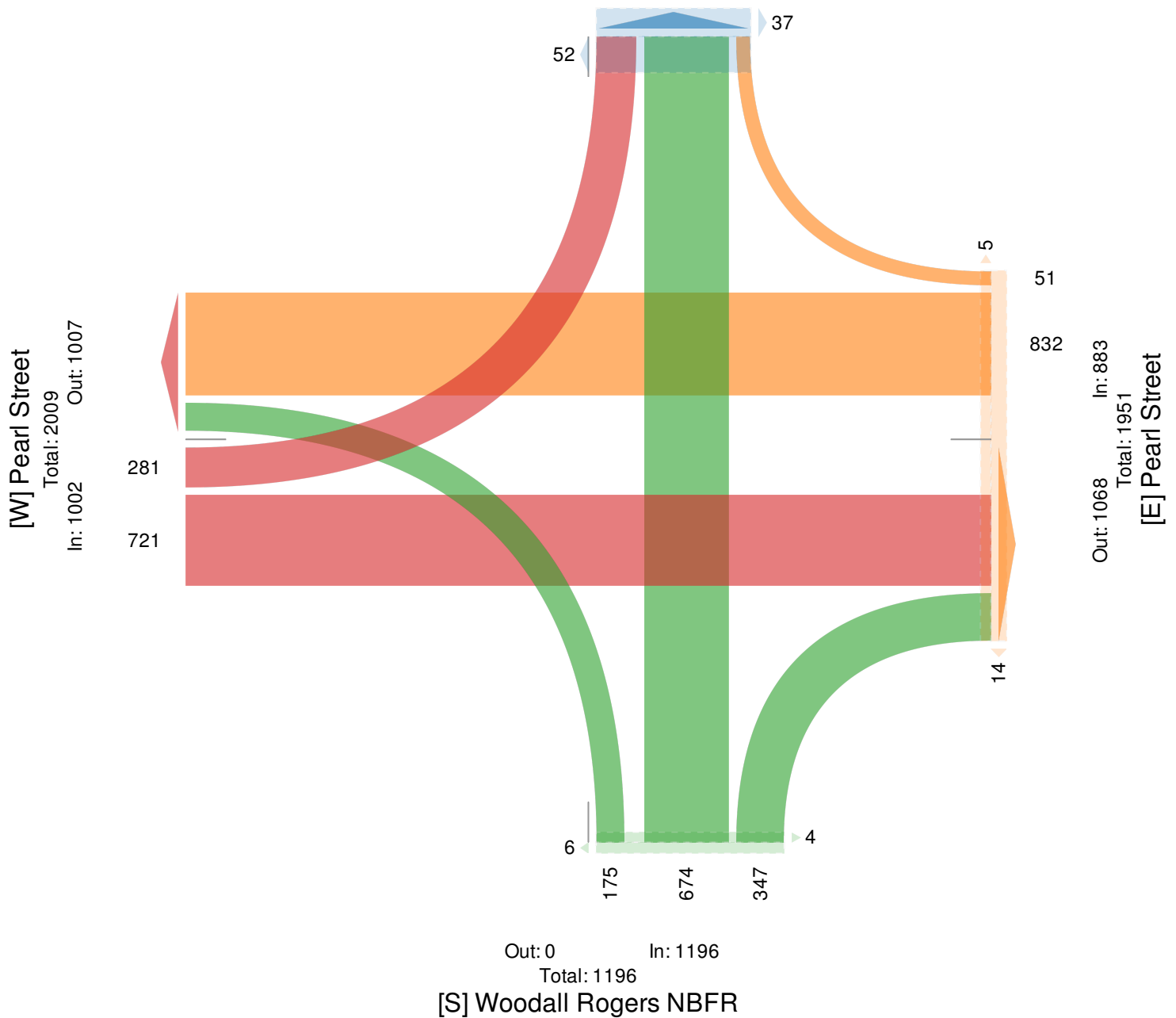
CJ Hensch &
Associates, Inc.

Provided by: C. J. Hensch & Associates
Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US

[N] Woodall Rogers NBFR

Total: 1006
In: 0 Out: 1006



5. Pearl Street at Woodall Rogers NBFR - TMC

Tue Oct 8, 2019

PM Peak (4:45 PM - 5:45 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703606, Location: 32.790255, -96.799966



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg	Pearl Street					Pearl Street					Woodall Rogers NBFR					Woodall Rogers NBFR		
Direction	Eastbound					Westbound					Northbound					Southbound		
Time	L	T	U	App	Ped*	T	R	U	App	Ped*	L	T	R	App	Ped*	App	Ped*	Int
2019-10-08 4:45PM	158	260	0	418	0	205	22	1	228	8	38	209	36	283	3	0	14	929
5:00PM	150	265	0	415	1	212	40	1	253	10	30	172	30	232	11	0	17	900
5:15PM	151	260	0	411	0	205	32	0	237	8	35	211	21	267	10	0	28	915
5:30PM	166	219	0	385	0	246	39	0	285	6	31	186	24	241	6	0	14	911
Total	625	1004	0	1629	1	868	133	2	1003	32	134	778	111	1023	30	0	73	3655
% Approach	38.4%	61.6%	0%	-	-	86.5%	13.3%	0.2%	-	-	13.1%	76.1%	10.9%	-	-	-	-	-
% Total	17.1%	27.5%	0%	44.6%	-	23.7%	3.6%	0.1%	27.4%	-	3.7%	21.3%	3.0%	28.0%	-	0%	-	-
PHF	0.941	0.947	-	0.974	-	0.882	0.831	0.500	0.880	-	0.882	0.922	0.771	0.904	-	-	-	0.984
Lights	620	981	0	1601	-	843	132	2	977	-	133	777	108	1018	-	0	-	3596
% Lights	99.2%	97.7%	0%	98.3%	-	97.1%	99.2%	100%	97.4%	-	99.3%	99.9%	97.3%	99.5%	-	-	-	98.4%
Articulated Trucks	2	0	0	2	-	0	0	0	0	-	0	1	0	1	-	0	-	3
% Articulated Trucks	0.3%	0%	0%	0.1%	-	0%	0%	0%	0%	-	0%	0.1%	0%	0.1%	-	-	-	0.1%
Buses and Single-Unit Trucks	3	23	0	26	-	25	1	0	26	-	1	0	3	4	-	0	-	56
% Buses and Single-Unit Trucks	0.5%	2.3%	0%	1.6%	-	2.9%	0.8%	0%	2.6%	-	0.7%	0%	2.7%	0.4%	-	-	-	1.5%
Pedestrians	-	-	-	-	1	-	-	-	-	32	-	-	-	-	30	-	72	
% Pedestrians	-	-	-	-	100%	-	-	-	-	100%	-	-	-	-	100%	-	98.6%	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	1	
% Bicycles on Crosswalk	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	1.4%	

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

5. Pearl Street at Woodall Rogers NBFR - TMC

Tue Oct 8, 2019

PM Peak (4:45 PM - 5:45 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703606, Location: 32.790255, -96.799966

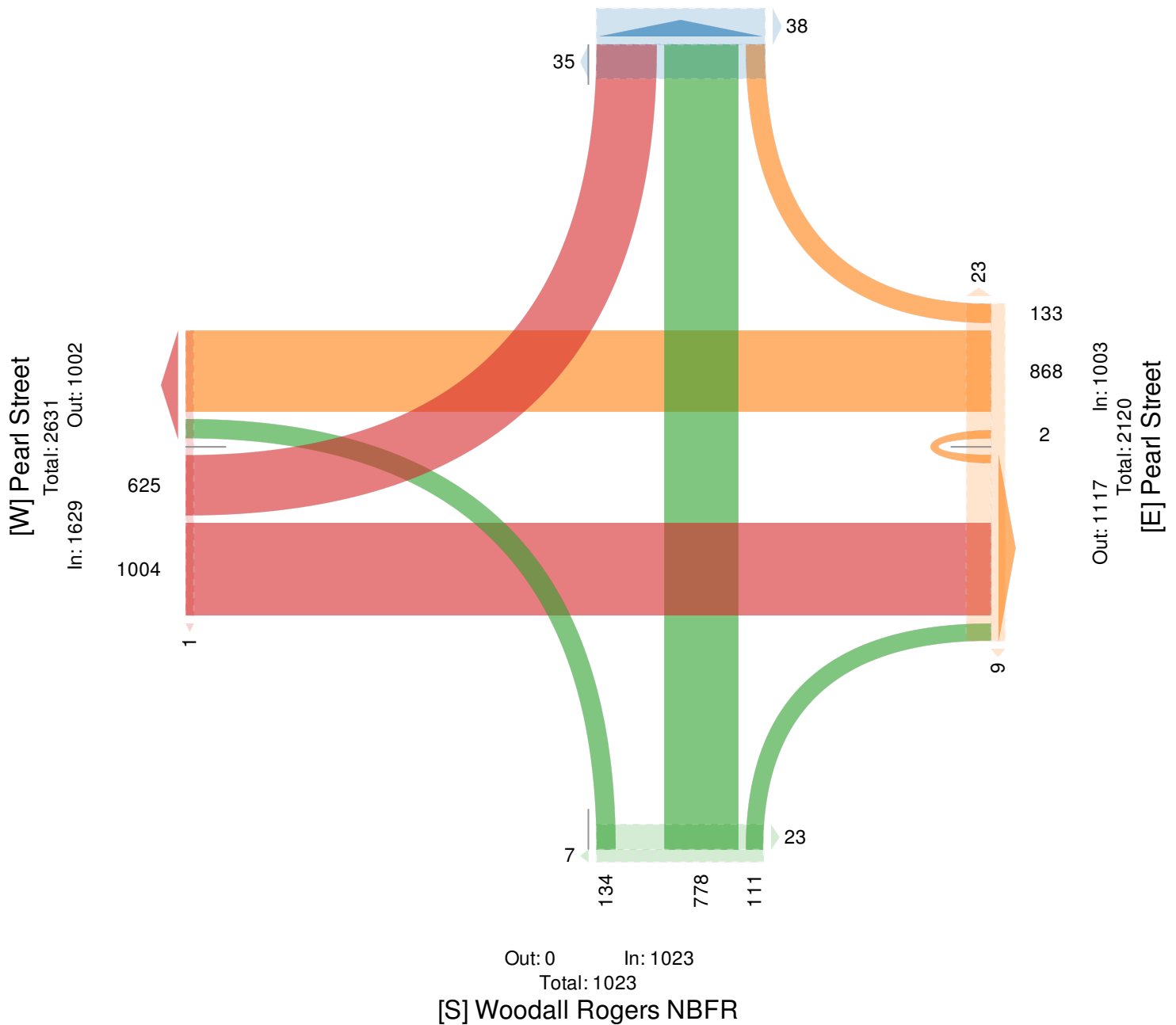


Provided by: C. J. Hensch & Associates
Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US

[N] Woodall Rogers NBFR

Total: 1536
In: 0 Out: 1536



6. Harwood Street at Woodall Rogers NBFR - TMC

Tue Oct 8, 2019

Full Length (6:30 AM-8:30 AM, 4:30 PM-6:30 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703607, Location: 32.788894, -96.801608



Provided by: C. J. Hensch &
Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	Harwood Street Westbound		Harwood Street Northbound				Woodall Rogers NBFR Southbound		
Time	App	Ped*	T	R	App	Ped*	App	Ped*	Int
2019-10-08 6:30AM	0	1	60	12	72	2	0	0	72
6:45AM	0	1	77	21	98	2	0	2	98
Hourly Total	0	2	137	33	170	4	0	2	170
7:00AM	0	2	83	26	109	1	0	3	109
7:15AM	0	5	97	29	126	11	0	2	126
7:30AM	0	5	119	29	148	5	0	3	148
7:45AM	0	2	151	51	202	1	0	7	202
Hourly Total	0	14	450	135	585	18	0	15	585
8:00AM	0	4	109	65	174	1	0	10	174
8:15AM	0	6	119	77	196	9	0	7	196
Hourly Total	0	10	228	142	370	10	0	17	370
4:30PM	0	2	161	35	196	18	0	2	196
4:45PM	0	4	192	32	224	22	0	9	224
Hourly Total	0	6	353	67	420	40	0	11	420
5:00PM	0	8	188	23	211	35	0	9	211
5:15PM	0	6	183	37	220	8	0	6	220
5:30PM	0	7	177	33	210	10	0	16	210
5:45PM	0	1	184	32	216	5	0	11	216
Hourly Total	0	22	732	125	857	58	0	42	857
6:00PM	0	18	202	27	229	5	0	16	229
6:15PM	0	4	177	16	193	16	0	19	193
Hourly Total	0	22	379	43	422	21	0	35	422
Total	0	76	2279	545	2824	151	0	122	2824
% Approach	-	-	80.7%	19.3%	-	-	-	-	-
% Total	0 %	-	80.7%	19.3%	100 %	-	0 %	-	-
Lights	0	-	2244	541	2785	-	0	-	2785
% Lights	-	-	98.5%	99.3%	98.6 %	-	-	-	98.6%
Articulated Trucks	0	-	11	0	11	-	0	-	11
% Articulated Trucks	-	-	0.5%	0%	0.4 %	-	-	-	0.4%
Buses and Single-Unit Trucks	0	-	24	4	28	-	0	-	28
% Buses and Single-Unit Trucks	-	-	1.1%	0.7%	1.0 %	-	-	-	1.0%
Pedestrians	-	72	-	-	-	150	-	119	
% Pedestrians	-	94.7%	-	-	-	99.3%	-	97.5%	-
Bicycles on Crosswalk	-	4	-	-	-	1	-	3	
% Bicycles on Crosswalk	-	5.3%	-	-	-	0.7%	-	2.5%	-

* Pedestrians and Bicycles on Crosswalk. R: Right, T: Thru

6. Harwood Street at Woodall Rogers NBFR - TMC

Tue Oct 8, 2019

Full Length (6:30 AM-8:30 AM, 4:30 PM-6:30 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703607, Location: 32.788894, -96.801608



Provided by: C. J. Hensch & Associates
Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US

[N] Woodall Rogers NBFR

Total: 2279
In: 0 Out: 2279



Out: 0 In: 2824
Total: 2824
[S] Harwood Street

Out: 545 In: 0
Total: 545
[E] Harwood Street

6. Harwood Street at Woodall Rogers NBFR - TMC

Tue Oct 8, 2019

AM Peak (7:30 AM - 8:30 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703607, Location: 32.788894, -96.801608



Provided by: C. J. Hensch &
Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	Harwood Street Westbound		Harwood Street Northbound				Woodall Rogers NBFR Southbound		
Time	App	Ped*	T	R	App	Ped*	App	Ped*	Int
2019-10-08 7:30AM	0	5	119	29	148	5	0	3	148
7:45AM	0	2	151	51	202	1	0	7	202
8:00AM	0	4	109	65	174	1	0	10	174
8:15AM	0	6	119	77	196	9	0	7	196
Total	0	17	498	222	720	16	0	27	720
% Approach	-	-	69.2%	30.8%	-	-	-	-	-
% Total	0%	-	69.2%	30.8%	100%	-	0%	-	-
PHF	-	-	0.825	0.721	0.891	-	-	-	0.891
Lights	0	-	489	222	711	-	0	-	711
% Lights	-	-	98.2%	100%	98.8%	-	-	-	98.8%
Articulated Trucks	0	-	2	0	2	-	0	-	2
% Articulated Trucks	-	-	0.4%	0%	0.3%	-	-	-	0.3%
Buses and Single-Unit Trucks	0	-	7	0	7	-	0	-	7
% Buses and Single-Unit Trucks	-	-	1.4%	0%	1.0%	-	-	-	1.0%
Pedestrians	-	17	-	-	-	15	-	27	
% Pedestrians	-	100%	-	-	-	93.8%	-	100%	-
Bicycles on Crosswalk	-	0	-	-	-	1	-	0	
% Bicycles on Crosswalk	-	0%	-	-	-	6.3%	-	0%	-

* Pedestrians and Bicycles on Crosswalk. R: Right, T: Thru

6. Harwood Street at Woodall Rogers NBFR - TMC

Tue Oct 8, 2019

AM Peak (7:30 AM - 8:30 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703607, Location: 32.788894, -96.801608



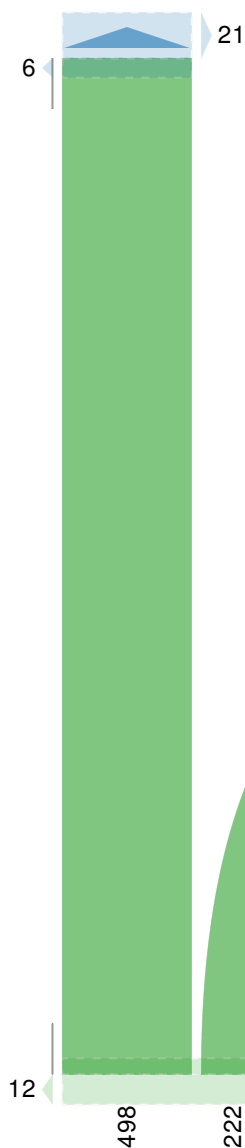
Provided by: C. J. Hensch & Associates
Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US

[N] Woodall Rogers NBFR

Total: 498

In: 0 Out: 498



Out: 0 In: 720

Total: 720

[S] Harwood Street

Out: 222 In: 0

Total: 222

[E] Harwood Street

6. Harwood Street at Woodall Rogers NBFR - TMC

Tue Oct 8, 2019

PM Peak (5:15 PM - 6:15 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703607, Location: 32.788894, -96.801608



Provided by: C. J. Hensch &
Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	Harwood Street Westbound		Harwood Street Northbound				Woodall Rogers NBFR Southbound		
Time	App	Ped*	T	R	App	Ped*	App	Ped*	Int
2019-10-08 5:15PM	0	6	183	37	220	8	0	6	220
5:30PM	0	7	177	33	210	10	0	16	210
5:45PM	0	1	184	32	216	5	0	11	216
6:00PM	0	18	202	27	229	5	0	16	229
Total	0	32	746	129	875	28	0	49	875
% Approach	-	-	85.3%	14.7%	-	-	-	-	-
% Total	0%	-	85.3%	14.7%	100%	-	0%	-	-
PHF	-	-	0.923	0.872	0.955	-	-	-	0.955
Lights	0	-	739	126	865	-	0	-	865
% Lights	-	-	99.1%	97.7%	98.9%	-	-	-	98.9%
Articulated Trucks	0	-	2	0	2	-	0	-	2
% Articulated Trucks	-	-	0.3%	0%	0.2%	-	-	-	0.2%
Buses and Single-Unit Trucks	0	-	5	3	8	-	0	-	8
% Buses and Single-Unit Trucks	-	-	0.7%	2.3%	0.9%	-	-	-	0.9%
Pedestrians	-	30	-	-	-	28	-	48	
% Pedestrians	-	93.8%	-	-	-	100%	-	98.0%	-
Bicycles on Crosswalk	-	2	-	-	-	0	-	1	
% Bicycles on Crosswalk	-	6.3%	-	-	-	0%	-	2.0%	-

* Pedestrians and Bicycles on Crosswalk. R: Right, T: Thru

6. Harwood Street at Woodall Rogers NBFR - TMC

Tue Oct 8, 2019

PM Peak (5:15 PM - 6:15 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703607, Location: 32.788894, -96.801608



Provided by: C. J. Hensch & Associates
Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US

[N] Woodall Rogers NBFR

Total: 746

In: 0 Out: 746



Out: 0 In: 875

Total: 875

[S] Harwood Street

Out: 129 In: 0

Total: 129

[E] Harwood Street

7. Harwood Street at Woodall Rogers SBFR - TMC

Tue Oct 8, 2019

Full Length (6:30 AM-8:30 AM, 4:30 PM-6:30 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703608, Location: 32.789449, -96.802174



Provided by: C. J. Hensch &
Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	Harwood Street Eastbound				Woodall Rogers SBFR Northbound		Woodall Rogers SBFR Southbound				
Time	R	U	App	Ped*	App	Ped*	T	R	App	Ped*	Int
2019-10-08 6:30AM	2	0	2	3	0	3	62	23	85	5	87
6:45AM	3	0	3	1	0	5	71	28	99	4	102
Hourly Total	5	0	5	4	0	8	133	51	184	9	189
7:00AM	6	0	6	2	0	5	90	35	125	2	131
7:15AM	1	0	1	5	0	7	119	40	159	4	160
7:30AM	15	0	15	4	0	6	125	47	172	9	187
7:45AM	12	0	12	4	0	9	160	66	226	7	238
Hourly Total	34	0	34	15	0	27	494	188	682	22	716
8:00AM	9	0	9	5	0	12	171	75	246	5	255
8:15AM	10	0	10	2	0	20	199	81	280	5	290
Hourly Total	19	0	19	7	0	32	370	156	526	10	545
4:30PM	36	0	36	6	0	22	160	9	169	7	205
4:45PM	37	0	37	7	0	18	134	7	141	6	178
Hourly Total	73	0	73	13	0	40	294	16	310	13	383
5:00PM	62	0	62	9	0	24	148	11	159	11	221
5:15PM	42	0	42	8	0	14	172	13	185	11	227
5:30PM	65	0	65	16	0	21	163	10	173	10	238
5:45PM	43	0	43	8	0	23	160	20	180	11	223
Hourly Total	212	0	212	41	0	82	643	54	697	43	909
6:00PM	37	0	37	6	0	25	174	5	179	7	216
6:15PM	42	0	42	10	0	24	170	20	190	11	232
Hourly Total	79	0	79	16	0	49	344	25	369	18	448
Total	422	0	422	96	0	238	2278	490	2768	115	3190
% Approach	100%	0%	-	-	-	-	82.3%	17.7%	-	-	-
% Total	13.2%	0%	13.2%	-	0%	-	71.4%	15.4%	86.8%	-	-
Lights	416	0	416	-	0	-	2246	487	2733	-	3149
% Lights	98.6%	0%	98.6%	-	-	-	98.6%	99.4%	98.7%	-	98.7%
Articulated Trucks	1	0	1	-	0	-	3	0	3	-	4
% Articulated Trucks	0.2%	0%	0.2%	-	-	-	0.1%	0%	0.1%	-	0.1%
Buses and Single-Unit Trucks	5	0	5	-	0	-	29	3	32	-	37
% Buses and Single-Unit Trucks	1.2%	0%	1.2%	-	-	-	1.3%	0.6%	1.2%	-	1.2%
Pedestrians	-	-	-	87	-	236	-	-	-	110	-
% Pedestrians	-	-	-	90.6%	-	99.2%	-	-	-	95.7%	-
Bicycles on Crosswalk	-	-	-	9	-	2	-	-	-	5	-
% Bicycles on Crosswalk	-	-	-	9.4%	-	0.8%	-	-	-	4.3%	-

* Pedestrians and Bicycles on Crosswalk. R: Right, T: Thru, U: U-Turn

7. Harwood Street at Woodall Rogers SBFR - TMC

Tue Oct 8, 2019

Full Length (6:30 AM-8:30 AM, 4:30 PM-6:30 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703608, Location: 32.789449, -96.802174

CJ Hensch &
Associates, Inc.

Provided by: C. J. Hensch & Associates
Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US

[N] Woodall Rogers SBFR

Total: 2768

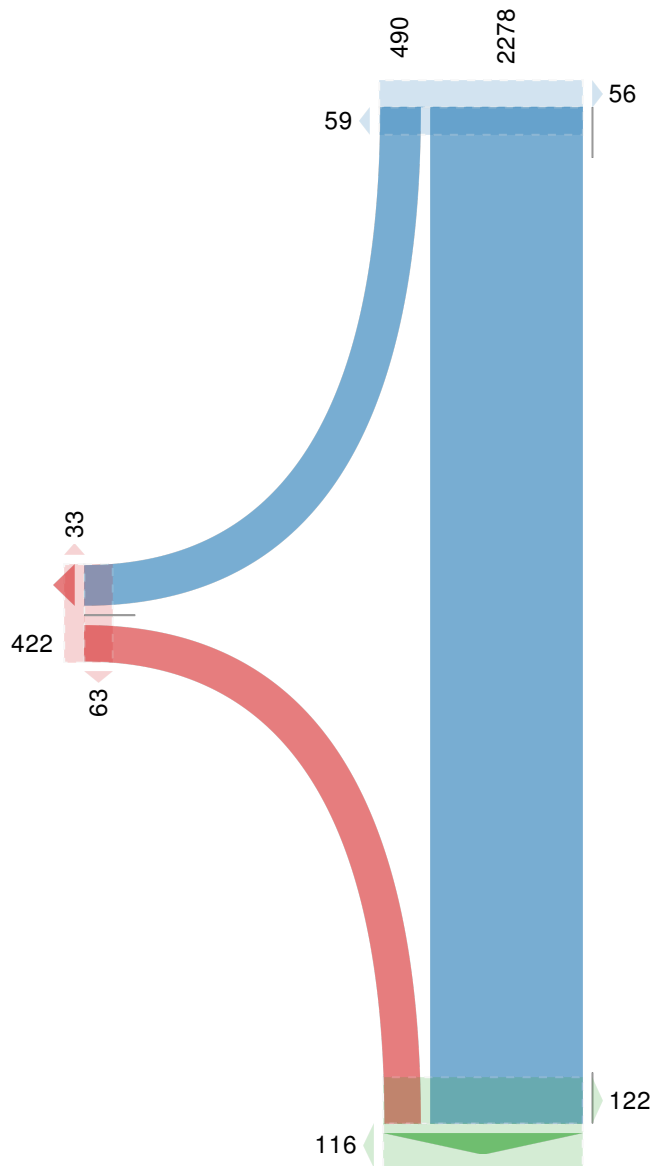
In: 2768

Out: 0

[W] Harwood Street

Total: 912

In: 422 Out: 490



[S] Woodall Rogers SBFR

7. Harwood Street at Woodall Rogers SBFR - TMC

Tue Oct 8, 2019

AM Peak (7:30 AM - 8:30 AM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703608, Location: 32.789449, -96.802174



Provided by: C. J. Hensch &
Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	Harwood Street Eastbound				Woodall Rogers SBFR Northbound		Woodall Rogers SBFR Southbound				
Time	R	U	App	Ped*	App	Ped*	T	R	App	Ped*	Int
2019-10-08 7:30AM	15	0	15	4	0	6	125	47	172	9	187
7:45AM	12	0	12	4	0	9	160	66	226	7	238
8:00AM	9	0	9	5	0	12	171	75	246	5	255
8:15AM	10	0	10	2	0	20	199	81	280	5	290
Total	46	0	46	15	0	47	655	269	924	26	970
% Approach	100%	0%	-	-	-	-	70.9%	29.1%	-	-	-
% Total	4.7%	0%	4.7%	-	0%	-	67.5%	27.7%	95.3%	-	-
PHF	0.767	-	0.767	-	-	-	0.823	0.830	0.825	-	0.836
Lights	44	0	44	-	0	-	644	268	912	-	956
% Lights	95.7%	0%	95.7%	-	-	-	98.3%	99.6%	98.7%	-	98.6%
Articulated Trucks	1	0	1	-	0	-	1	0	1	-	2
% Articulated Trucks	2.2%	0%	2.2%	-	-	-	0.2%	0%	0.1%	-	0.2%
Buses and Single-Unit Trucks	1	0	1	-	0	-	10	1	11	-	12
% Buses and Single-Unit Trucks	2.2%	0%	2.2%	-	-	-	1.5%	0.4%	1.2%	-	1.2%
Pedestrians	-	-	-	13	-	47	-	-	-	24	
% Pedestrians	-	-	-	86.7%	-	100%	-	-	-	92.3%	-
Bicycles on Crosswalk	-	-	-	2	-	0	-	-	-	2	
% Bicycles on Crosswalk	-	-	-	13.3%	-	0%	-	-	-	7.7%	-

*Pedestrians and Bicycles on Crosswalk. R: Right, T: Thru, U: U-Turn

7. Harwood Street at Woodall Rogers SBFR - TMC

Tue Oct 8, 2019

AM Peak (7:30 AM - 8:30 AM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

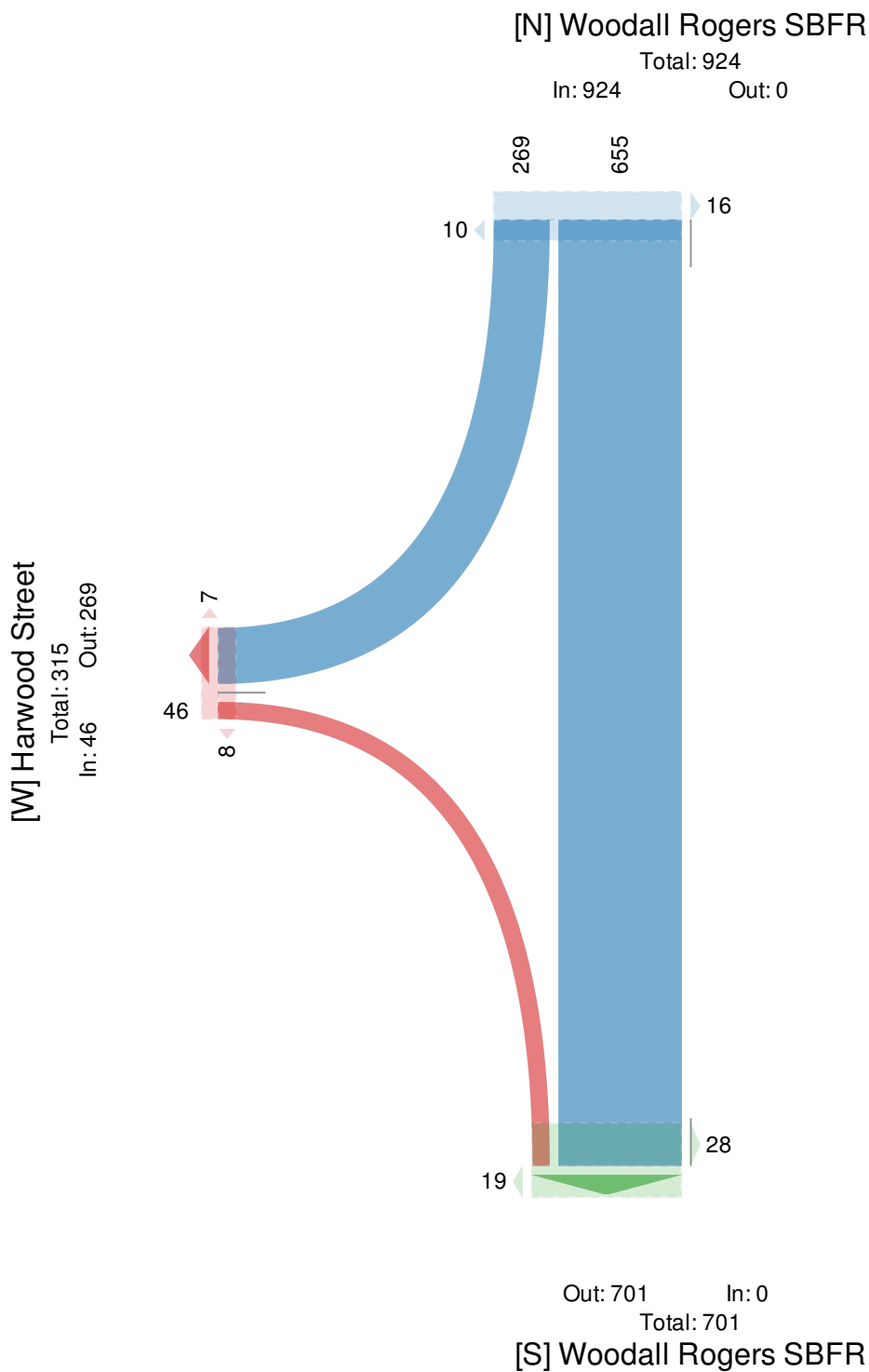
All Movements

ID: 703608, Location: 32.789449, -96.802174

CJ Hensch &
Associates, Inc.

Provided by: C. J. Hensch & Associates
Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US



7. Harwood Street at Woodall Rogers SBFR - TMC

Tue Oct 8, 2019

PM Peak (5 PM - 6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703608, Location: 32.789449, -96.802174



Provided by: C. J. Hensch &
Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	Harwood Street Eastbound				Woodall Rogers SBFR Northbound		Woodall Rogers SBFR Southbound				
Time	R	U	App	Ped*	App	Ped*	T	R	App	Ped*	Int
2019-10-08 5:00PM	62	0	62	9	0	24	148	11	159	11	221
5:15PM	42	0	42	8	0	14	172	13	185	11	227
5:30PM	65	0	65	16	0	21	163	10	173	10	238
5:45PM	43	0	43	8	0	23	160	20	180	11	223
Total	212	0	212	41	0	82	643	54	697	43	909
% Approach	100%	0%	-	-	-	-	92.3%	7.7%	-	-	-
% Total	23.3%	0%	23.3%	-	0%	-	70.7%	5.9%	76.7%	-	-
PHF	0.815	-	0.815	-	-	-	0.935	0.675	0.942	-	0.955
Lights	210	0	210	-	0	-	639	54	693	-	903
% Lights	99.1%	0%	99.1%	-	-	-	99.4%	100%	99.4%	-	99.3%
Articulated Trucks	0	0	0	-	0	-	0	0	0	-	0
% Articulated Trucks	0%	0%	0%	-	-	-	0%	0%	0%	-	0%
Buses and Single-Unit Trucks	2	0	2	-	0	-	4	0	4	-	6
% Buses and Single-Unit Trucks	0.9%	0%	0.9%	-	-	-	0.6%	0%	0.6%	-	0.7%
Pedestrians	-	-	-	38	-	80	-	-	-	41	
% Pedestrians	-	-	-	92.7%	-	97.6%	-	-	-	95.3%	-
Bicycles on Crosswalk	-	-	-	3	-	2	-	-	-	2	
% Bicycles on Crosswalk	-	-	-	7.3%	-	2.4%	-	-	-	4.7%	-

* Pedestrians and Bicycles on Crosswalk. R: Right, T: Thru, U: U-Turn

7. Harwood Street at Woodall Rogers SBFR - TMC

Tue Oct 8, 2019

PM Peak (5 PM - 6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703608, Location: 32.789449, -96.802174

CJ Hensch &
Associates, Inc.

Provided by: C. J. Hensch & Associates
Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US

[N] Woodall Rogers SBFR

Total: 697

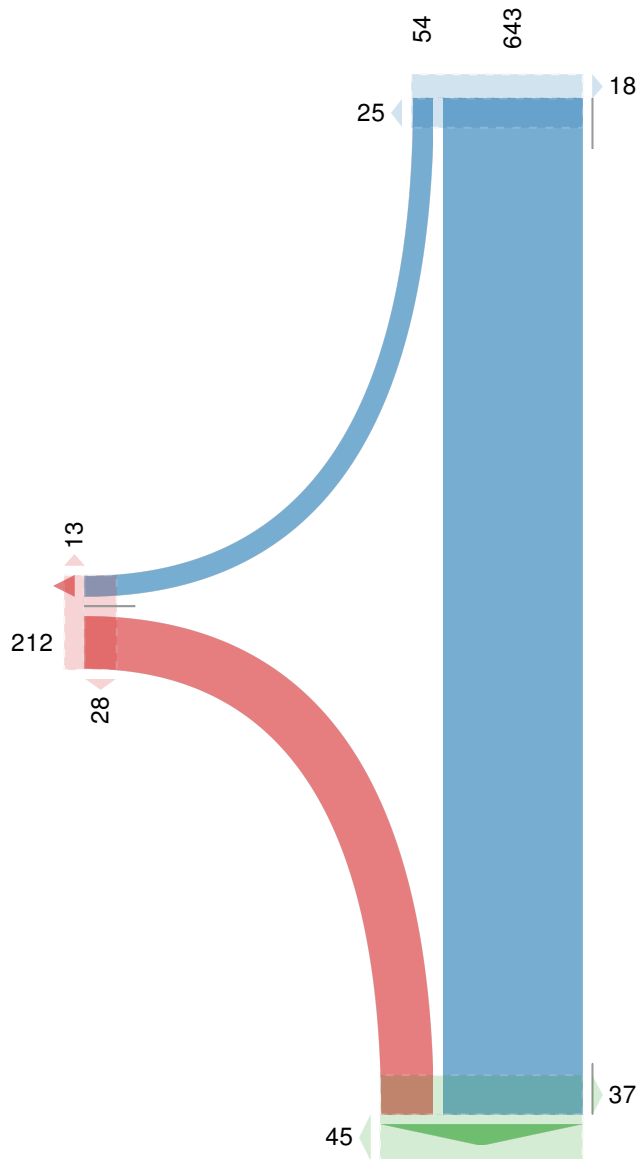
In: 697

Out: 0

[W] Harwood Street

Total: 266

In: 212 Out: 54



[S] Woodall Rogers SBFR

Out: 855

In: 0

Total: 855

8. Field Street at Woodall Rogers NBFR - TMC

Tue Oct 8, 2019

Full Length (6:30 AM-8:30 AM, 4:30 PM-6:30 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703609, Location: 32.786248, -96.804843



Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg	Field Street					Field Street					Woodall Rogers NBFR					Woodall Rogers NBFR			
Direction	Eastbound					Westbound					Northbound					Southbound			
Time	L	T	U	App	Ped*	T	R	U	App	Ped*	L	T	R	U	App	Ped*	App	Ped*	Int
2019-10-08 6:30AM	39	81	1	121	0	111	48	0	159	7	20	91	32	3	146	2	0	0	426
6:45AM	32	124	0	156	0	114	27	1	142	11	25	99	25	4	153	2	0	1	451
Hourly Total	71	205	1	277	0	225	75	1	301	18	45	190	57	7	299	4	0	1	877
7:00AM	36	106	0	142	0	159	69	1	229	12	28	89	28	9	154	3	0	0	525
7:15AM	33	156	0	189	0	192	56	0	248	12	23	90	29	11	153	3	0	1	590
7:30AM	30	195	0	225	0	194	36	0	230	7	27	146	45	20	238	6	0	1	693
7:45AM	41	205	0	246	0	165	52	0	217	8	50	145	64	18	277	6	0	4	740
Hourly Total	140	662	0	802	0	710	213	1	924	39	128	470	166	58	822	18	0	6	2548
8:00AM	24	188	0	212	0	153	40	0	193	20	39	125	55	7	226	8	0	4	631
8:15AM	32	187	1	220	0	143	29	2	174	22	42	125	48	7	222	8	0	0	616
Hourly Total	56	375	1	432	0	296	69	2	367	42	81	250	103	14	448	16	0	4	1247
4:30PM	51	204	0	255	0	194	106	0	300	22	23	182	17	28	250	12	0	3	805
4:45PM	84	198	0	282	0	212	99	0	311	29	24	158	30	24	236	0	0	3	829
Hourly Total	135	402	0	537	0	406	205	0	611	51	47	340	47	52	486	12	0	6	1634
5:00PM	75	201	0	276	0	241	89	1	331	45	16	190	21	37	264	17	0	5	871
5:15PM	70	239	0	309	0	253	86	1	340	42	22	186	20	29	257	16	0	1	906
5:30PM	88	260	0	348	0	211	77	0	288	9	32	171	23	31	257	5	0	2	893
5:45PM	80	219	1	300	0	172	97	1	270	10	13	212	22	26	273	6	0	1	843
Hourly Total	313	919	1	1233	0	877	349	3	1229	106	83	759	86	123	1051	44	0	9	3513
6:00PM	81	201	2	284	0	183	85	0	268	9	23	180	11	27	241	1	0	2	793
6:15PM	79	158	4	241	0	184	108	2	294	3	26	152	22	28	228	10	0	8	763
Hourly Total	160	359	6	525	0	367	193	2	562	12	49	332	33	55	469	11	0	10	1556
Total	875	2922	9	3806	0	2881	1104	9	3994	268	433	2341	492	309	3575	105	0	36	11375
% Approach	23.0%	76.8%	0.2%	-	-	72.1%	27.6%	0.2%	-	-	12.1%	65.5%	13.8%	8.6%	-	-	-	-	-
% Total	7.7%	25.7%	0.1%	33.5%	-	25.3%	9.7%	0.1%	35.1%	-	3.8%	20.6%	4.3%	2.7%	31.4%	-	0%	-	-
Lights	867	2872	9	3748	-	2837	1092	9	3938	-	421	2291	485	304	3501	-	0	-	11187
% Lights	99.1%	98.3%	100%	98.5%	-	98.5%	98.9%	100%	98.6%	-	97.2%	97.9%	98.6%	98.4%	97.9%	-	-	-	98.3%
Articulated Trucks	1	1	0	2	-	4	6	0	10	-	1	7	2	0	10	-	0	-	22
% Articulated Trucks	0.1%	0%	0%	0.1%	-	0.1%	0.5%	0%	0.3%	-	0.2%	0.3%	0.4%	0%	0.3%	-	-	-	0.2%
Buses and Single-Unit Trucks	7	49	0	56	-	40	6	0	46	-	11	43	5	5	64	-	0	-	166
% Buses and Single-Unit Trucks	0.8%	1.7%	0%	1.5%	-	1.4%	0.5%	0%	1.2%	-	2.5%	1.8%	1.0%	1.6%	1.8%	-	-	-	1.5%
Pedestrians	-	-	-	-	0	-	-	-	-	266	-	-	-	-	-	101	-	29	-
% Pedestrians	-	-	-	-	-	-	-	-	-	99.3%	-	-	-	-	-	96.2%	-	80.6%	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	2	-	-	-	-	-	4	-	7	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	0.7%	-	-	-	-	-	3.8%	-	19.4%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

8. Field Street at Woodall Rogers NBFR - TMC

Tue Oct 8, 2019

Full Length (6:30 AM-8:30 AM, 4:30 PM-6:30 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703609, Location: 32.786248, -96.804843

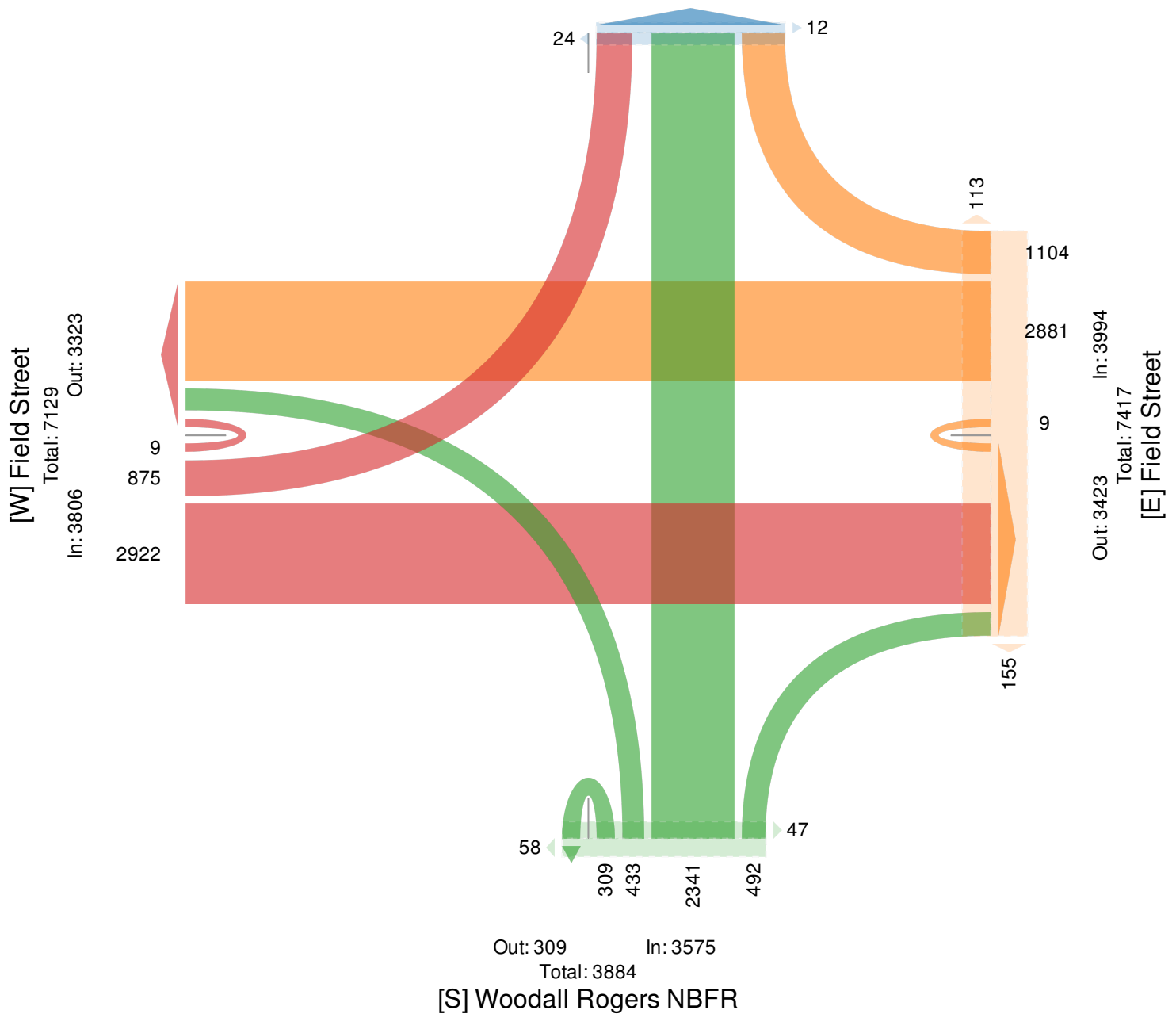
CJ Hensch &
Associates, Inc.

Provided by: C. J. Hensch & Associates
Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US

[N] Woodall Rogers NBFR

Total: 4320
In: 0 Out: 4320



8. Field Street at Woodall Rogers NBFR - TMC

Tue Oct 8, 2019

AM Peak (7:30 AM - 8:30 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703609, Location: 32.786248, -96.804843



Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg	Field Street					Field Street					Woodall Rogers NBFR						Woodall Rogers NBFR		
Direction	Eastbound					Westbound					Northbound						Southbound		
Time	L	T	U	App	Ped*	T	R	U	App	Ped*	L	T	R	U	App	Ped*	App	Ped*	Int
2019-10-08 7:30AM	30	195	0	225	0	194	36	0	230	7	27	146	45	20	238	6	0	1	693
7:45AM	41	205	0	246	0	165	52	0	217	8	50	145	64	18	277	6	0	4	740
8:00AM	24	188	0	212	0	153	40	0	193	20	39	125	55	7	226	8	0	4	631
8:15AM	32	187	1	220	0	143	29	2	174	22	42	125	48	7	222	8	0	0	616
Total	127	775	1	903	0	655	157	2	814	57	158	541	212	52	963	28	0	9	2680
% Approach	14.1%	85.8%	0.1%	-	-	80.5%	19.3%	0.2%	-	-	16.4%	56.2%	22.0%	5.4%	-	-	-	-	-
% Total	4.7%	28.9%	0%	33.7%	-	24.4%	5.9%	0.1%	30.4%	-	5.9%	20.2%	7.9%	1.9%	35.9%	-	0%	-	-
PHF	0.774	0.945	0.250	0.918	-	0.844	0.755	0.250	0.885	-	0.790	0.926	0.828	0.650	0.869	-	-	-	0.905
Lights	126	765	1	892	-	635	156	2	793	-	150	524	209	52	935	-	0	-	2620
% Lights	99.2%	98.7%	100%	98.8%	-	96.9%	99.4%	100%	97.4%	-	94.9%	96.9%	98.6%	100%	97.1%	-	-	-	97.8%
Articulated Trucks	0	0	0	0	-	3	0	0	3	-	0	1	0	0	1	-	0	-	4
% Articulated Trucks	0%	0%	0%	0%	-	0.5%	0%	0%	0.4%	-	0%	0.2%	0%	0%	0.1%	-	-	-	0.1%
Buses and Single-Unit Trucks	1	10	0	11	-	17	1	0	18	-	8	16	3	0	27	-	0	-	56
% Buses and Single-Unit Trucks	0.8%	1.3%	0%	1.2%	-	2.6%	0.6%	0%	2.2%	-	5.1%	3.0%	1.4%	0%	2.8%	-	-	-	2.1%
Pedestrians	-	-	-	-	0	-	-	-	-	57	-	-	-	-	-	27	-	9	
% Pedestrians	-	-	-	-	-	-	-	-	-	100%	-	-	-	-	-	96.4%	-	100%	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	1	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	0%	-	-	-	-	-	3.6%	-	0%	

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

8. Field Street at Woodall Rogers NBFR - TMC

Tue Oct 8, 2019

AM Peak (7:30 AM - 8:30 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703609, Location: 32.786248, -96.804843



Provided by: C. J. Hensch & Associates
Inc.

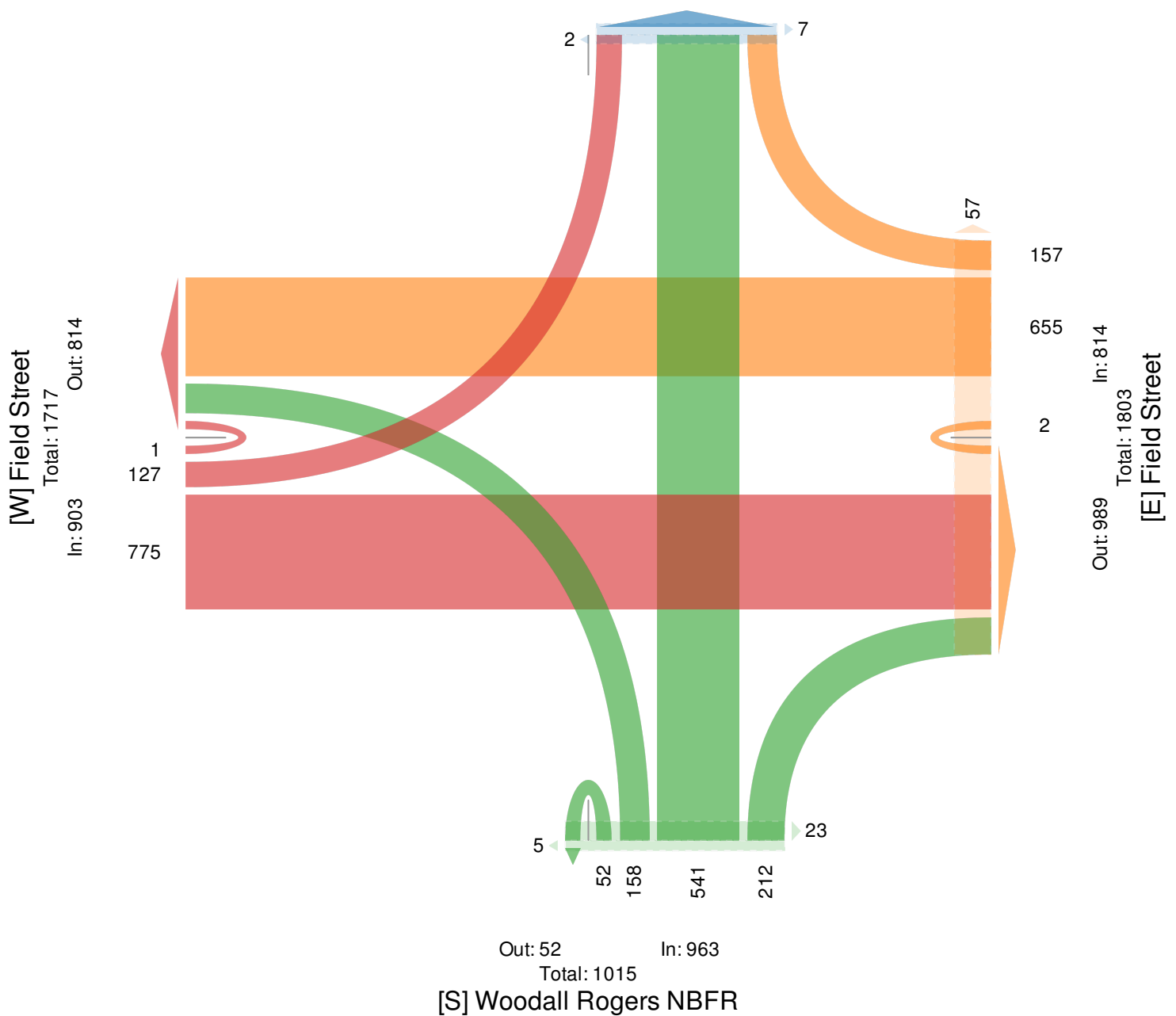
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

[N] Woodall Rogers NBFR

Total: 825

In: 0

Out: 825



8. Field Street at Woodall Rogers NBFR - TMC

Tue Oct 8, 2019

PM Peak (5 PM - 6 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703609, Location: 32.786248, -96.804843



Provided by: C. J. Hensch & Associates
Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg	Field Street					Field Street					Woodall Rogers NBFR						Woodall Rogers NBFR		
Direction	Eastbound					Westbound					Northbound						Southbound		
Time	L	T	U	App	Ped*	T	R	U	App	Ped*	L	T	R	U	App	Ped*	App	Ped*	Int
2019-10-08 5:00PM	75	201	0	276	0	241	89	1	331	45	16	190	21	37	264	17	0	5	871
5:15PM	70	239	0	309	0	253	86	1	340	42	22	186	20	29	257	16	0	1	906
5:30PM	88	260	0	348	0	211	77	0	288	9	32	171	23	31	257	5	0	2	893
5:45PM	80	219	1	300	0	172	97	1	270	10	13	212	22	26	273	6	0	1	843
Total	313	919	1	1233	0	877	349	3	1229	106	83	759	86	123	1051	44	0	9	3513
% Approach	25.4%	74.5%	0.1%	-	-	71.4%	28.4%	0.2%	-	-	7.9%	72.2%	8.2%	11.7%	-	-	-	-	-
% Total	8.9%	26.2%	0%	35.1%	-	25.0%	9.9%	0.1%	35.0%	-	2.4%	21.6%	2.4%	3.5%	29.9%	-	0%	-	-
PHF	0.889	0.884	0.250	0.886	-	0.867	0.899	0.750	0.904	-	0.648	0.895	0.935	0.831	0.962	-	-	-	0.969
Lights	311	903	1	1215	-	872	347	3	1222	-	83	750	85	123	1041	-	0	-	3478
% Lights	99.4%	98.3%	100%	98.5%	-	99.4%	99.4%	100%	99.4%	-	100%	98.8%	98.8%	100%	99.0%	-	-	-	99.0%
Articulated Trucks	1	1	0	2	-	0	2	0	2	-	0	2	1	0	3	-	0	-	7
% Articulated Trucks	0.3%	0.1%	0%	0.2%	-	0%	0.6%	0%	0.2%	-	0%	0.3%	1.2%	0%	0.3%	-	-	-	0.2%
Buses and Single-Unit Trucks	1	15	0	16	-	5	0	0	5	-	0	7	0	0	7	-	0	-	28
% Buses and Single-Unit Trucks	0.3%	1.6%	0%	1.3%	-	0.6%	0%	0%	0.4%	-	0%	0.9%	0%	0%	0.7%	-	-	-	0.8%
Pedestrians	-	-	-	-	0	-	-	-	-	105	-	-	-	-	-	43	-	7	
% Pedestrians	-	-	-	-	-	-	-	-	-	99.1%	-	-	-	-	-	97.7%	-	77.8%	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	1	-	-	-	-	-	1	-	2	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	0.9%	-	-	-	-	-	2.3%	-	22.2%	

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

8. Field Street at Woodall Rogers NBFR - TMC

Tue Oct 8, 2019

PM Peak (5 PM - 6 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703609, Location: 32.786248, -96.804843

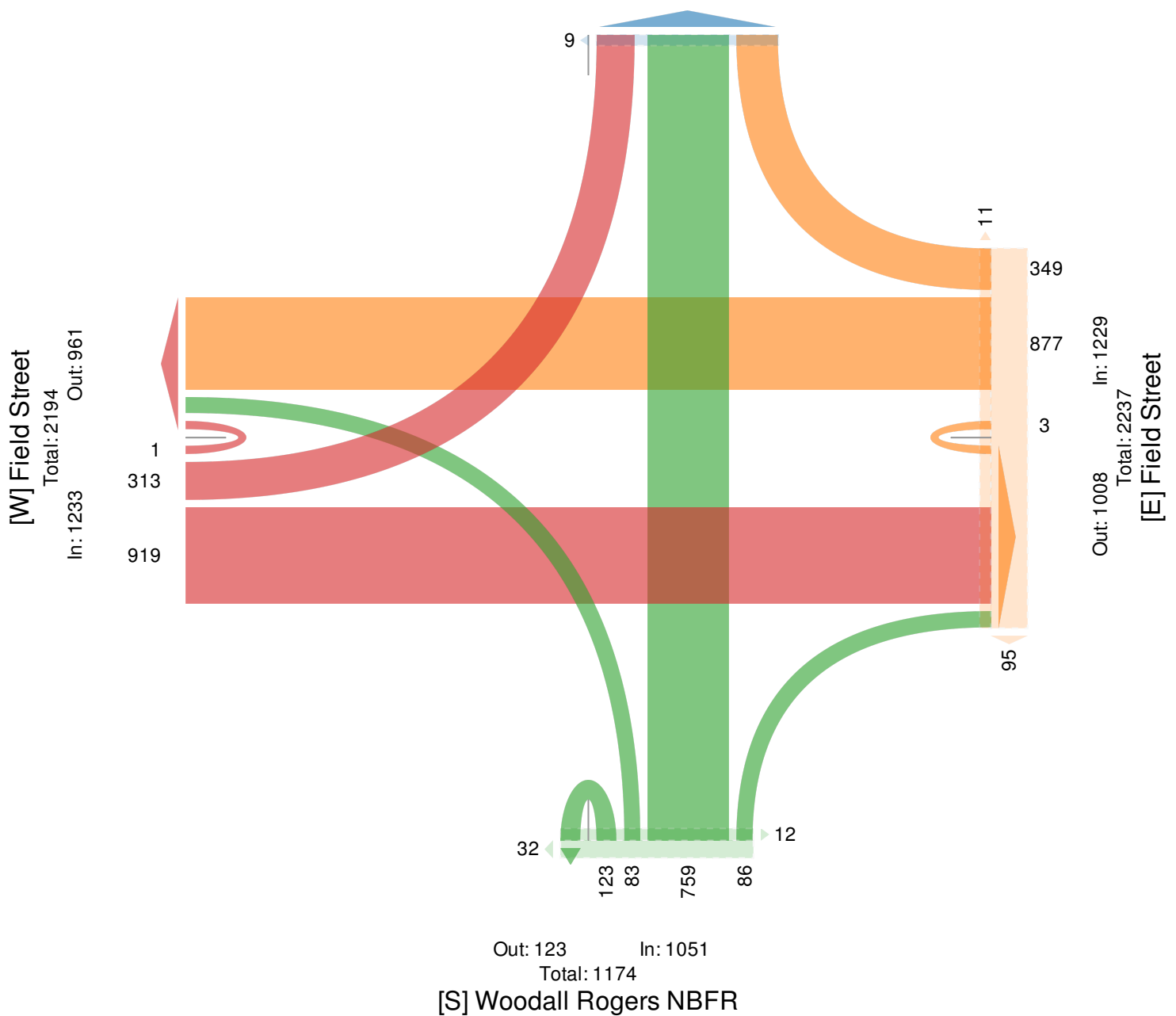


Provided by: C. J. Hensch & Associates
Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US

[N] Woodall Rogers NBFR

Total: 1421
In: 0 Out: 1421



9. Field Street at Woodall Rogers SBFR - TMC

Tue Oct 8, 2019

Full Length (6:30 AM-8:30 AM, 4:30 PM-6:30 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703611, Location: 32.786727, -96.805399



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	Field Street Eastbound						Field Street Westbound						Woodall Rogers SBFR Northbound						Woodall Rogers SBFR Southbound						
Time	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	App	Ped*	L	T	R	U	App	Ped*	Int	
2019-10-08 6:30AM	0	83	21	0	104	0	23	97	0	0	120	0	0	0	0	0	2	37	84	80	0	201	0	425	
6:45AM	0	105	15	0	120	0	14	135	0	0	149	0	0	0	0	0	1	51	76	106	0	233	1	502	
Hourly Total	0	188	36	0	224	0	37	232	0	0	269	0	0	0	0	0	3	88	160	186	0	434	1	927	
7:00AM	0	98	17	0	115	2	31	156	0	0	187	0	0	0	0	0	3	43	68	96	0	207	1	509	
7:15AM	0	146	21	1	168	1	31	178	0	0	209	0	0	0	0	0	3	42	89	79	0	210	1	587	
7:30AM	0	169	34	0	203	5	24	201	0	0	225	0	0	0	0	0	5	46	95	78	0	219	1	647	
7:45AM	0	182	47	0	229	3	25	185	0	1	211	0	0	0	0	0	7	56	96	78	0	230	3	670	
Hourly Total	0	595	119	1	715	11	111	720	0	1	832	0	0	0	0	0	18	187	348	331	0	866	6	2413	
8:00AM	0	166	45	0	211	6	28	169	0	0	197	0	0	0	0	0	10	44	109	80	0	233	4	641	
8:15AM	0	165	35	0	200	1	25	164	0	1	190	0	0	0	0	0	4	53	88	72	0	213	0	603	
Hourly Total	0	331	80	0	411	7	53	333	0	1	387	0	0	0	0	0	14	97	197	152	0	446	4	1244	
4:30PM	0	224	54	0	278	4	105	121	0	0	226	0	0	0	0	0	8	31	94	74	0	199	6	703	
4:45PM	0	230	67	0	297	11	109	131	0	1	241	0	0	0	0	0	0	36	103	78	0	217	3	755	
Hourly Total	0	454	121	0	575	15	214	252	0	1	467	0	0	0	0	0	8	67	197	152	0	416	9	1458	
5:00PM	0	240	77	2	319	8	112	135	0	0	247	0	0	0	0	0	12	29	78	57	0	164	8	730	
5:15PM	0	250	68	0	318	5	133	154	0	0	287	0	0	0	0	0	13	39	109	48	0	196	5	801	
5:30PM	0	307	100	0	407	14	105	149	0	0	254	0	0	0	0	0	7	40	82	76	0	198	3	859	
5:45PM	0	258	87	2	347	17	83	119	0	0	202	0	0	0	0	0	6	33	96	85	0	214	1	763	
Hourly Total	0	1055	332	4	1391	44	433	557	0	0	990	0	0	0	0	0	38	141	365	266	0	772	17	3153	
6:00PM	0	252	68	0	320	4	79	146	0	0	225	0	0	0	0	0	7	30	93	78	0	201	3	746	
6:15PM	0	207	76	0	283	16	73	145	0	0	218	0	0	0	0	0	11	27	88	81	0	196	8	697	
Hourly Total	0	459	144	0	603	20	152	291	0	0	443	0	0	0	0	0	18	57	181	159	0	397	11	1443	
Total	0	3082	832	5	3919	97	1000	2385	0	3	3388	0	0	0	0	0	99	637	1448	1246	0	3331	48	10638	
% Approach	0%	78.6%	21.2%	0.1%	-	-	29.5%	70.4%	0%	0.1%	-	-	0%	0%	0%	-	-	19.1%	43.5%	37.4%	0%	-	-	-	
% Total	0%	29.0%	7.8%	0%	36.8%	-	9.4%	22.4%	0%	0%	31.8%	-	0%	0%	0%	0%	-	6.0%	13.6%	11.7%	0%	31.3%	-	-	
Lights	0	3029	819	5	3853	-	991	2343	0	3	3337	-	0	0	0	0	-	632	1430	1233	0	3295	-	10485	
% Lights	0%	98.3%	98.4%	100%	98.3%	-	99.1%	98.2%	0%	100%	98.5%	-	0%	0%	0%	-	-	99.2%	98.8%	99.0%	0%	98.9%	-	98.6%	
Articulated Trucks	0	4	4	0	8	-	1	5	0	0	6	-	0	0	0	0	-	1	2	3	0	6	-	20	
% Articulated Trucks	0%	0.1%	0.5%	0%	0.2%	-	0.1%	0.2%	0%	0%	0.2%	-	0%	0%	0%	-	-	0.2%	0.1%	0.2%	0%	0.2%	-	0.2%	
Buses and Single-Unit Trucks	0	49	9	0	58	-	8	37	0	0	45	-	0	0	0	0	-	4	16	10	0	30	-	133	
% Buses and Single-Unit Trucks	0%	1.6%	1.1%	0%	1.5%	-	0.8%	1.6%	0%	0%	1.3%	-	0%	0%	0%	-	-	0.6%	1.1%	0.8%	0%	0.9%	-	1.3%	
Pedestrians	-	-	-	-	-	86	-	-	-	-	-	0	-	-	-	-	98	-	-	-	-	-	44	-	
% Pedestrians	-	-	-	-	-	88.7%	-	-	-	-	-	-	-	-	-	-	99.0%	-	-	-	-	-	91.7%	-	
Bicycles on Crosswalk	-	-	-	-	-	11	-	-	-	-	-	0	-	-	-	-	1	-	-	-	-	-	4	-	
% Bicycles on Crosswalk	-	-	-	-	-	11.3%	-	-	-	-	-	-	-	-	-	-	1.0%	-	-	-	-	-	8.3%	-	

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

9. Field Street at Woodall Rogers SBFR - TMC

Tue Oct 8, 2019

Full Length (6:30 AM-8:30 AM, 4:30 PM-6:30 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703611, Location: 32.786727, -96.805399

CJ Hensch &
Associates, Inc.

Provided by: C. J. Hensch & Associates
Inc.

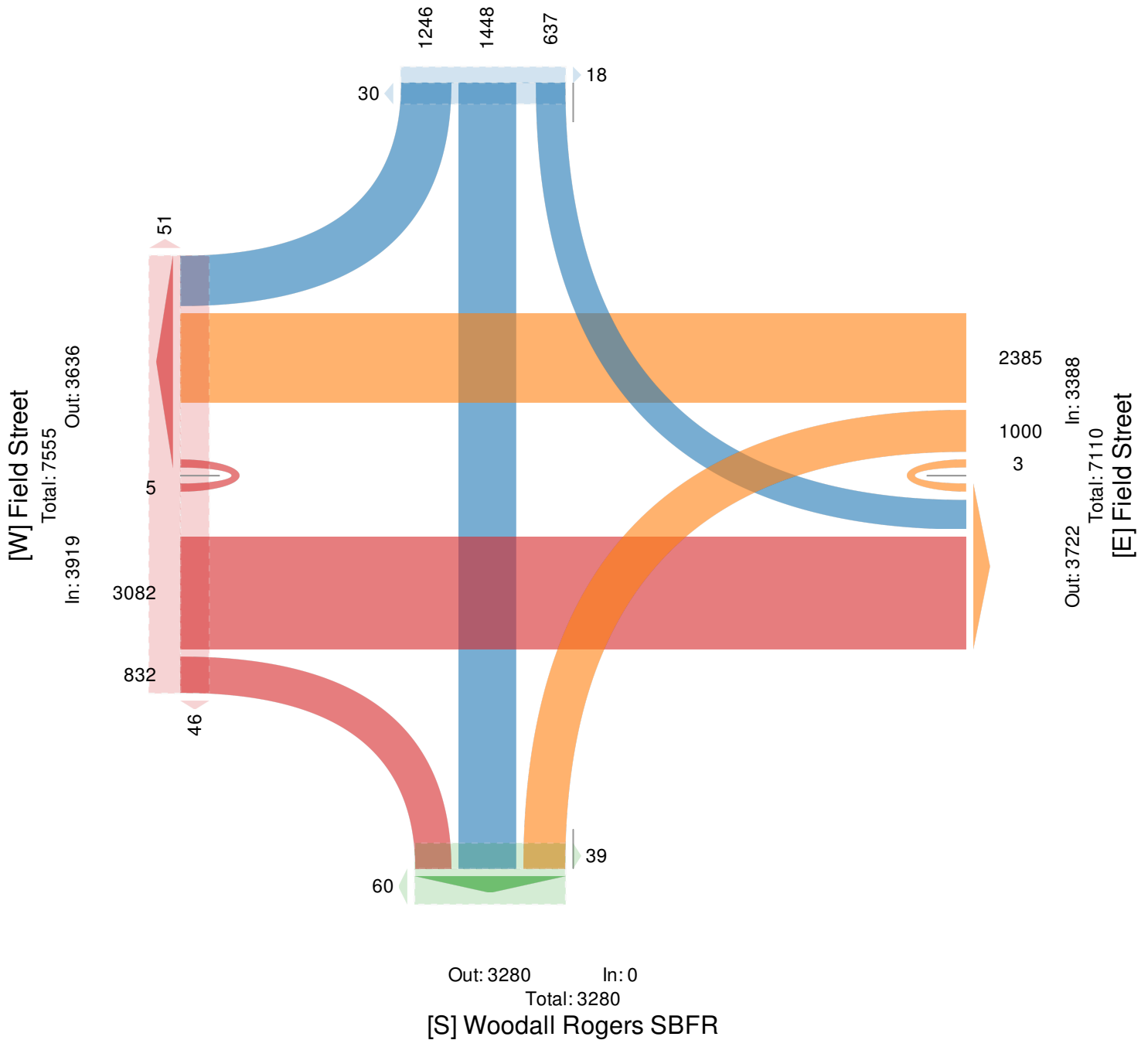
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

[N] Woodall Rogers SBFR

Total: 3331

In: 3331

Out: 0



9. Field Street at Woodall Rogers SBFR - TMC

Tue Oct 8, 2019

AM Peak (7:30 AM - 8:30 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703611, Location: 32.786727, -96.805399



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	Field Street Eastbound						Field Street Westbound						Woodall Rogers SBFR Northbound						Woodall Rogers SBFR Southbound						
Time	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	App	Ped*	L	T	R	U	App	Ped*	Int	
2019-10-08 7:30AM	0	169	34	0	203	5	24	201	0	0	225	0	0	0	0	0	5	46	95	78	0	219	1	647	
7:45AM	0	182	47	0	229	3	25	185	0	1	211	0	0	0	0	0	7	56	96	78	0	230	3	670	
8:00AM	0	166	45	0	211	6	28	169	0	0	197	0	0	0	0	0	10	44	109	80	0	233	4	641	
8:15AM	0	165	35	0	200	1	25	164	0	1	190	0	0	0	0	0	4	53	88	72	0	213	0	603	
Total	0	682	161	0	843	15	102	719	0	2	823	0	0	0	0	0	26	199	388	308	0	895	8	2561	
% Approach	0%	80.9%	19.1%	0%	-	-	12.4%	87.4%	0%	0.2%	-	-	0%	0%	0%	-	-	22.2%	43.4%	34.4%	0%	-	-	-	
% Total	0%	26.6%	6.3%	0%	32.9%	-	4.0%	28.1%	0%	0.1%	32.1%	-	0%	0%	0%	0%	-	7.8%	15.2%	12.0%	0%	34.9%	-	-	
PHF	-	0.937	0.856	-	0.920	-	0.911	0.894	-	0.500	0.914	-	-	-	-	-	-	0.888	0.890	0.963	-	0.960	-	0.956	
Lights	0	673	156	0	829	-	98	700	0	2	800	-	0	0	0	0	-	198	385	300	0	883	-	2512	
% Lights	0%	98.7%	96.9%	0%	98.3%	-	96.1%	97.4%	0%	100%	97.2%	-	0%	0%	0%	-	-	99.5%	99.2%	97.4%	0%	98.7%	-	98.1%	
Articulated Trucks	0	0	0	0	0	-	0	4	0	0	4	-	0	0	0	0	-	1	0	1	0	2	-	6	
% Articulated Trucks	0%	0%	0%	0%	0%	-	0%	0.6%	0%	0%	0.5%	-	0%	0%	0%	-	-	0.5%	0%	0.3%	0%	0.2%	-	0.2%	
Buses and Single-Unit Trucks	0	9	5	0	14	-	4	15	0	0	19	-	0	0	0	0	-	0	3	7	0	10	-	43	
% Buses and Single-Unit Trucks	0%	1.3%	3.1%	0%	1.7%	-	3.9%	2.1%	0%	0%	2.3%	-	0%	0%	0%	-	-	0%	0.8%	2.3%	0%	1.1%	-	1.7%	
Pedestrians	-	-	-	-	-	8	-	-	-	-	-	0	-	-	-	-	26	-	-	-	-	-	8		
% Pedestrians	-	-	-	-	-	53.3%	-	-	-	-	-	-	-	-	-	-	100%	-	-	-	-	-	100%	-	
Bicycles on Crosswalk	-	-	-	-	-	7	-	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0		
% Bicycles on Crosswalk	-	-	-	-	-	46.7%	-	-	-	-	-	-	-	-	-	-	0%	-	-	-	-	-	0%		

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

ID: 703611, Location: 32.786727, -96.805399

CJ Hensch &
Associates, Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US



9. Field Street at Woodall Rogers SBFR - TMC

Tue Oct 8, 2019

PM Peak (5:15 PM - 6:15 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703611, Location: 32.786727, -96.805399



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	Field Street Eastbound						Field Street Westbound						Woodall Rogers SBFR Northbound						Woodall Rogers SBFR Southbound						
Time	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	App	Ped*	L	T	R	U	App	Ped*	Int	
2019-10-08 5:15PM	0	250	68	0	318	5	133	154	0	0	287	0	0	0	0	0	13	39	109	48	0	196	5	801	
5:30PM	0	307	100	0	407	14	105	149	0	0	254	0	0	0	0	0	7	40	82	76	0	198	3	859	
5:45PM	0	258	87	2	347	17	83	119	0	0	202	0	0	0	0	0	6	33	96	85	0	214	1	763	
6:00PM	0	252	68	0	320	4	79	146	0	0	225	0	0	0	0	0	7	30	93	78	0	201	3	746	
Total	0	1067	323	2	1392	40	400	568	0	0	968	0	0	0	0	0	33	142	380	287	0	809	12	3169	
% Approach	0%	76.7%	23.2%	0.1%	-	-	41.3%	58.7%	0%	0%	-	-	0%	0%	0%	-	-	17.6%	47.0%	35.5%	0%	-	-	-	
% Total	0%	33.7%	10.2%	0.1%	43.9%	-	12.6%	17.9%	0%	0%	30.5%	-	0%	0%	0%	0%	-	4.5%	12.0%	9.1%	0%	25.5%	-	-	
PHF	-	0.869	0.808	0.250	0.855	-	0.752	0.922	-	-	0.843	-	-	-	-	-	-	0.888	0.872	0.844	-	0.945	-	0.922	
Lights	0	1052	320	2	1374	-	399	565	0	0	964	-	0	0	0	0	-	140	374	286	0	800	-	3138	
% Lights	0%	98.6%	99.1%	100%	98.7%	-	99.8%	99.5%	0%	0%	99.6%	-	0%	0%	0%	-	-	98.6%	98.4%	99.7%	0%	98.9%	-	99.0%	
Articulated Trucks	0	2	2	0	4	-	0	0	0	0	0	-	0	0	0	0	-	0	1	0	0	1	-	5	
% Articulated Trucks	0%	0.2%	0.6%	0%	0.3%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	-	-	0%	0.3%	0%	0%	0.1%	-	0.2%	
Buses and Single-Unit Trucks	0	13	1	0	14	-	1	3	0	0	4	-	0	0	0	0	-	2	5	1	0	8	-	26	
% Buses and Single-Unit Trucks	0%	1.2%	0.3%	0%	1.0%	-	0.3%	0.5%	0%	0%	0.4%	-	0%	0%	0%	-	-	1.4%	1.3%	0.3%	0%	1.0%	-	0.8%	
Pedestrians	-	-	-	-	-	37	-	-	-	-	-	0	-	-	-	-	32	-	-	-	-	-	12		
% Pedestrians	-	-	-	-	-	92.5%	-	-	-	-	-	-	-	-	-	-	97.0%	-	-	-	-	-	100%	-	
Bicycles on Crosswalk	-	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	1	-	-	-	-	-	0		
% Bicycles on Crosswalk	-	-	-	-	-	7.5%	-	-	-	-	-	-	-	-	-	-	3.0%	-	-	-	-	-	0%	-	

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

9. Field Street at Woodall Rogers SBFR - TMC

Tue Oct 8, 2019

PM Peak (5:15 PM - 6:15 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703611, Location: 32.786727, -96.805399



Provided by: C. J. Hensch & Associates
Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US

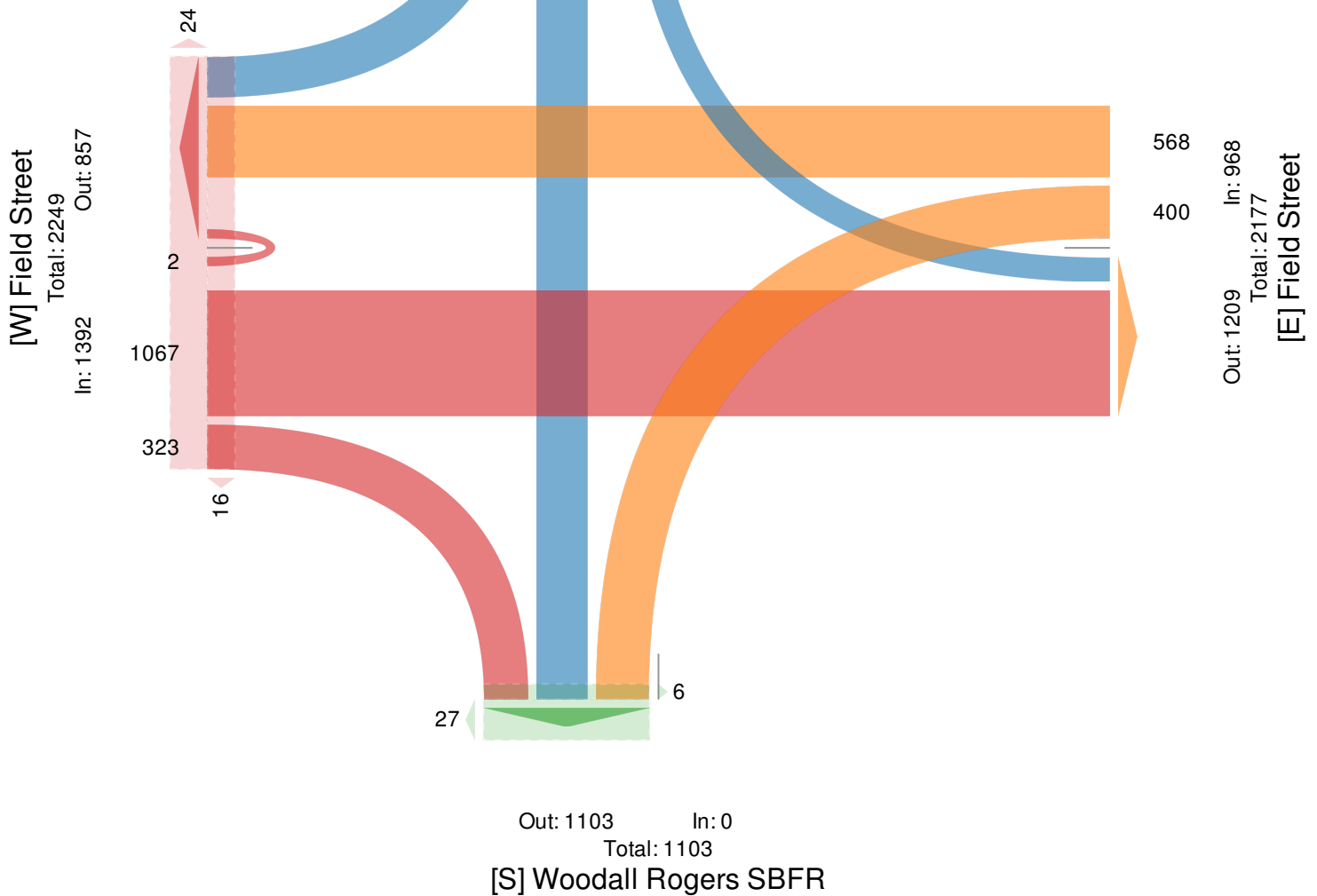
[N] Woodall Rogers SBFR

Total: 809

In: 809 Out: 0

287 380 142

6 6



10. St Paul Street at North and South Drivew... - TMC

Tue Oct 8, 2019

Full Length (6:30 AM-8:30 AM, 4:30 PM-6:30 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703612, Location: 32.788982, -96.803612



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	Paul Street Eastbound					Paul Street Westbound		South Driveway Northbound					North Driveway Southbound					
Time	L	T	R	App	Ped*	App	Ped*	T	R	U	App	Ped*	L	T	U	App	Ped*	Int
2019-10-08 6:30AM	0	38	4	42	1	0	0	0	0	0	0	4	0	0	0	0	1	42
6:45AM	0	64	0	64	0	0	0	0	0	0	0	1	0	0	0	0	1	64
Hourly Total	0	102	4	106	1	0	0	0	0	0	0	5	0	0	0	0	2	106
7:00AM	0	70	10	80	2	0	0	0	1	0	1	2	0	1	0	1	0	82
7:15AM	0	116	13	129	0	0	2	0	0	0	0	2	1	0	0	1	2	130
7:30AM	0	112	12	124	0	0	0	0	0	0	0	1	0	1	0	1	3	125
7:45AM	0	168	18	186	1	0	0	0	0	0	0	3	0	0	0	0	2	186
Hourly Total	0	466	53	519	3	0	2	0	1	0	1	8	1	2	0	3	7	523
8:00AM	0	164	41	205	0	0	0	0	1	0	1	4	0	0	0	0	2	206
8:15AM	0	164	18	182	0	0	0	0	0	0	0	7	0	0	0	0	1	182
Hourly Total	0	328	59	387	0	0	0	0	1	0	1	11	0	0	0	0	3	388
4:30PM	0	191	2	193	0	0	0	0	24	0	24	0	1	0	0	1	3	218
4:45PM	0	177	1	178	0	0	0	0	17	0	17	2	1	0	0	1	4	196
Hourly Total	0	368	3	371	0	0	0	0	41	0	41	2	2	0	0	2	7	414
5:00PM	0	174	0	174	1	0	0	0	24	0	24	1	3	0	0	3	0	201
5:15PM	0	164	0	164	3	0	0	0	26	0	26	4	4	0	0	4	6	194
5:30PM	0	183	0	183	0	0	0	0	28	0	28	2	6	0	0	6	7	217
5:45PM	0	184	3	187	3	0	0	0	14	0	14	3	0	0	0	0	8	201
Hourly Total	0	705	3	708	7	0	0	0	92	0	92	10	13	0	0	13	21	813
6:00PM	1	182	0	183	0	0	0	0	11	0	11	9	0	0	0	0	4	194
6:15PM	1	182	2	185	0	0	0	0	13	0	13	2	1	0	0	1	10	199
Hourly Total	2	364	2	368	0	0	0	0	24	0	24	11	1	0	0	1	14	393
Total	2	2333	124	2459	11	0	2	0	159	0	159	47	17	2	0	19	54	2637
% Approach	0.1%	94.9%	5.0%	-	-	-	-	0%	100%	0%	-	-	89.5%	10.5%	0%	-	-	-
% Total	0.1%	88.5%	4.7%	93.2%	-	0%	-	0%	6.0%	0%	6.0%	-	0.6%	0.1%	0%	0.7%	-	-
Lights	2	2297	124	2423	-	0	-	0	159	0	159	-	17	2	0	19	-	2601
% Lights	100%	98.5%	100%	98.5%	-	-	-	0%	100%	0%	100%	-	100%	100%	0%	100%	-	98.6%
Articulated Trucks	0	2	0	2	-	0	-	0	0	0	0	-	0	0	0	0	-	2
% Articulated Trucks	0%	0.1%	0%	0.1%	-	-	-	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0.1%
Buses and Single-Unit Trucks	0	34	0	34	-	0	-	0	0	0	0	-	0	0	0	0	-	34
% Buses and Single-Unit Trucks	0%	1.5%	0%	1.4%	-	-	-	0%	0%	0%	0%	-	0%	0%	0%	0%	-	1.3%
Pedestrians	-	-	-	-	10	-	2	-	-	-	-	43	-	-	-	-	49	-
% Pedestrians	-	-	-	-	90.9%	-	100%	-	-	-	-	91.5%	-	-	-	-	90.7%	-
Bicycles on Crosswalk	-	-	-	-	1	-	0	-	-	-	-	4	-	-	-	-	5	-
% Bicycles on Crosswalk	-	-	-	-	9.1%	-	0%	-	-	-	-	8.5%	-	-	-	-	9.3%	-

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

10. St Paul Street at North and South Driveway... - TMC

Tue Oct 8, 2019

Full Length (6:30 AM-8:30 AM, 4:30 PM-6:30 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703612, Location: 32.788982, -96.803612



Provided by: C. J. Hensch & Associates
Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US

[N] North Driveway

Total: 21
In: 19 Out: 2

32 17 22

[W] Paul Street

Total: 2459
In: 2459 Out: 0

5 2 2333 124 6

Total: 2509
In: 0 Out: 2509

[E] Paul Street

23 24 159 2

Out: 126 In: 159
Total: 285

[S] South Driveway

10. St Paul Street at North and South Drivew... - TMC

Tue Oct 8, 2019

AM Peak (7:30 AM - 8:30 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703612, Location: 32.788982, -96.803612



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	Paul Street Eastbound					Paul Street Westbound		South Driveway Northbound					North Driveway Southbound					
Time	L	T	R	App	Ped*	App	Ped*	T	R	U	App	Ped*	L	T	U	App	Ped*	Int
2019-10-08 7:30AM	0	112	12	124	0	0	0	0	0	0	0	1	0	1	0	1	3	125
7:45AM	0	168	18	186	1	0	0	0	0	0	0	3	0	0	0	0	2	186
8:00AM	0	164	41	205	0	0	0	0	1	0	1	4	0	0	0	0	2	206
8:15AM	0	164	18	182	0	0	0	0	0	0	0	7	0	0	0	0	1	182
Total	0	608	89	697	1	0	0	0	1	0	1	15	0	1	0	1	8	699
% Approach	0%	87.2%	12.8%	-	-	-	-	0%	100%	0%	-	-	0%	100%	0%	-	-	-
% Total	0%	87.0%	12.7%	99.7%	-	0%	-	0%	0.1%	0%	0.1%	-	0%	0.1%	0%	0.1%	-	-
PHF	-	0.905	0.543	0.850	-	-	-	-	0.250	-	0.250	-	-	0.250	-	0.250	-	0.848
Lights	0	600	89	689	-	0	-	0	1	0	1	-	0	1	0	1	-	691
% Lights	0%	98.7%	100%	98.9%	-	-	-	0%	100%	0%	100%	-	0%	100%	0%	100%	-	98.9%
Articulated Trucks	0	0	0	0	-	0	-	0	0	0	0	-	0	0	0	0	-	0
% Articulated Trucks	0%	0%	0%	0%	-	-	-	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%
Buses and Single-Unit Trucks	0	8	0	8	-	0	-	0	0	0	0	-	0	0	0	0	-	8
% Buses and Single-Unit Trucks	0%	1.3%	0%	1.1%	-	-	-	0%	0%	0%	0%	-	0%	0%	0%	0%	-	1.1%
Pedestrians	-	-	-	-	1	-	0	-	-	-	-	12	-	-	-	-	7	
% Pedestrians	-	-	-	-	100%	-	-	-	-	-	-	80.0%	-	-	-	-	87.5%	-
Bicycles on Crosswalk	-	-	-	-	0	-	0	-	-	-	-	3	-	-	-	-	1	
% Bicycles on Crosswalk	-	-	-	-	0%	-	-	-	-	-	-	20.0%	-	-	-	-	12.5%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

10. St Paul Street at North and South Driveway... - TMC

Tue Oct 8, 2019

AM Peak (7:30 AM - 8:30 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

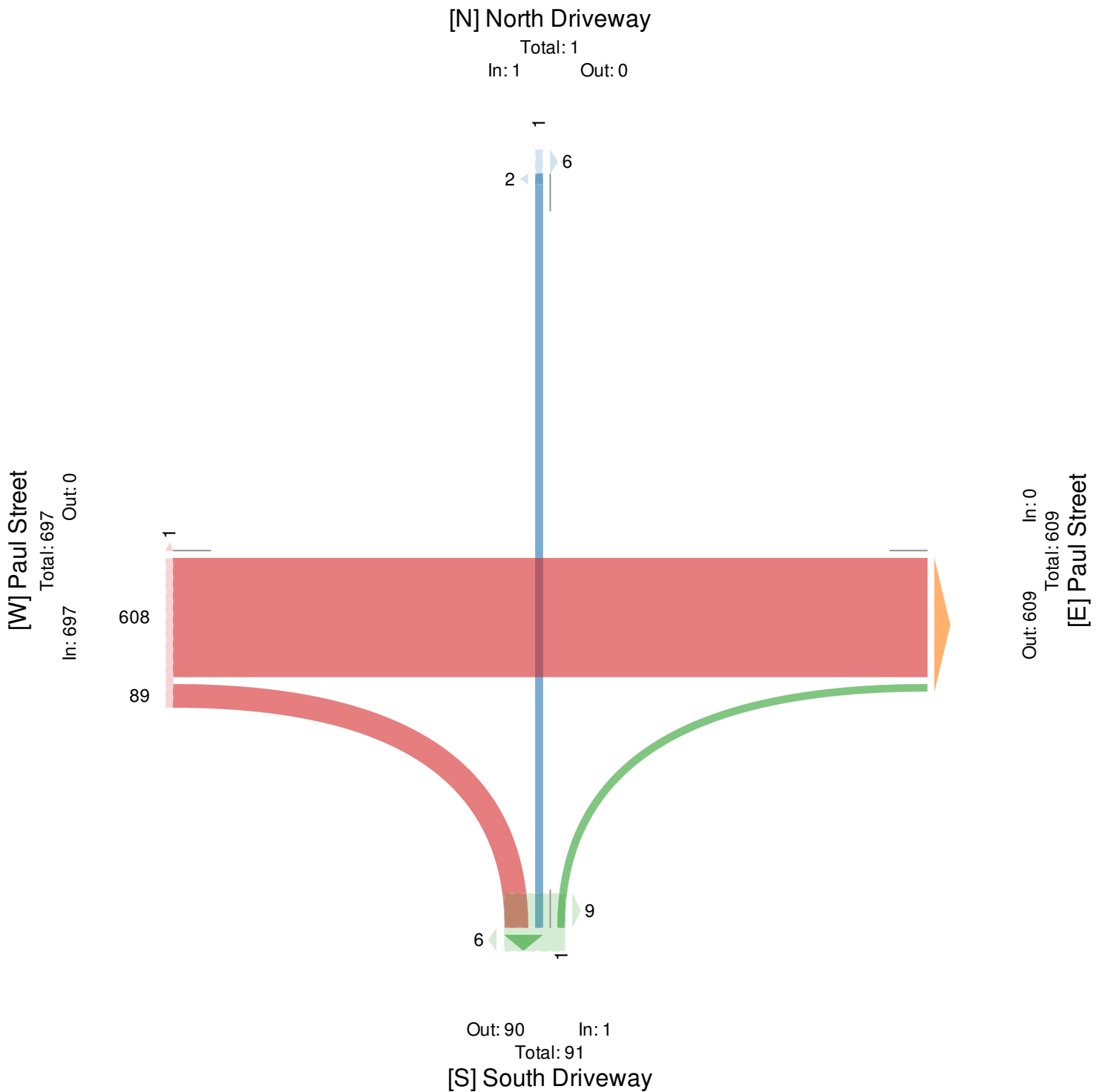
All Movements

ID: 703612, Location: 32.788982, -96.803612



Provided by: C. J. Hensch & Associates
Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US



10. St Paul Street at North and South Drivew... - TMC

Tue Oct 8, 2019

PM Peak (5 PM - 6 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703612, Location: 32.788982, -96.803612



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	Paul Street Eastbound					Paul Street Westbound		South Drive way Northbound					North Drive way Southbound					
Time	L	T	R	App	Ped*	App	Ped*	T	R	U	App	Ped*	L	T	U	App	Ped*	Int
2019-10-08 5:00PM	0	174	0	174	1	0	0	0	24	0	24	1	3	0	0	3	0	201
5:15PM	0	164	0	164	3	0	0	0	26	0	26	4	4	0	0	4	6	194
5:30PM	0	183	0	183	0	0	0	0	28	0	28	2	6	0	0	6	7	217
5:45PM	0	184	3	187	3	0	0	0	14	0	14	3	0	0	0	0	8	201
Total	0	705	3	708	7	0	0	0	92	0	92	10	13	0	0	13	21	813
% Approach	0%	99.6%	0.4%	-	-	-	-	0%	100%	0%	-	-	100%	0%	0%	-	-	-
% Total	0%	86.7%	0.4%	87.1%	-	0%	-	0%	11.3%	0%	11.3%	-	1.6%	0%	0%	1.6%	-	-
PHF	-	0.958	0.250	0.947	-	-	-	-	0.821	-	0.821	-	0.542	-	-	0.542	-	0.937
Lights	0	692	3	695	-	0	-	0	92	0	92	-	13	0	0	13	-	800
% Lights	0%	98.2%	100%	98.2%	-	-	-	0%	100%	0%	100%	-	100%	0%	0%	100%	-	98.4%
Articulated Trucks	0	0	0	0	-	0	-	0	0	0	0	-	0	0	0	0	-	0
% Articulated Trucks	0%	0%	0%	0%	-	-	-	0%	0%	0%	0%	-	0%	0%	0%	0%	-	0%
Buses and Single-Unit Trucks	0	13	0	13	-	0	-	0	0	0	0	-	0	0	0	0	-	13
% Buses and Single-Unit Trucks	0%	1.8%	0%	1.8%	-	-	-	0%	0%	0%	0%	-	0%	0%	0%	0%	-	1.6%
Pedestrians	-	-	-	-	7	-	0	-	-	-	-	10	-	-	-	-	18	
% Pedestrians	-	-	-	-	100%	-	-	-	-	-	-	100%	-	-	-	-	85.7%	-
Bicycles on Crosswalk	-	-	-	-	0	-	0	-	-	-	-	0	-	-	-	-	3	
% Bicycles on Crosswalk	-	-	-	-	0%	-	-	-	-	-	-	0%	-	-	-	-	14.3%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

10. St Paul Street at North and South Driveway... - TMC

Tue Oct 8, 2019

PM Peak (5 PM - 6 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703612, Location: 32.788982, -96.803612



Provided by: C. J. Hensch & Associates
Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US

[N] North Driveway

Total: 13
In: 13 Out: 0

13
12 9

[W] Paul Street

Total: 708
In: 708 Out: 0

2
705
3
5

In: 0
Total: 810
Out: 810
[E] Paul Street

Out: 3 In: 92
Total: 95
[S] South Driveway

6 4
92

11. Harwood Street at North and South Drivew... - TMC

Tue Oct 8, 2019

Full Length (6:30 AM-8:30 AM, 4:30 PM-6:30 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703613, Location: 32.789773, -96.802483



Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	N Harwood Street Eastbound						N Harwood Street Westbound						Drive ways Northbound						Drive way Southbound						
Time	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	Int
2019-10-08 6:30AM	0	2	1	0	3	1	5	18	0	0	23	4	0	0	0	0	0	2	0	0	0	0	0	3	26
6:45AM	1	4	0	0	5	0	0	29	0	0	29	2	0	0	0	0	0	2	0	0	0	0	0	1	34
Hourly Total	1	6	1	0	8	1	5	47	0	0	52	6	0	0	0	0	0	4	0	0	0	0	0	4	60
7:00AM	1	6	0	0	7	1	1	33	1	0	35	3	0	0	0	0	0	4	0	0	0	0	0	1	42
7:15AM	0	1	0	0	1	0	1	38	1	0	40	0	0	0	0	0	0	5	0	0	1	0	1	5	42
7:30AM	3	14	1	0	18	0	0	47	0	0	47	2	1	0	0	0	1	2	1	0	1	0	2	5	68
7:45AM	0	12	0	0	12	0	1	61	4	0	66	0	0	0	0	0	0	7	0	0	4	0	4	3	82
Hourly Total	4	33	1	0	38	1	3	179	6	0	188	5	1	0	0	0	1	18	1	0	6	0	7	14	234
8:00AM	2	7	0	0	9	0	1	71	2	0	74	0	2	0	0	0	2	9	1	0	0	0	1	5	86
8:15AM	0	12	0	0	12	0	1	80	1	0	82	0	0	0	0	0	0	14	0	0	0	0	0	3	94
Hourly Total	2	19	0	0	21	0	2	151	3	0	156	0	2	0	0	0	2	23	1	0	0	0	1	8	180
4:30PM	1	26	0	0	27	0	0	9	0	0	9	3	0	0	1	0	1	19	9	0	4	0	13	4	50
4:45PM	0	26	1	0	27	1	0	8	0	0	8	0	0	0	0	0	0	11	10	0	2	0	12	3	47
Hourly Total	1	52	1	0	54	1	0	17	0	0	17	3	0	0	1	0	1	30	19	0	6	0	25	7	97
5:00PM	1	48	0	0	49	0	0	12	0	0	12	1	0	0	2	0	2	14	15	0	2	0	17	6	80
5:15PM	2	37	3	0	42	0	0	13	0	0	13	0	0	0	2	0	2	10	4	0	5	0	9	7	66
5:30PM	1	57	1	0	59	0	0	10	1	0	11	0	1	0	1	0	2	11	6	0	2	0	8	8	80
5:45PM	0	38	1	0	39	0	0	18	1	0	19	0	0	0	1	0	1	18	2	0	0	0	2	4	61
Hourly Total	4	180	5	0	189	0	0	53	2	0	55	1	1	0	6	0	7	53	27	0	9	0	36	25	287
6:00PM	1	32	1	0	34	0	0	6	0	0	6	0	0	0	0	0	0	9	6	0	6	0	12	4	52
6:15PM	4	40	1	0	45	0	0	15	5	0	20	1	1	0	0	0	1	8	3	0	3	0	6	5	72
Hourly Total	5	72	2	0	79	0	0	21	5	0	26	1	1	0	0	0	1	17	9	0	9	0	18	9	124
Total	17	362	10	0	389	3	10	468	16	0	494	16	5	0	7	0	12	145	57	0	30	0	87	67	982
% Approach	4.4%	93.1%	2.6%	0%	-	-	2.0%	94.7%	3.2%	0%	-	-	41.7%	0%	58.3%	0%	-	-	65.5%	0%	34.5%	0%	-	-	-
% Total	1.7%	36.9%	1.0%	0%	39.6%	-	1.0%	47.7%	1.6%	0%	50.3%	-	0.5%	0%	0.7%	0%	1.2%	-	5.8%	0%	3.1%	0%	8.9%	-	-
Lights	17	356	9	0	382	-	10	466	16	0	492	-	4	0	7	0	11	-	57	0	30	0	87	-	972
% Lights	100%	98.3%	90.0%	0%	98.2%	-	100%	99.6%	100%	0%	99.6%	-	80.0%	0%	100%	0%	91.7%	-	100%	0%	100%	0%	100%	-	99.0%
Articulated Trucks	0	1	0	0	1	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	1
% Articulated Trucks	0%	0.3%	0%	0%	0.3%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0.1%
Buses and Single-Unit Trucks	0	5	1	0	6	-	0	2	0	0	2	-	1	0	0	0	1	-	0	0	0	0	0	-	9
% Buses and Single-Unit Trucks	0%	1.4%	10.0%	0%	1.5%	-	0%	0.4%	0%	0%	0.4%	-	20.0%	0%	0%	0%	8.3%	-	0%	0%	0%	0%	0%	-	0.9%
Pedestrians	-	-	-	-	-	3	-	-	-	-	-	16	-	-	-	-	-	142	-	-	-	-	-	61	
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	-	100%	-	-	-	-	-	97.9%	-	-	-	-	-	91.0%	
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	3	-	-	-	-	-	6	
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	2.1%	-	-	-	-	-	9.0%	

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

11. Harwood Street at North and South Driveway... - TMC

Tue Oct 8, 2019

Full Length (6:30 AM-8:30 AM, 4:30 PM-6:30 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

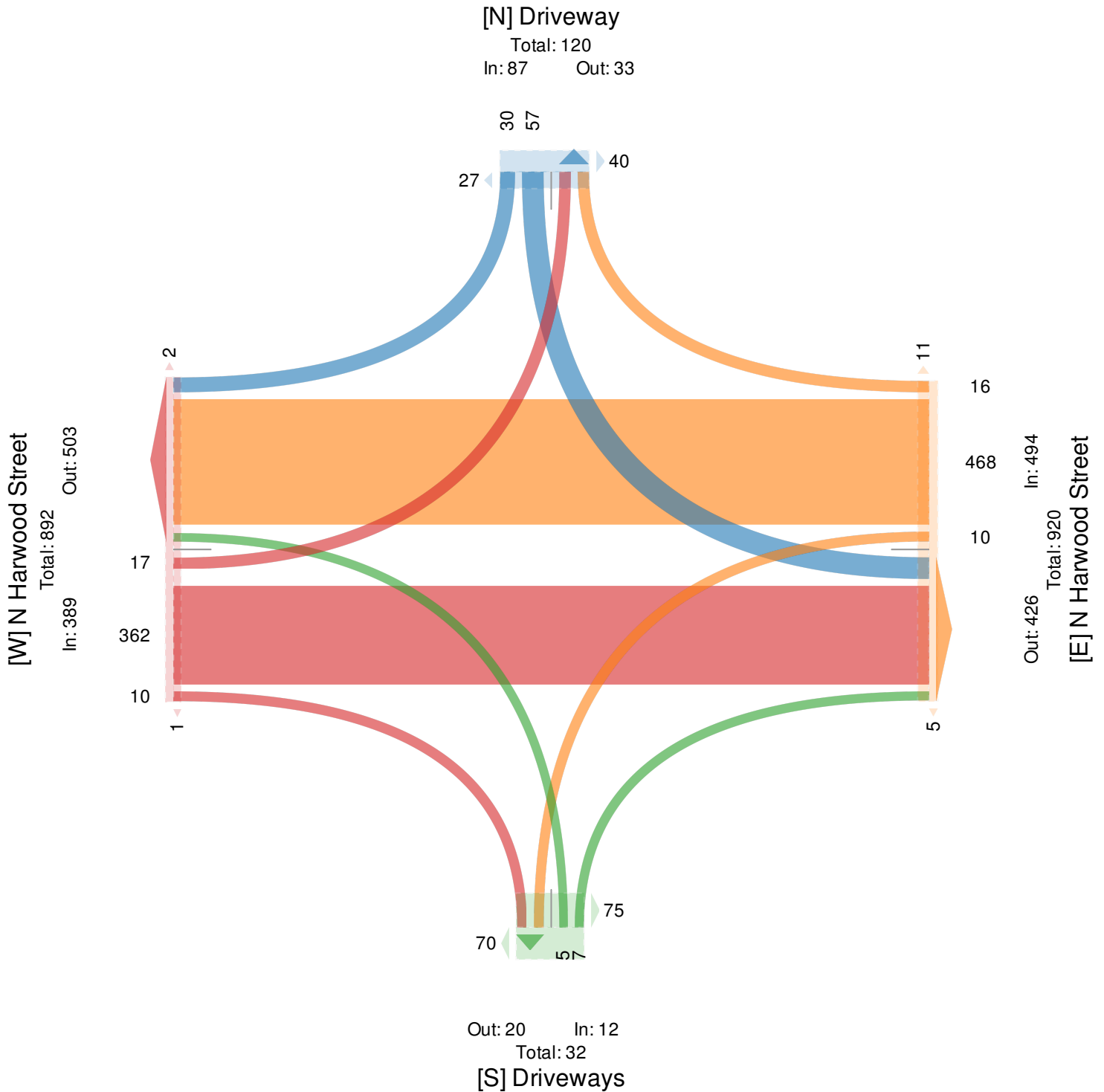
All Movements

ID: 703613, Location: 32.789773, -96.802483

CJ Hensch &
Associates, Inc.

Provided by: C. J. Hensch & Associates
Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US



11. Harwood Street at North and South Drivew... - TMC

Tue Oct 8, 2019

AM Peak (7:30 AM - 8:30 AM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703613, Location: 32.789773, -96.802483



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	N Harwood Street Eastbound						N Harwood Street Westbound						Drive ways Northbound						Drive way Southbound						
Time	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	Int
2019-10-08 7:30AM	3	14	1	0	18	0	0	47	0	0	47	2	1	0	0	0	1	2	1	0	1	0	2	5	68
7:45AM	0	12	0	0	12	0	1	61	4	0	66	0	0	0	0	0	0	7	0	0	4	0	4	3	82
8:00AM	2	7	0	0	9	0	1	71	2	0	74	0	2	0	0	0	2	9	1	0	0	0	1	5	86
8:15AM	0	12	0	0	12	0	1	80	1	0	82	0	0	0	0	0	0	14	0	0	0	0	0	3	94
Total	5	45	1	0	51	0	3	259	7	0	269	2	3	0	0	0	3	32	2	0	5	0	7	16	330
% Approach	9.8%	88.2%	2.0%	0%	-	-	1.1%	96.3%	2.6%	0%	-	-	100%	0%	0%	0%	-	-	28.6%	0%	71.4%	0%	-	-	-
% Total	1.5%	13.6%	0.3%	0%	15.5%	-	0.9%	78.5%	2.1%	0%	81.5%	-	0.9%	0%	0%	0%	0.9%	-	0.6%	0%	1.5%	0%	2.1%	-	-
PHF	0.417	0.804	0.250	-	0.708	-	0.750	0.809	0.438	-	0.820	-	0.375	-	-	-	0.375	-	0.500	-	0.313	-	0.438	-	0.878
Lights	5	43	0	0	48	-	3	258	7	0	268	-	2	0	0	0	2	-	2	0	5	0	7	-	325
% Lights	100%	95.6%	0%	0%	94.1%	-	100%	99.6%	100%	0%	99.6%	-	66.7%	0%	0%	0%	66.7%	-	100%	0%	100%	0%	100%	-	98.5%
Articulated Trucks	0	1	0	0	1	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	1
% Articulated Trucks	0%	2.2%	0%	0%	2.0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0.3%
Buses and Single-Unit Trucks	0	1	1	0	2	-	0	1	0	0	1	-	1	0	0	0	1	-	0	0	0	0	0	-	4
% Buses and Single-Unit Trucks	0%	2.2%	100%	0%	3.9%	-	0%	0.4%	0%	0%	0.4%	-	33.3%	0%	0%	0%	33.3%	-	0%	0%	0%	0%	0%	-	1.2%
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	31	-	-	-	-	-	14	
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	100%	-	-	-	-	-	96.9%	-	-	-	-	-	87.5%	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	2	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	0%	-	-	-	-	-	3.1%	-	-	-	-	-	12.5%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

11. Harwood Street at North and South Drivew... - TMC

Tue Oct 8, 2019

AM Peak (7:30 AM - 8:30 AM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703613, Location: 32.789773, -96.802483

CJ Hensch & Associates, Inc.

Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US

[N] Driveway

Total: 19

In: 7 Out: 12

522

8 8

[W] N Harwood Street

Total: 318

In: 51 Out: 267

5
45
1

259

3

In: 269

Out: 47

Total: 316

[E] N Harwood Street

15 3

17

Out: 4 In: 3

Total: 7

[S] Driveways

11. Harwood Street at North and South Drivew... - TMC

Tue Oct 8, 2019

PM Peak (5 PM - 6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703613, Location: 32.789773, -96.802483



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	N Harwood Street Eastbound						N Harwood Street Westbound						Drive ways Northbound						Driveway Southbound						
Time	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	Int
2019-10-08 5:00PM	1	48	0	0	49	0	0	12	0	0	12	1	0	0	2	0	2	14	15	0	2	0	17	6	80
5:15PM	2	37	3	0	42	0	0	13	0	0	13	0	0	0	2	0	2	10	4	0	5	0	9	7	66
5:30PM	1	57	1	0	59	0	0	10	1	0	11	0	1	0	1	0	2	11	6	0	2	0	8	8	80
5:45PM	0	38	1	0	39	0	0	18	1	0	19	0	0	0	1	0	1	18	2	0	0	0	2	4	61
Total	4	180	5	0	189	0	0	53	2	0	55	1	1	0	6	0	7	53	27	0	9	0	36	25	287
% Approach	2.1%	95.2%	2.6%	0%	-	-	0%	96.4%	3.6%	0%	-	-	14.3%	0%	85.7%	0%	-	-	75.0%	0%	25.0%	0%	-	-	-
% Total	1.4%	62.7%	1.7%	0%	65.9%	-	0%	18.5%	0.7%	0%	19.2%	-	0.3%	0%	2.1%	0%	2.4%	-	9.4%	0%	3.1%	0%	12.5%	-	-
PHF	0.500	0.789	0.417	-	0.801	-	-	0.736	0.500	-	0.724	-	0.250	-	0.750	-	0.875	-	0.450	-	0.450	-	0.529	-	0.897
Lights	4	178	5	0	187	-	0	53	2	0	55	-	1	0	6	0	7	-	27	0	9	0	36	-	285
% Lights	100%	98.9%	100%	0%	98.9%	-	0%	100%	100%	0%	100%	-	100%	0%	100%	0%	100%	-	100%	0%	100%	0%	100%	-	99.3%
Articulated Trucks	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0
% Articulated Trucks	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%
Buses and Single-Unit Trucks	0	2	0	0	2	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	2
% Buses and Single-Unit Trucks	0%	1.1%	0%	0%	1.1%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0.7%
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	51	-	-	-	-	-	24	
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	100%	-	-	-	-	-	96.2%	-	-	-	-	-	96.0%	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	1	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	0%	-	-	-	-	-	3.8%	-	-	-	-	-	4.0%	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

11. Harwood Street at North and South Drivew... - TMC

Tue Oct 8, 2019

PM Peak (5 PM - 6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

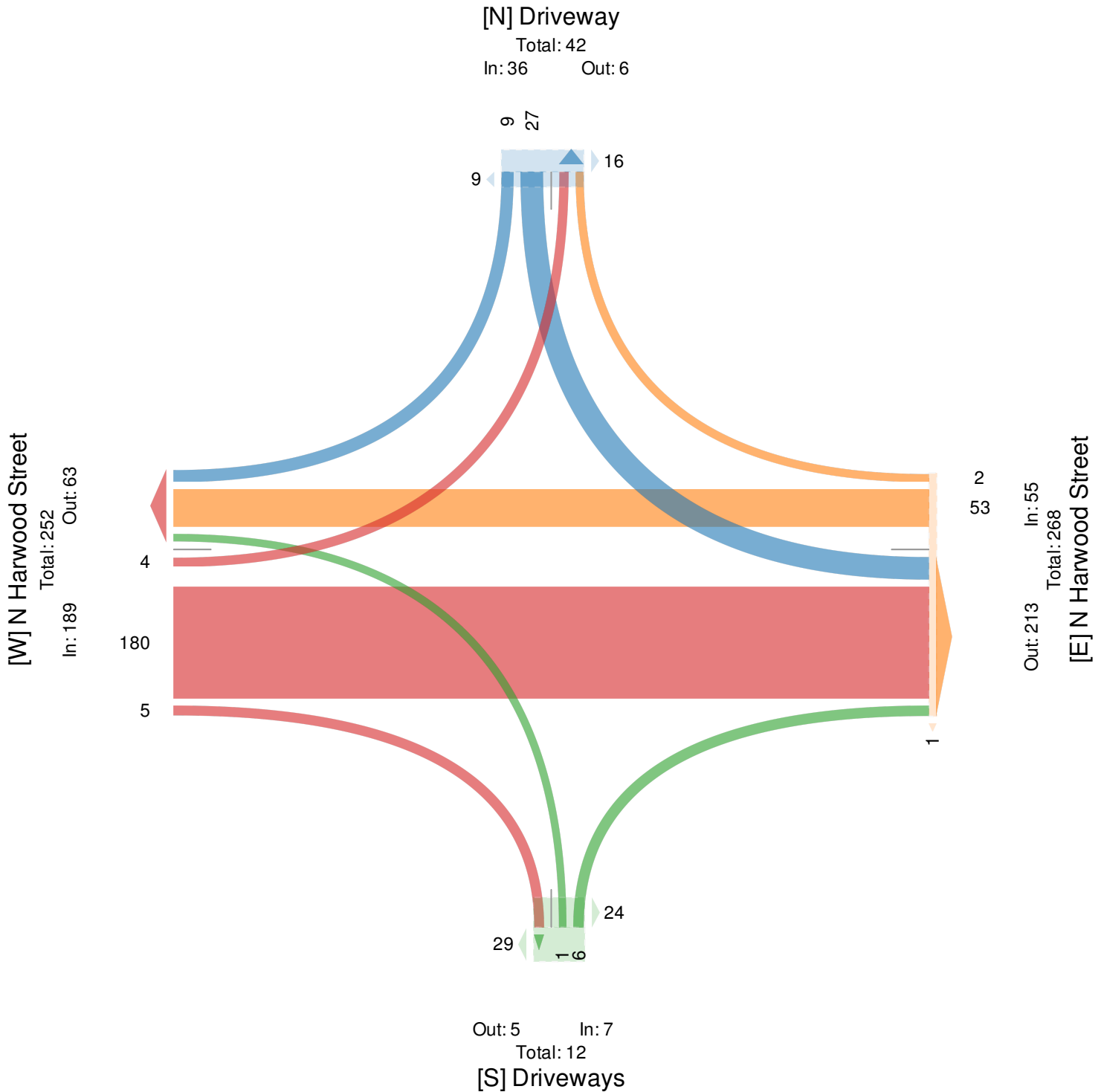
All Movements

ID: 703613, Location: 32.789773, -96.802483

CJ Hensch & Associates, Inc.

Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US



12. Harwood Street at North and South Drivew... - TMC

Tue Oct 8, 2019

Full Length (6:30 AM-8:30 AM, 4:30 PM-6:30 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703614, Location: 32.790131, -96.802903



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave., Pasadena, TX, 77503, US

Leg Direction	Harwood Street Eastbound							Harwood Street Westbound							South Driveway Northbound							North Driveway Southbound							
Time	L	T	R	U	App	Ped*		L	T	R	U	App	Ped*		L	T	R	U	App	Ped*		L	T	R	U	App	Ped*		Int
2019-10-08 6:30AM	4	3	2	2	11	0		2	3	8	0	13	0		0	0	0	0	0	3		0	0	0	0	0	3		24
6:45AM	3	7	2	0	12	0		0	8	16	0	24	0		0	0	1	0	1	2		0	0	0	0	0	0		37
Hourly Total	7	10	4	2	23	0		2	11	24	0	37	0		0	0	1	0	1	5		0	0	0	0	0	3		61
7:00AM	14	5	3	1	23	0		1	20	10	0	31	1		0	0	0	0	0	3		0	0	0	0	0	2		54
7:15AM	21	2	4	0	27	0		7	15	16	0	38	0		0	0	0	0	0	7		0	0	0	0	0	1		65
7:30AM	21	18	5	0	44	1		4	23	23	0	50	0		0	0	0	0	0	5		0	0	0	0	0	3		94
7:45AM	19	12	6	1	38	0		6	24	33	0	63	0		0	0	0	1	1	7		0	0	0	0	0	1		102
Hourly Total	75	37	18	2	132	1		18	82	82	0	182	1		0	0	0	1	1	22		0	0	0	0	0	7		315
8:00AM	33	11	16	1	61	0		10	29	32	0	71	0		0	0	0	0	0	15		0	0	0	0	0	3		132
8:15AM	54	13	10	0	77	0		6	28	44	0	78	0		1	1	0	0	2	20		0	0	0	0	0	3		157
Hourly Total	87	24	26	1	138	0		16	57	76	0	149	0		1	1	0	0	2	35		0	0	0	0	0	6		289
4:30PM	6	25	0	0	31	0		0	8	5	0	13	0		9	0	3	0	12	24		1	0	1	0	2	6		58
4:45PM	4	23	0	0	27	0		0	7	4	0	11	0		5	0	5	0	10	18		0	0	0	0	0	5		48
Hourly Total	10	48	0	0	58	0		0	15	9	0	24	0		14	0	8	0	22	42		1	0	1	0	2	11		106
5:00PM	3	42	0	0	45	0		0	15	1	0	16	0		12	0	8	0	20	16		0	0	0	0	0	4		81
5:15PM	3	41	0	0	44	0		1	14	3	0	18	0		10	0	2	0	12	12		0	0	0	0	0	7		74
5:30PM	3	57	1	0	61	0		0	10	2	0	12	2		11	0	1	0	12	19		0	0	0	0	0	7		85
5:45PM	5	34	0	2	41	0		0	11	6	0	17	0		12	0	6	0	18	16		0	0	0	0	0	3		76
Hourly Total	14	174	1	2	191	0		1	50	12	0	63	2		45	0	17	0	62	63		0	0	0	0	0	21		316
6:00PM	8	34	0	2	44	2		0	11	2	0	13	1		3	0	2	0	5	8		0	0	0	0	0	7		62
6:15PM	2	42	0	2	46	0		0	15	4	0	19	0		6	0	4	0	10	10		0	0	0	0	0	2		75
Hourly Total	10	76	0	4	90	2		0	26	6	0	32	1		9	0	6	0	15	18		0	0	0	0	0	9		137
Total	203	369	49	11	632	3		37	241	209	0	487	4		69	1	32	1	103	185		1	0	1	0	2	57		1224
% Approach	32.1%	58.4%	7.8%	1.7%	-	-		7.6%	49.5%	42.9%	0%	-	-		67.0%	1.0%	31.1%	1.0%	-	-		50.0%	0%	50.0%	0%	-	-		-
% Total	16.6%	30.1%	4.0%	0.9%	51.6%	-		3.0%	19.7%	17.1%	0%	39.8%	-		5.6%	0.1%	2.6%	0.1%	8.4%	-		0.1%	0%	0.1%	0%	0.2%	-		-
Lights	203	362	47	11	623	-		37	238	209	0	484	-		68	1	32	1	102	-		1	0	1	0	2	-		1211
% Lights	100%	98.1%	95.9%	100%	98.6%	-		100%	98.8%	100%	0%	99.4%	-		98.6%	100%	100%	100%	99.0%	-		100%	0%	100%	0%	100%	-		98.9%
Articulated Trucks	0	1	0	0	1	-		0	0	0	0	0	-		0	0	0	0	0	-		0	0	0	0	0	-		1
% Articulated Trucks	0%	0.3%	0%	0%	0.2%	-		0%	0%	0%	0%	0%	-		0%	0%	0%	0%	0%	-		0%	0%	0%	0%	0%	-		0.1%
Buses and Single-Unit Trucks	0	6	2	0	8	-		0	3	0	0	3	-		1	0	0	0	1	-		0	0	0	0	0	-		12
% Buses and Single-Unit Trucks	0%	1.6%	4.1%	0%	1.3%	-		0%	1.2%	0%	0%	0.6%	-		1.4%	0%	0%	0%	1.0%	-		0%	0%	0%	0%	0%	-		1.0%
Pedestrians	-	-	-	-	-	3		-	-	-	-	-	4		-	-	-	-	-	182		-	-	-	-	-	57		
% Pedestrians	-	-	-	-	-	100%		-	-	-	-	-	100%		-	-	-	-	-	98.4%		-	-	-	-	-	100%		-
Bicycles on Crosswalk	-	-	-	-	-	0		-	-	-	-	-	0		-	-	-	-	-	3		-	-	-	-	-	0		
% Bicycles on Crosswalk	-	-	-	-	-	0%		-	-	-	-	-	0%		-	-	-	-	-	1.6%		-	-	-	-	-	0%		

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

12. Harwood Street at North and South Driveway... - TMC

Tue Oct 8, 2019

Full Length (6:30 AM-8:30 AM, 4:30 PM-6:30 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

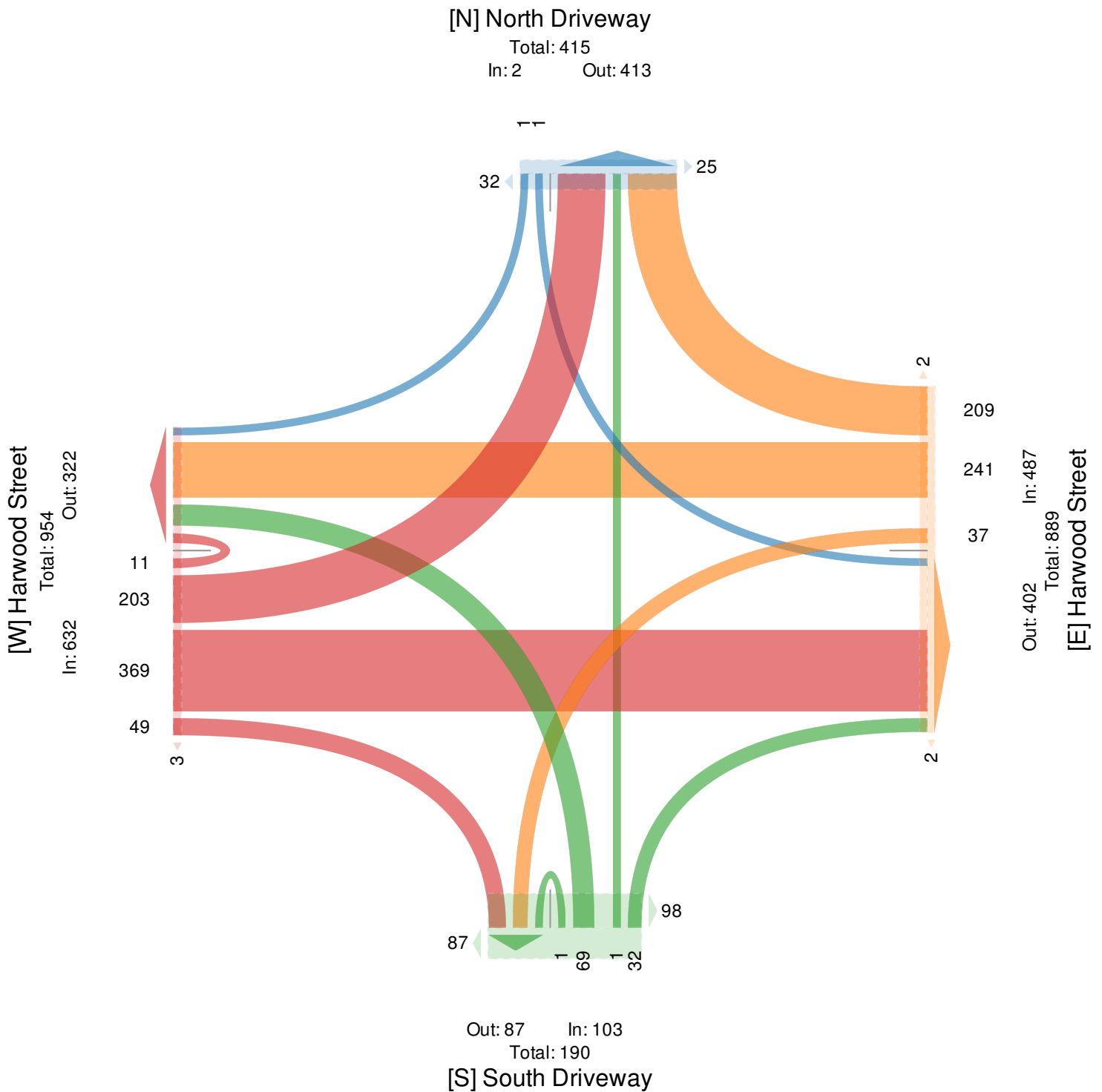
All Movements

ID: 703614, Location: 32.790131, -96.802903

CJ Hensch &
Associates, Inc.

Provided by: C. J. Hensch & Associates
Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US



12. Harwood Street at North and South Drivew... - TMC

Tue Oct 8, 2019

AM Peak (7:30 AM - 8:30 AM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703614, Location: 32.790131, -96.802903



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	Harwood Street Eastbound							Harwood Street Westbound							South Driveway Northbound							North Driveway Southbound							
Time	L	T	R	U	App	Ped*		L	T	R	U	App	Ped*		L	T	R	U	App	Ped*		L	T	R	U	App	Ped*		Int
2019-10-08 7:30AM	21	18	5	0	44	1		4	23	23	0	50	0		0	0	0	0	0	5		0	0	0	0	0	3		94
7:45AM	19	12	6	1	38	0		6	24	33	0	63	0		0	0	0	1	1	7		0	0	0	0	0	1		102
8:00AM	33	11	16	1	61	0		10	29	32	0	71	0		0	0	0	0	0	15		0	0	0	0	0	3		132
8:15AM	54	13	10	0	77	0		6	28	44	0	78	0		1	1	0	0	2	20		0	0	0	0	0	3		157
Total	127	54	37	2	220	1		26	104	132	0	262	0		1	1	0	1	3	47		0	0	0	0	0	10		485
% Approach	57.7%	24.5%	16.8%	0.9%	-	-		9.9%	39.7%	50.4%	0%	-	-		33.3%	33.3%	0%	33.3%	-	-		0%	0%	0%	0%	-	-		-
% Total	26.2%	11.1%	7.6%	0.4%	45.4%	-		5.4%	21.4%	27.2%	0%	54.0%	-		0.2%	0.2%	0%	0.2%	0.6%	-		0%	0%	0%	0%	0%	-		-
PHF	0.588	0.750	0.578	0.500	0.714	-		0.650	0.897	0.750	-	0.840	-		0.250	0.250	-	0.250	0.375	-		-	-	-	-	-	-		0.772
Lights	127	51	35	2	215	-		26	102	132	0	260	-		0	1	0	1	2	-		0	0	0	0	0	-		477
% Lights	100%	94.4%	94.6%	100%	97.7%	-		100%	98.1%	100%	0%	99.2%	-		0%	100%	0%	100%	66.7%	-		0%	0%	0%	0%	-	-		98.4%
Articulated Trucks	0	1	0	0	1	-		0	0	0	0	0	-		0	0	0	0	0	-		0	0	0	0	0	-		1
% Articulated Trucks	0%	1.9%	0%	0%	0.5%	-		0%	0%	0%	0%	0%	-		0%	0%	0%	0%	0%	-		0%	0%	0%	0%	-	-		0.2%
Buses and Single-Unit Trucks	0	2	2	0	4	-		0	2	0	0	2	-		1	0	0	0	1	-		0	0	0	0	0	-		7
% Buses and Single-Unit Trucks	0%	3.7%	5.4%	0%	1.8%	-		0%	1.9%	0%	0%	0.8%	-		100%	0%	0%	0%	33.3%	-		0%	0%	0%	0%	-	-		1.4%
Pedestrians	-	-	-	-	-	1		-	-	-	-	-	0		-	-	-	-	-	45		-	-	-	-	-	10		
% Pedestrians	-	-	-	-	-	100%		-	-	-	-	-	-		-	-	-	-	-	95.7%		-	-	-	-	-	100%		-
Bicycles on Crosswalk	-	-	-	-	-	0		-	-	-	-	-	0		-	-	-	-	-	2		-	-	-	-	-	0		
% Bicycles on Crosswalk	-	-	-	-	-	0%		-	-	-	-	-	-		-	-	-	-	-	4.3%		-	-	-	-	-	0%		-

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

12. Harwood Street at North and South Driveway... - TMC

Tue Oct 8, 2019

AM Peak (7:30 AM - 8:30 AM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703614, Location: 32.790131, -96.802903

CJ Hensch &
Associates, Inc.

Provided by: C. J. Hensch & Associates
Inc.

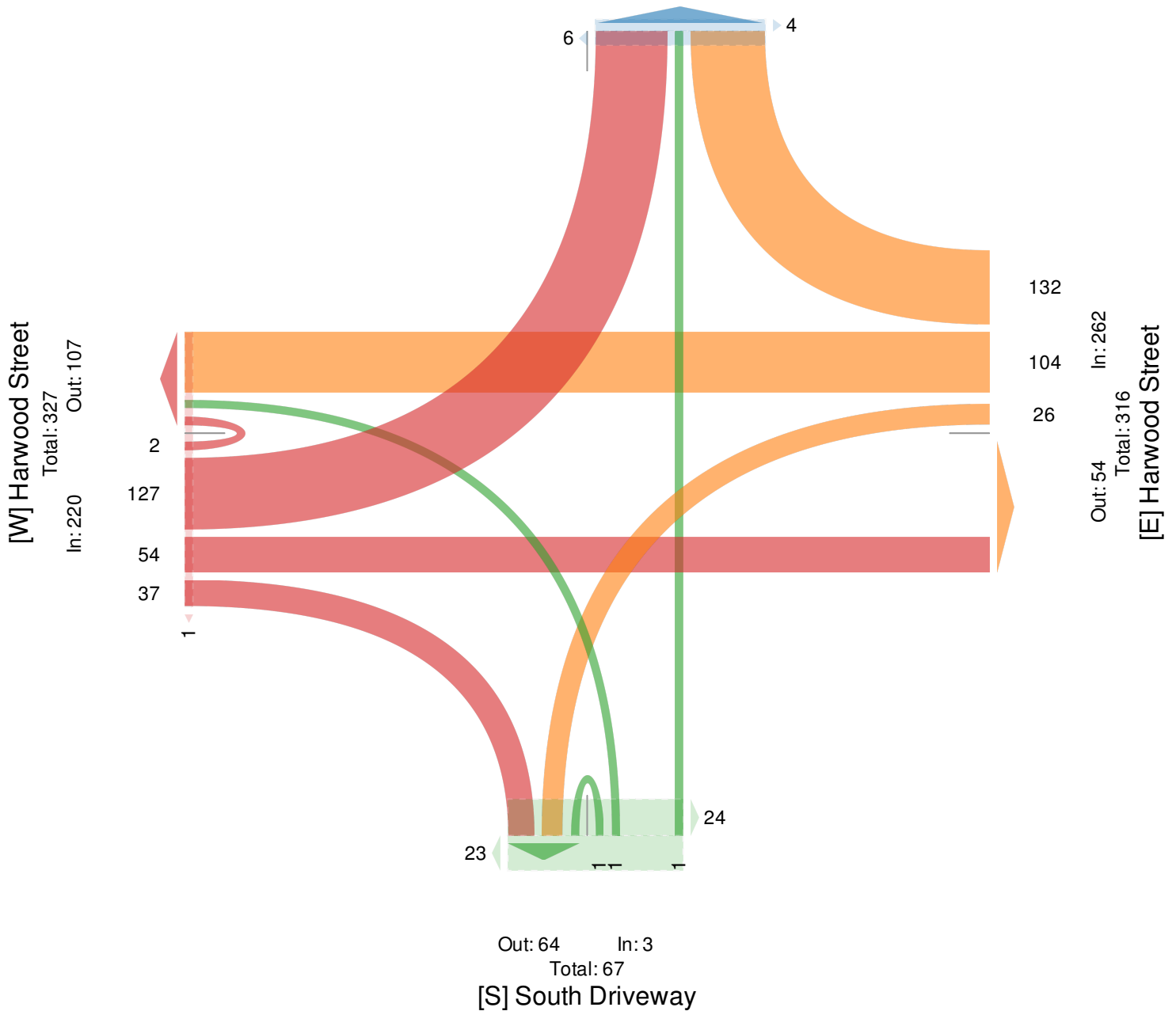
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

[N] North Driveway

Total: 260

In: 0

Out: 260



12. Harwood Street at North and South Drivew... - TMC

Tue Oct 8, 2019

PM Peak (5 PM - 6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703614, Location: 32.790131, -96.802903



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	Harwood Street Eastbound							Harwood Street Westbound							South Driveway Northbound							North Driveway Southbound							
Time	L	T	R	U	App	Ped*		L	T	R	U	App	Ped*		L	T	R	U	App	Ped*		L	T	R	U	App	Ped*	Int	
2019-10-08 5:00PM	3	42	0	0	45	0		0	15	1	0	16	0		12	0	8	0	20	16		0	0	0	0	0	4	81	
5:15PM	3	41	0	0	44	0		1	14	3	0	18	0		10	0	2	0	12	12		0	0	0	0	0	7	74	
5:30PM	3	57	1	0	61	0		0	10	2	0	12	2		11	0	1	0	12	19		0	0	0	0	0	7	85	
5:45PM	5	34	0	2	41	0		0	11	6	0	17	0		12	0	6	0	18	16		0	0	0	0	0	3	76	
Total	14	174	1	2	191	0		1	50	12	0	63	2		45	0	17	0	62	63		0	0	0	0	0	21	316	
% Approach	7.3%	91.1%	0.5%	1.0%	-	-		1.6%	79.4%	19.0%	0%	-	-		72.6%	0%	27.4%	0%	-	-		0%	0%	0%	0%	-	-	-	
% Total	4.4%	55.1%	0.3%	0.6%	60.4%	-		0.3%	15.8%	3.8%	0%	19.9%	-		14.2%	0%	5.4%	0%	19.6%	-		0%	0%	0%	0%	0%	-	-	
PHF	0.700	0.763	0.250	0.250	0.783	-		0.250	0.833	0.500	-	0.875	-		0.938	-	0.531	-	0.775	-		-	-	-	-	-	-	0.929	
Lights	14	172	1	2	189	-		1	50	12	0	63	-		45	0	17	0	62	-		0	0	0	0	0	-	314	
% Lights	100%	98.9%	100%	100%	99.0%	-		100%	100%	100%	0%	100%	-		100%	0%	100%	0%	100%	-		0%	0%	0%	0%	-	-	99.4%	
Articulated Trucks	0	0	0	0	0	-		0	0	0	0	0	-		0	0	0	0	0	-		0	0	0	0	0	-	0	
% Articulated Trucks	0%	0%	0%	0%	0%	-		0%	0%	0%	0%	0%	-		0%	0%	0%	0%	0%	-		0%	0%	0%	0%	-	-	0%	
Buses and Single-Unit Trucks	0	2	0	0	2	-		0	0	0	0	0	-		0	0	0	0	0	-		0	0	0	0	0	-	2	
% Buses and Single-Unit Trucks	0%	1.1%	0%	0%	1.0%	-		0%	0%	0%	0%	0%	-		0%	0%	0%	0%	0%	-		0%	0%	0%	0%	-	-	0.6%	
Pedestrians	-	-	-	-	-	0		-	-	-	-	-	2		-	-	-	-	-	63		-	-	-	-	-	21		
% Pedestrians	-	-	-	-	-	-		-	-	-	-	-	100%		-	-	-	-	-	100%		-	-	-	-	-	100%	-	
Bicycles on Crosswalk	-	-	-	-	-	0		-	-	-	-	-	0		-	-	-	-	-	0		-	-	-	-	-	0		
% Bicycles on Crosswalk	-	-	-	-	-	-		-	-	-	-	-	0%		-	-	-	-	-	0%		-	-	-	-	-	0%	-	

* Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

12. Harwood Street at North and South Driveway... - TMC

Tue Oct 8, 2019

PM Peak (5 PM - 6 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703614, Location: 32.790131, -96.802903

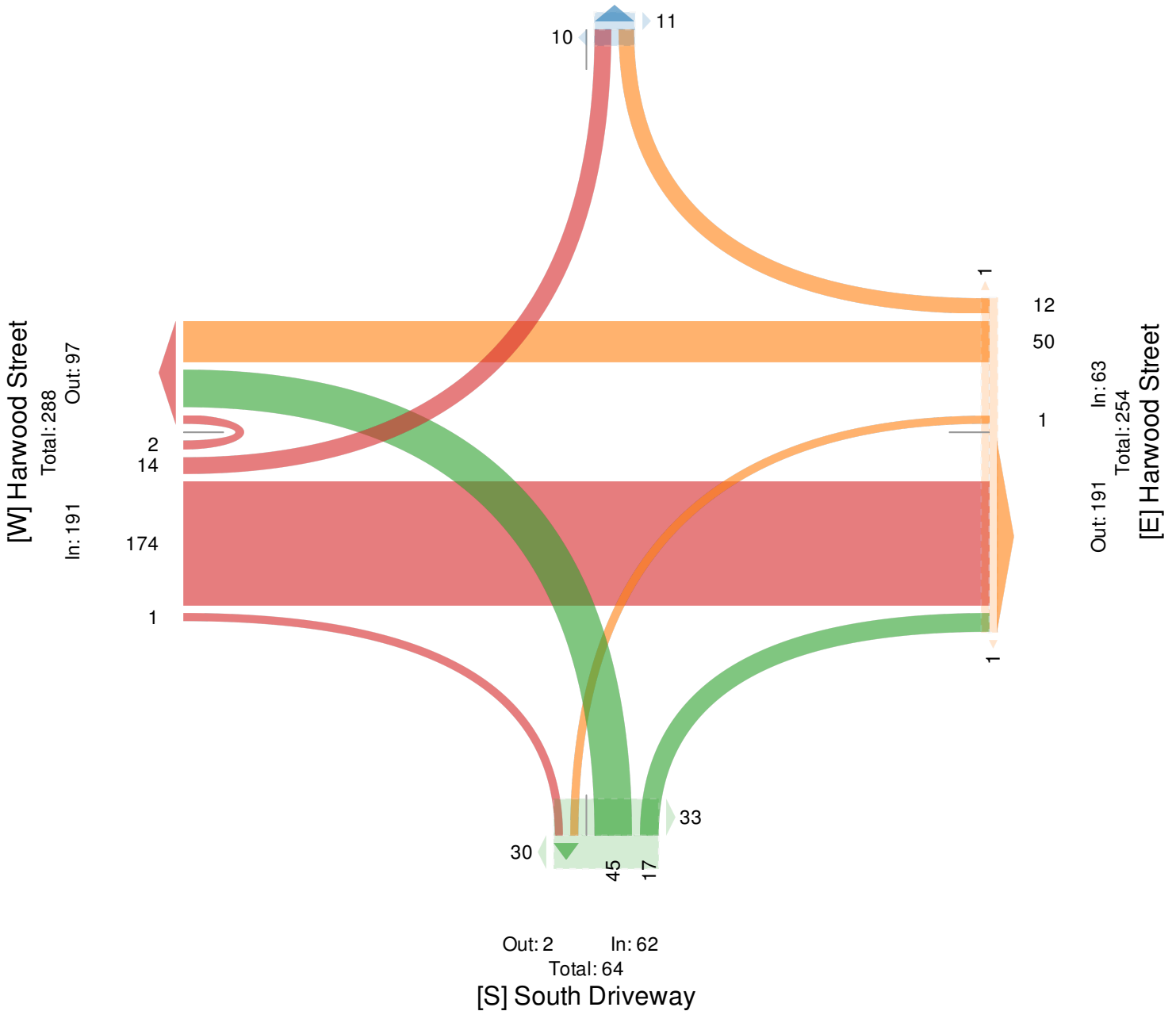


Provided by: C. J. Hensch & Associates
Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US

[N] North Driveway

Total: 26
In: 0 Out: 26



13. Woodall Rogers SBFR at West Driveway #1 - TMC

Tue Oct 8, 2019

Full Length (6:30 AM-8:30 AM, 4:30 PM-6:30 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703615, Location: 32.789041, -96.80272



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	West Driveway #1 Eastbound				Woodall Rogers SBFR Northbound		Woodall Rogers SBFR Southbound				
Time	R	U	App	Ped*	App	Ped*	T	R	App	Ped*	Int
2019-10-08 6:30AM	0	0	0	7	0	0	62	1	63	4	63
6:45AM	0	0	0	0	0	0	75	5	80	1	80
Hourly Total	0	0	0	7	0	0	137	6	143	5	143
7:00AM	0	0	0	3	0	0	94	1	95	0	95
7:15AM	0	0	0	2	0	0	120	2	122	0	122
7:30AM	0	0	0	2	0	0	135	4	139	0	139
7:45AM	1	0	1	4	0	0	166	7	173	1	174
Hourly Total	1	0	1	11	0	0	515	14	529	1	530
8:00AM	0	0	0	4	0	1	169	9	178	0	178
8:15AM	0	0	0	3	0	0	201	7	208	0	208
Hourly Total	0	0	0	7	0	1	370	16	386	0	386
4:30PM	5	0	5	6	0	0	190	3	193	0	198
4:45PM	3	0	3	7	0	0	178	1	179	0	182
Hourly Total	8	0	8	13	0	0	368	4	372	0	380
5:00PM	2	0	2	10	0	0	201	0	201	0	203
5:15PM	6	0	6	12	0	0	218	0	218	0	224
5:30PM	5	0	5	18	0	0	222	2	224	0	229
5:45PM	5	0	5	6	0	0	202	1	203	0	208
Hourly Total	18	0	18	46	0	0	843	3	846	0	864
6:00PM	1	0	1	18	0	0	208	1	209	0	210
6:15PM	6	0	6	26	0	0	216	1	217	1	223
Hourly Total	7	0	7	44	0	0	424	2	426	1	433
Total	34	0	34	128	0	1	2657	45	2702	7	2736
% Approach	100%	0%	-	-	-	-	98.3%	1.7%	-	-	-
% Total	1.2%	0%	1.2%	-	0%	-	97.1%	1.6%	98.8%	-	-
Lights	34	0	34	-	0	-	2619	45	2664	-	2698
% Lights	100%	0%	100%	-	-	-	98.6%	100%	98.6%	-	98.6%
Articulated Trucks	0	0	0	-	0	-	5	0	5	-	5
% Articulated Trucks	0%	0%	0%	-	-	-	0.2%	0%	0.2%	-	0.2%
Buses and Single-Unit Trucks	0	0	0	-	0	-	33	0	33	-	33
% Buses and Single-Unit Trucks	0%	0%	0%	-	-	-	1.2%	0%	1.2%	-	1.2%
Pedestrians	-	-	-	115	-	1	-	-	-	7	-
% Pedestrians	-	-	-	89.8%	-	100%	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	13	-	0	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	10.2%	-	0%	-	-	-	0%	-

* Pedestrians and Bicycles on Crosswalk. R: Right, T: Thru, U: U-Turn

13. Woodall Rogers SBFR at West Driveway #1 - TMC

Tue Oct 8, 2019

Full Length (6:30 AM-8:30 AM, 4:30 PM-6:30 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703615, Location: 32.789041, -96.80272

CJ Hensch &
Associates, Inc.

Provided by: C. J. Hensch & Associates
Inc.

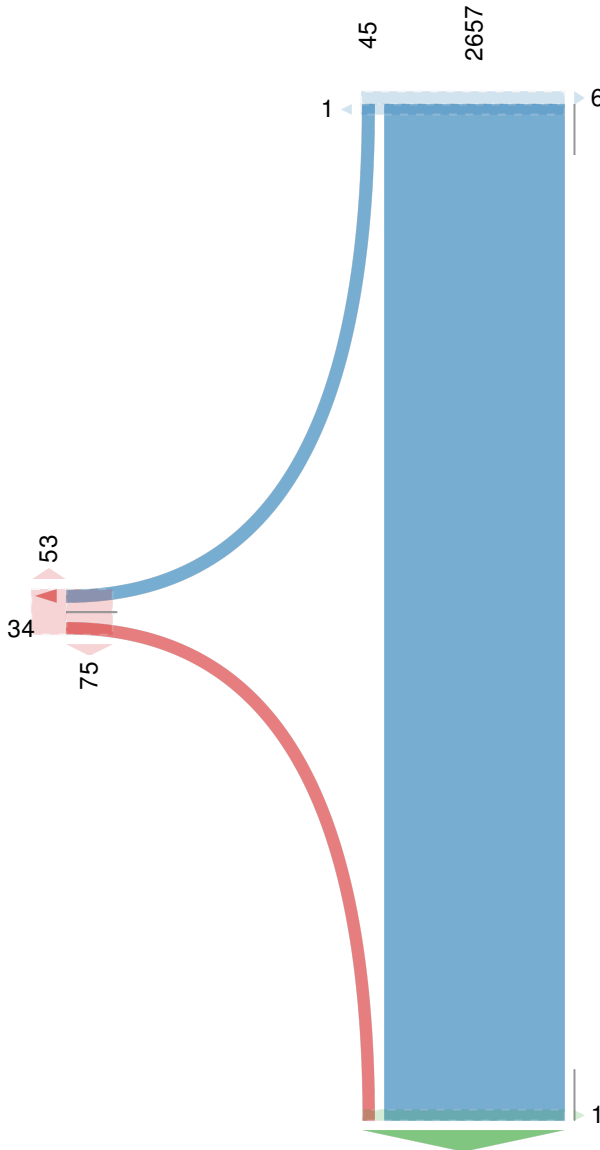
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

[N] Woodall Rogers SBFR

Total: 2702
In: 2702 Out: 0

[W] West Driveway #1

Total: 79
In: 34 Out: 45



Out: 2691 In: 0
Total: 2691
[S] Woodall Rogers SBFR

13. Woodall Rogers SBFR at West Driveway #1 - TMC

Tue Oct 8, 2019

AM Peak (7:30 AM - 8:30 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703615, Location: 32.789041, -96.80272



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	West Driveway #1 Eastbound				Woodall Rogers SBFR Northbound		Woodall Rogers SBFR Southbound				
Time	R	U	App	Ped*	App	Ped*	T	R	App	Ped*	Int
2019-10-08 7:30AM	0	0	0	2	0	0	135	4	139	0	139
7:45AM	1	0	1	4	0	0	166	7	173	1	174
8:00AM	0	0	0	4	0	1	169	9	178	0	178
8:15AM	0	0	0	3	0	0	201	7	208	0	208
Total	1	0	1	13	0	1	671	27	698	1	699
% Approach	100%	0%	-	-	-	-	96.1%	3.9%	-	-	-
% Total	0.1%	0%	0.1%	-	0%	-	96.0%	3.9%	99.9%	-	-
PHF	0.250	-	0.250	-	-	-	0.835	0.750	0.839	-	0.840
Lights	1	0	1	-	0	-	657	27	684	-	685
% Lights	100%	0%	100%	-	-	-	97.9%	100%	98.0%	-	98.0%
Articulated Trucks	0	0	0	-	0	-	2	0	2	-	2
% Articulated Trucks	0%	0%	0%	-	-	-	0.3%	0%	0.3%	-	0.3%
Buses and Single-Unit Trucks	0	0	0	-	0	-	12	0	12	-	12
% Buses and Single-Unit Trucks	0%	0%	0%	-	-	-	1.8%	0%	1.7%	-	1.7%
Pedestrians	-	-	-	12	-	1	-	-	-	1	-
% Pedestrians	-	-	-	92.3%	-	100%	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	1	-	0	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	7.7%	-	0%	-	-	-	0%	-

*Pedestrians and Bicycles on Crosswalk. R: Right, T: Thru, U: U-Turn

13. Woodall Rogers SBFR at West Driveway #1 - TMC

Tue Oct 8, 2019

AM Peak (7:30 AM - 8:30 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

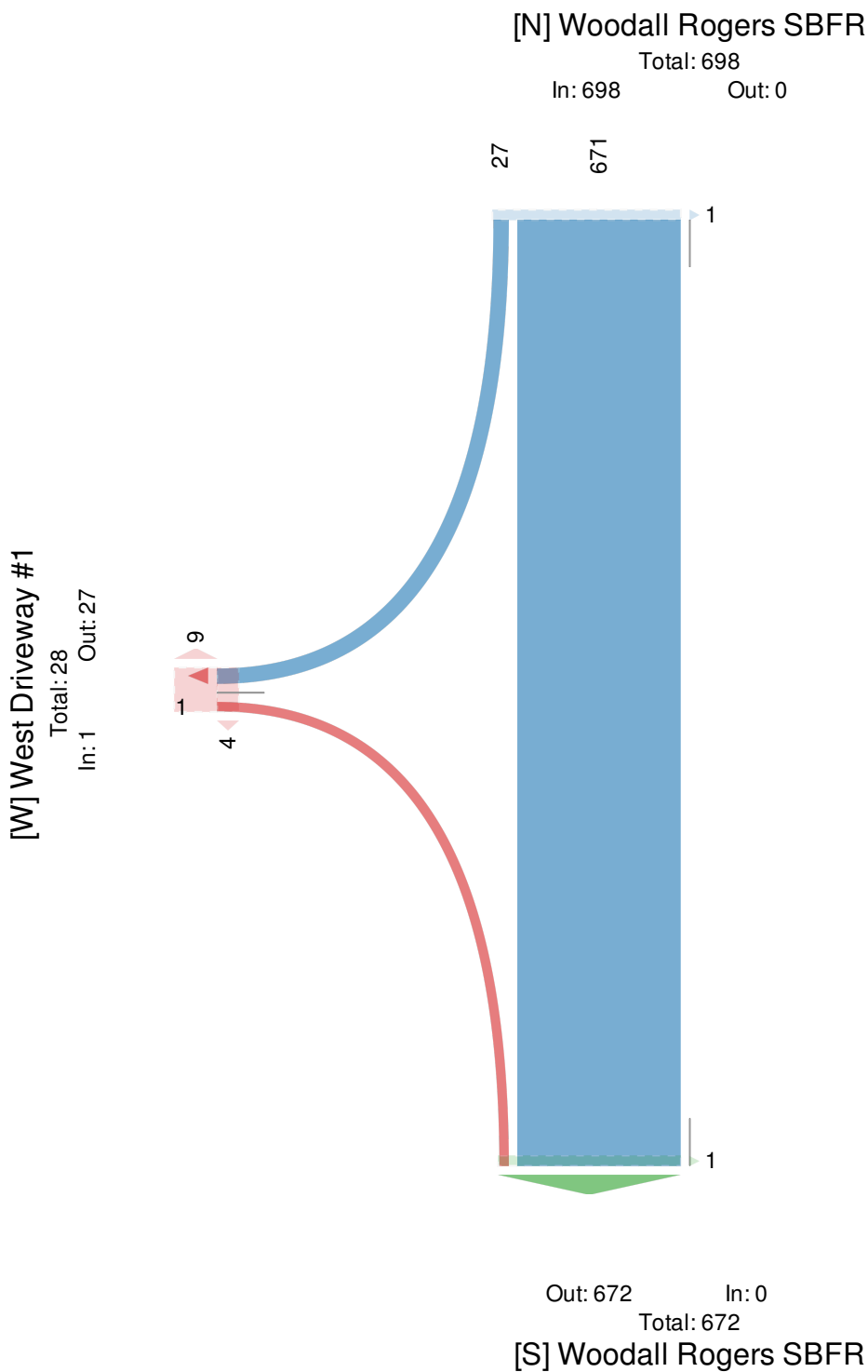
All Movements

ID: 703615, Location: 32.789041, -96.80272



Provided by: C. J. Hensch & Associates
Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US



13. Woodall Rogers SBFR at West Driveway #1 - TMC

Tue Oct 8, 2019

PM Peak (5:15 PM - 6:15 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703615, Location: 32.789041, -96.80272



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	West Driveway #1 Eastbound				Woodall Rogers SBFR Northbound		Woodall Rogers SBFR Southbound				
Time	R	U	App	Ped*	App	Ped*	T	R	App	Ped*	Int
2019-10-08 5:15PM	6	0	6	12	0	0	218	0	218	0	224
5:30PM	5	0	5	18	0	0	222	2	224	0	229
5:45PM	5	0	5	6	0	0	202	1	203	0	208
6:00PM	1	0	1	18	0	0	208	1	209	0	210
Total	17	0	17	54	0	0	850	4	854	0	871
% Approach	100%	0%	-	-	-	-	99.5%	0.5%	-	-	-
% Total	2.0%	0%	2.0%	-	0%	-	97.6%	0.5%	98.0%	-	-
PHF	0.708	-	0.708	-	-	-	0.957	0.500	0.953	-	0.951
Lights	17	0	17	-	0	-	842	4	846	-	863
% Lights	100%	0%	100%	-	-	-	99.1%	100%	99.1%	-	99.1%
Articulated Trucks	0	0	0	-	0	-	0	0	0	-	0
% Articulated Trucks	0%	0%	0%	-	-	-	0%	0%	0%	-	0%
Buses and Single-Unit Trucks	0	0	0	-	0	-	8	0	8	-	8
% Buses and Single-Unit Trucks	0%	0%	0%	-	-	-	0.9%	0%	0.9%	-	0.9%
Pedestrians	-	-	-	49	-	0	-	-	-	0	-
% Pedestrians	-	-	-	90.7%	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	5	-	0	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	9.3%	-	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. R: Right, T: Thru, U: U-Turn

13. Woodall Rogers SBFR at West Driveway #1 - TMC

Tue Oct 8, 2019

PM Peak (5:15 PM - 6:15 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

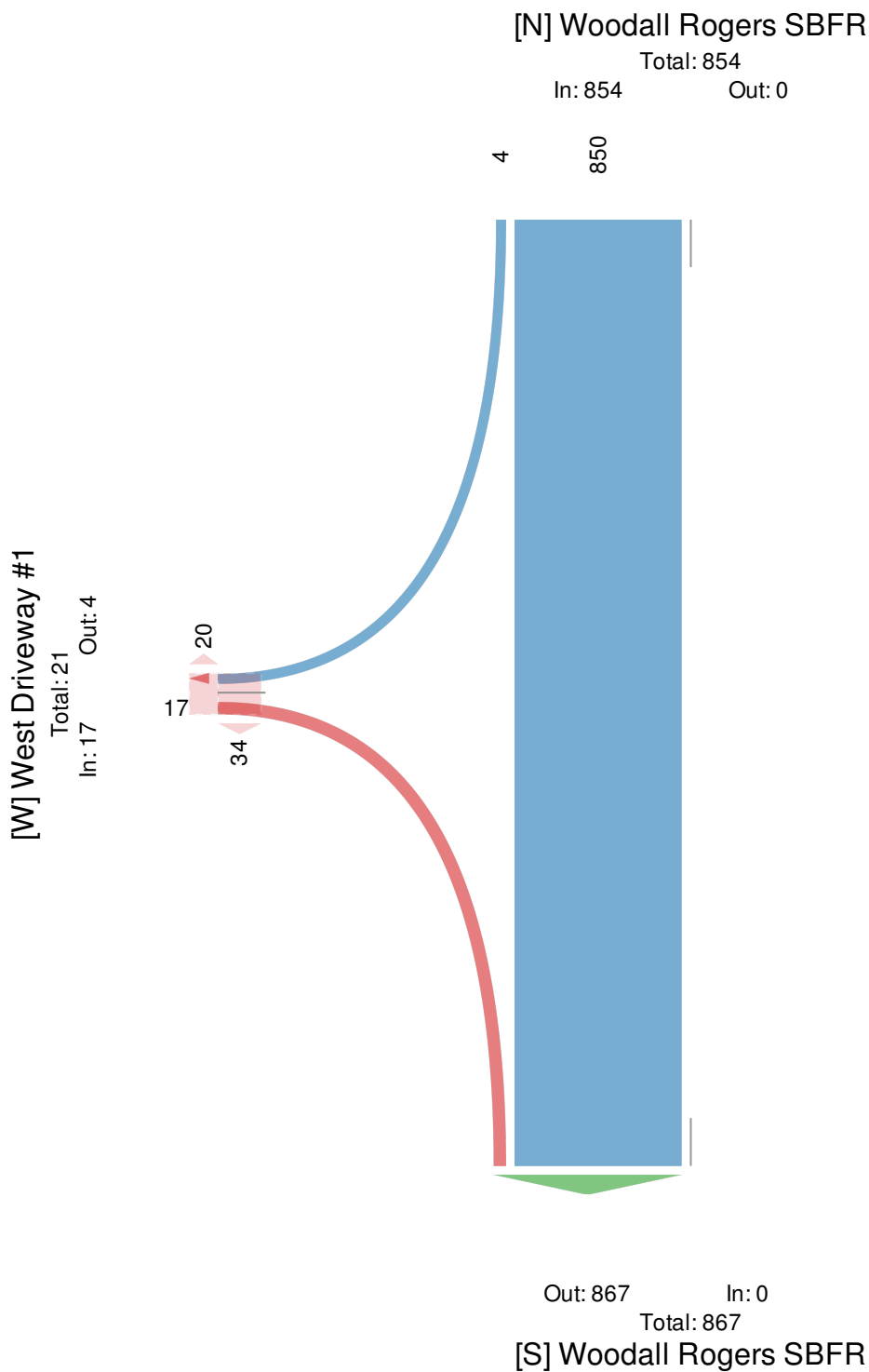
All Movements

ID: 703615, Location: 32.789041, -96.80272



Provided by: C. J. Hensch & Associates
Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US



14. Woodall Rogers SBFR at West Driveway #2 - TMC

Tue Oct 8, 2019

Full Length (6:30 AM-8:30 AM, 4:30 PM-6:30 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703616, Location: 32.789168, -96.802526



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	West Driveway #2 Eastbound				Woodall Rogers SBFR Northbound		Woodall Rogers SBFR Southbound				
Time	R	U	App	Ped*	App	Ped*	T	R	App	Ped*	Int
2019-10-08 6:30AM	0	0	0	4	0	4	63	0	63	0	63
6:45AM	1	0	1	2	0	1	78	2	80	0	81
Hourly Total	1	0	1	6	0	5	141	2	143	0	144
7:00AM	0	0	0	5	0	0	95	0	95	0	95
7:15AM	0	0	0	2	0	0	123	0	123	0	123
7:30AM	1	0	1	3	0	0	139	2	141	0	142
7:45AM	1	0	1	6	0	0	173	0	173	1	174
Hourly Total	2	0	2	16	0	0	530	2	532	1	534
8:00AM	0	0	0	4	0	0	178	2	180	0	180
8:15AM	2	0	2	6	0	0	208	0	208	0	210
Hourly Total	2	0	2	10	0	0	386	2	388	0	390
4:30PM	2	0	2	5	0	0	191	1	192	0	194
4:45PM	0	0	0	8	0	0	168	1	169	0	169
Hourly Total	2	0	2	13	0	0	359	2	361	0	363
5:00PM	1	0	1	11	0	0	205	0	205	0	206
5:15PM	1	0	1	11	0	0	211	1	212	0	213
5:30PM	1	0	1	18	0	0	225	0	225	0	226
5:45PM	0	0	0	13	0	0	205	1	206	0	206
Hourly Total	3	0	3	53	0	0	846	2	848	0	851
6:00PM	1	0	1	18	0	0	207	0	207	0	208
6:15PM	3	0	3	23	0	1	213	2	215	0	218
Hourly Total	4	0	4	41	0	1	420	2	422	0	426
Total	14	0	14	139	0	6	2682	12	2694	1	2708
% Approach	100%	0%	-	-	-	-	99.6%	0.4%	-	-	-
% Total	0.5%	0%	0.5%	-	0%	-	99.0%	0.4%	99.5%	-	-
Lights	14	0	14	-	0	-	2644	12	2656	-	2670
% Lights	100%	0%	100%	-	-	-	98.6%	100%	98.6%	-	98.6%
Articulated Trucks	0	0	0	-	0	-	4	0	4	-	4
% Articulated Trucks	0%	0%	0%	-	-	-	0.1%	0%	0.1%	-	0.1%
Buses and Single-Unit Trucks	0	0	0	-	0	-	34	0	34	-	34
% Buses and Single-Unit Trucks	0%	0%	0%	-	-	-	1.3%	0%	1.3%	-	1.3%
Pedestrians	-	-	-	132	-	6	-	-	-	1	-
% Pedestrians	-	-	-	95.0%	-	100%	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	7	-	0	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	5.0%	-	0%	-	-	-	0%	-

* Pedestrians and Bicycles on Crosswalk. R: Right, T: Thru, U: U-Turn

14. Woodall Rogers SBFR at West Driveway #2 - TMC

Tue Oct 8, 2019

Full Length (6:30 AM-8:30 AM, 4:30 PM-6:30 PM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703616, Location: 32.789168, -96.802526

CJ Hensch & Associates, Inc.

Provided by: C. J. Hensch & Associates Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US

[N] Woodall Rogers SBFR

Total: 2694

In: 2694

Out: 0

12 2682

[W] West Driveway #2

Total: 26

Out: 12

In: 14

55 14 84

1 5

Out: 2696

In: 0

Total: 2696

[S] Woodall Rogers SBFR

14. Woodall Rogers SBFR at West Driveway #2 - TMC

Tue Oct 8, 2019

AM Peak (7:30 AM - 8:30 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703616, Location: 32.789168, -96.802526



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	West Driveway #2 Eastbound				Woodall Rogers SBFR Northbound		Woodall Rogers SBFR Southbound				
Time	R	U	App	Ped*	App	Ped*	T	R	App	Ped*	Int
2019-10-08 7:30AM	1	0	1	3	0	0	139	2	141	0	142
7:45AM	1	0	1	6	0	0	173	0	173	1	174
8:00AM	0	0	0	4	0	0	178	2	180	0	180
8:15AM	2	0	2	6	0	0	208	0	208	0	210
Total	4	0	4	19	0	0	698	4	702	1	706
% Approach	100%	0%	-	-	-	-	99.4%	0.6%	-	-	-
% Total	0.6%	0%	0.6%	-	0%	-	98.9%	0.6%	99.4%	-	-
PHF	0.500	-	0.500	-	-	-	0.839	0.500	0.844	-	0.840
Lights	4	0	4	-	0	-	685	4	689	-	693
% Lights	100%	0%	100%	-	-	-	98.1%	100%	98.1%	-	98.2%
Articulated Trucks	0	0	0	-	0	-	2	0	2	-	2
% Articulated Trucks	0%	0%	0%	-	-	-	0.3%	0%	0.3%	-	0.3%
Buses and Single-Unit Trucks	0	0	0	-	0	-	11	0	11	-	11
% Buses and Single-Unit Trucks	0%	0%	0%	-	-	-	1.6%	0%	1.6%	-	1.6%
Pedestrians	-	-	-	18	-	0	-	-	-	1	-
% Pedestrians	-	-	-	94.7%	-	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	1	-	0	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	5.3%	-	-	-	-	-	0%	-

*Pedestrians and Bicycles on Crosswalk. R: Right, T: Thru, U: U-Turn

14. Woodall Rogers SBFR at West Driveway #2 - TMC

Tue Oct 8, 2019

AM Peak (7:30 AM - 8:30 AM)

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703616, Location: 32.789168, -96.802526

CJ Hensch &
Associates, Inc.

Provided by: C. J. Hensch & Associates
Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US

[N] Woodall Rogers SBFR

Total: 702

In: 702

Out: 0



[W] West Driveway #2

Total: 8

Out: 4

In: 4

Out: 702

In: 0

Total: 702

[S] Woodall Rogers SBFR

14. Woodall Rogers SBFR at West Driveway #2 - TMC

Tue Oct 8, 2019

PM Peak (5:30 PM - 6:30 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703616, Location: 32.789168, -96.802526



Provided by: C. J. Hensch & Associates Inc.
5215 Sycamore Ave.,
Pasadena, TX, 77503, US

Leg Direction	West Driveway #2 Eastbound				Woodall Rogers SBFR Northbound		Woodall Rogers SBFR Southbound				
Time	R	U	App	Ped*	App	Ped*	T	R	App	Ped*	Int
2019-10-08 5:30PM	1	0	1	18	0	0	225	0	225	0	226
5:45PM	0	0	0	13	0	0	205	1	206	0	206
6:00PM	1	0	1	18	0	0	207	0	207	0	208
6:15PM	3	0	3	23	0	1	213	2	215	0	218
Total	5	0	5	72	0	1	850	3	853	0	858
% Approach	100%	0%	-	-	-	-	99.6%	0.4%	-	-	-
% Total	0.6%	0%	0.6%	-	0%	-	99.1%	0.3%	99.4%	-	-
PHF	0.417	-	0.417	-	-	-	0.944	0.375	0.948	-	0.949
Lights	5	0	5	-	0	-	842	3	845	-	850
% Lights	100%	0%	100%	-	-	-	99.1%	100%	99.1%	-	99.1%
Articulated Trucks	0	0	0	-	0	-	0	0	0	-	0
% Articulated Trucks	0%	0%	0%	-	-	-	0%	0%	0%	-	0%
Buses and Single-Unit Trucks	0	0	0	-	0	-	8	0	8	-	8
% Buses and Single-Unit Trucks	0%	0%	0%	-	-	-	0.9%	0%	0.9%	-	0.9%
Pedestrians	-	-	-	72	-	1	-	-	-	0	
% Pedestrians	-	-	-	100%	-	100%	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	0	-	0	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	0%	-	0%	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. R: Right, T: Thru, U: U-Turn

14. Woodall Rogers SBFR at West Driveway #2 - TMC

Tue Oct 8, 2019

PM Peak (5:30 PM - 6:30 PM) - Overall Peak Hour

All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks, Pedestrians, Bicycles on Crosswalk)

All Movements

ID: 703616, Location: 32.789168, -96.802526

CJ Hensch &
Associates, Inc.

Provided by: C. J. Hensch & Associates
Inc.

5215 Sycamore Ave.,
Pasadena, TX, 77503, US

[N] Woodall Rogers SBFR

Total: 853

In: 853

Out: 0

3 850

[W] West Driveway #2

Total: 8

Out: 3

In: 5

27
5
45

1

Out: 855

In: 0

Total: 855

[S] Woodall Rogers SBFR

EB Harwood Street West of Woodall Rogers SBFR

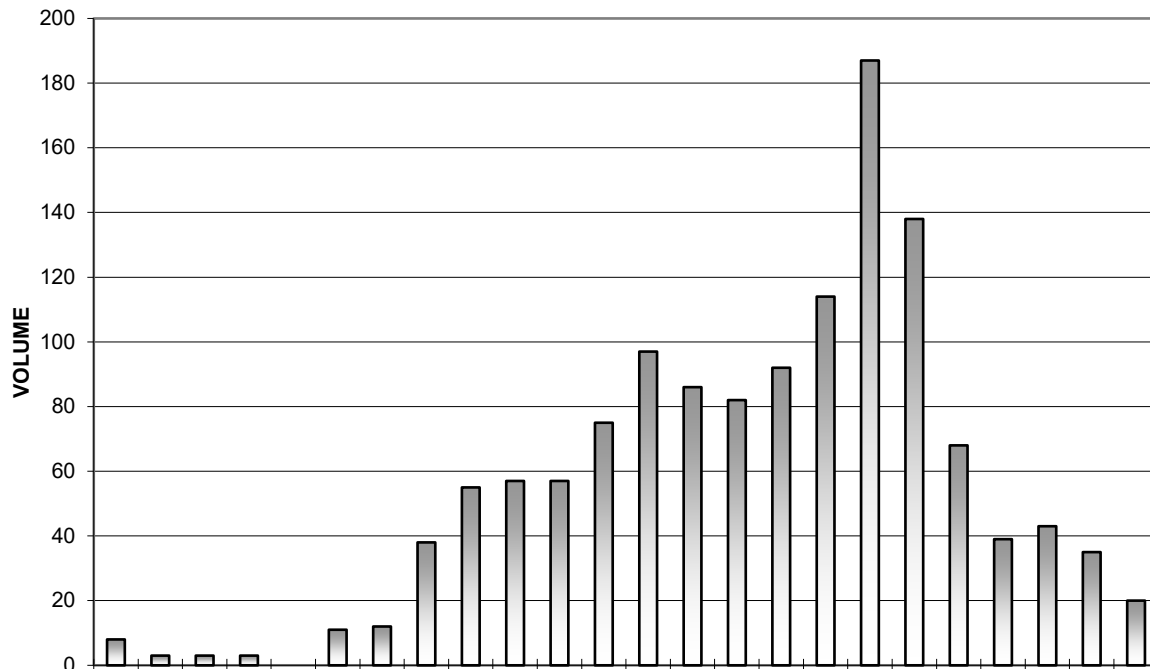
Date Began:
10/8/2019

TIME	0:00	0:15	0:30	0:45	TOTAL
0:00	3	2	2	1	8
1:00	0	0	2	1	3
2:00	2	1	0	0	3
3:00	1	1	1	0	3
4:00	0	0	0	0	0
5:00	1	3	1	6	11
6:00	2	1	4	5	12
7:00	6	2	16	14	38
8:00	8	12	19	16	55
9:00	11	17	14	15	57
10:00	14	11	17	15	57
11:00	10	18	21	26	75
12:00	25	32	18	22	97
13:00	32	21	23	10	86
14:00	17	23	20	22	82
15:00	13	31	31	17	92
16:00	37	23	26	28	114
17:00	48	41	60	38	187
18:00	34	45	34	25	138
19:00	15	19	18	16	68
20:00	11	13	6	9	39
21:00	9	14	10	10	43
22:00	5	7	13	10	35
23:00	7	8	2	3	20

TOTAL: 1323

The A.M. peak hour from 8:30 to 9:30 is 63

The P.M. peak hour from 17:00 to 18:00 is 187



WB Harwood Street West of Woodall Rogers SBFR

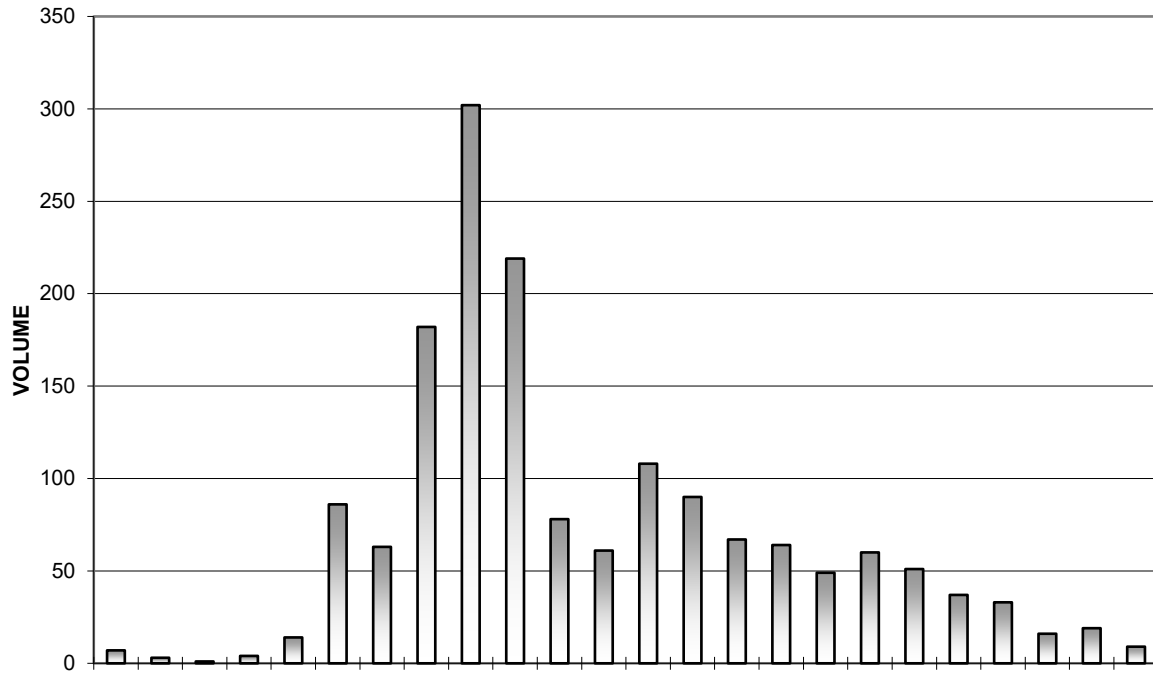
Date Began:
10/8/2019

TIME	0:00	0:15	0:30	0:45	TOTAL
0:00	6	0	0	1	7
1:00	0	2	1	0	3
2:00	1	0	0	0	1
3:00	2	2	0	0	4
4:00	1	3	1	9	14
5:00	12	22	39	13	86
6:00	11	10	13	29	63
7:00	35	37	46	64	182
8:00	62	78	77	85	302
9:00	81	55	42	41	219
10:00	19	20	22	17	78
11:00	9	19	12	21	61
12:00	27	30	25	26	108
13:00	30	24	15	21	90
14:00	20	19	15	13	67
15:00	17	16	19	12	64
16:00	12	13	11	13	49
17:00	14	17	13	16	60
18:00	13	15	18	5	51
19:00	6	14	8	9	37
20:00	9	10	7	7	33
21:00	6	4	2	4	16
22:00	1	9	6	3	19
23:00	2	2	3	2	9

TOTAL: 1623

The A.M. peak hour from 8:15 to 9:15 is 321

The P.M. peak hour from 14:45 to 15:45 is 65



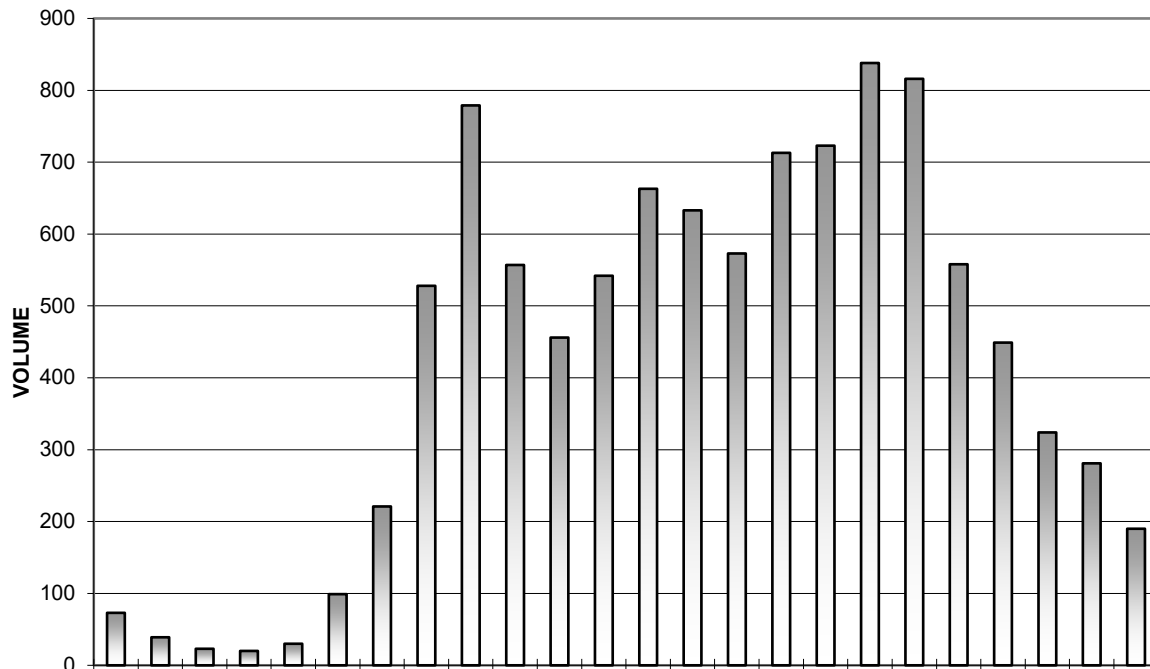
Woodall Rogers SBFR South of Harwood Street

Date Began:
10/8/2019

TIME	0:00	0:15	0:30	0:45	TOTAL
0:00	22	19	18	14	73
1:00	6	6	14	13	39
2:00	6	9	4	4	23
3:00	2	5	10	3	20
4:00	6	5	9	10	30
5:00	16	14	35	34	99
6:00	35	40	68	78	221
7:00	96	120	140	172	528
8:00	178	209	194	198	779
9:00	175	148	116	118	557
10:00	112	102	118	124	456
11:00	122	130	146	144	542
12:00	154	159	174	176	663
13:00	183	164	168	118	633
14:00	164	134	140	135	573
15:00	155	186	193	179	713
16:00	181	174	196	172	723
17:00	202	208	224	204	838
18:00	206	212	210	188	816
19:00	146	160	132	120	558
20:00	104	126	116	103	449
21:00	78	93	72	81	324
22:00	79	68	80	54	281
23:00	64	52	31	43	190

TOTAL: 10128

The A.M. peak hour from 8:00 to 9:00 is 779	0.931818
The P.M. peak hour from 17:30 to 18:30 is 846	0.944196





SynchroTM Output - 2019 Existing Traffic

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour

1: McKinney & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	78	151	31	10	96	4	1	29	144	53	6	76
Future Volume (vph)	78	151	31	10	96	4	1	29	144	53	6	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor	0.92	0.99			0.99				0.96			
Frt		0.975			0.995				0.965			
Flt Protected	0.950				0.995				0.993			
Satd. Flow (prot)	1770	1793	0	0	3491	0	0	0	3263	0	0	0
Flt Permitted	0.950				0.930				0.855			
Satd. Flow (perm)	1627	1793	0	0	3249	0	0	0	2792	0	0	0
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)		12			4				58			
Link Speed (mph)		30			30				30			
Link Distance (ft)		424			278				526			
Travel Time (s)		9.6			6.3				12.0			
Confl. Peds. (#/hr)	54		37	37		54		60		86		86
Peak Hour Factor	0.96	0.96	0.96	0.92	0.92	0.92	0.86	0.86	0.86	0.86	0.93	0.93
Adj. Flow (vph)	81	157	32	11	104	4	1	34	167	62	6	82
Shared Lane Traffic (%)												
Lane Group Flow (vph)	81	189	0	0	119	0	0	0	264	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	R NA	Left
Median Width(ft)		12			12				0			
Link Offset(ft)		0			0				0			
Crosswalk Width(ft)		16			16				16			
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	9	15		9	9	15
Turn Type	Prot	NA		Perm	NA		Perm	Perm	NA		Perm	Perm
Protected Phases	8!				4!				2			
Permitted Phases		8		4			2	2			6	6
Minimum Split (s)	23.4	23.4		23.4	23.4		23.4	23.4	23.4		23.4	23.4
Total Split (s)	46.0	46.0		46.0	46.0		54.0	54.0	54.0		54.0	54.0
Total Split (%)	46.0%	46.0%		46.0%	46.0%		54.0%	54.0%	54.0%		54.0%	54.0%
Maximum Green (s)	40.6	40.6		40.6	40.6		48.6	48.6	48.6		48.6	48.6
Yellow Time (s)	3.6	3.6		3.6	3.6		3.2	3.2	3.2		3.2	3.2
All-Red Time (s)	1.8	1.8		1.8	1.8		2.2	2.2	2.2		2.2	2.2
Lost Time Adjust (s)	-1.4	0.0			-1.4				-1.4			
Total Lost Time (s)	4.0	5.4			4.0				4.0			
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0		4.0	4.0
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		13.0	13.0	13.0		13.0	13.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0		0	0
Act Effect Green (s)	42.0	40.6			42.0				50.0			
Actuated g/C Ratio	0.42	0.41			0.42				0.50			
v/c Ratio	0.11	0.26			0.09				0.19			
Control Delay	13.1	14.3			15.4				3.9			

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour

1: McKinney & Harwood

	↓	↙
Lane Group	SBT	SBR
Lane Configurations	4T	
Traffic Volume (vph)	237	135
Future Volume (vph)	237	135
Ideal Flow (vphpl)	1900	1900
Lane Util. Factor	0.95	0.95
Ped Bike Factor	0.95	
Frt	0.955	
Flt Protected	0.991	
Satd. Flow (prot)	3234	0
Flt Permitted	0.832	
Satd. Flow (perm)	2664	0
Right Turn on Red		Yes
Satd. Flow (RTOR)	93	
Link Speed (mph)	30	
Link Distance (ft)	348	
Travel Time (s)	7.9	
Confl. Peds. (#/hr)		60
Peak Hour Factor	0.93	0.93
Adj. Flow (vph)	255	145
Shared Lane Traffic (%)		
Lane Group Flow (vph)	488	0
Enter Blocked Intersection	No	No
Lane Alignment	Left	Right
Median Width(ft)	0	
Link Offset(ft)	0	
Crosswalk Width(ft)	16	
Two way Left Turn Lane		
Headway Factor	1.00	1.00
Turning Speed (mph)		9
Turn Type	NA	
Protected Phases	6	
Permitted Phases		
Minimum Split (s)	23.4	
Total Split (s)	54.0	
Total Split (%)	54.0%	
Maximum Green (s)	48.6	
Yellow Time (s)	3.2	
All-Red Time (s)	2.2	
Lost Time Adjust (s)	-1.4	
Total Lost Time (s)	4.0	
Lead/Lag		
Lead-Lag Optimize?		
Walk Time (s)	4.0	
Flash Dont Walk (s)	13.0	
Pedestrian Calls (#/hr)	0	
Act Effct Green (s)	50.0	
Actuated g/C Ratio	0.50	
v/c Ratio	0.35	
Control Delay	5.4	

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour

1: McKinney & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Queue Delay	0.0	0.0			0.0				0.0			
Total Delay	13.1	14.3			15.4				3.9			
LOS	B	B			B				A			
Approach Delay		13.9			15.4				3.9			
Approach LOS		B			B				A			
Queue Length 50th (ft)	15	35			26				16			
Queue Length 95th (ft)	32	62			49				15			
Internal Link Dist (ft)		344			198				446			
Turn Bay Length (ft)												
Base Capacity (vph)	743	735			1366				1425			
Starvation Cap Reductn	0	0			0				0			
Spillback Cap Reductn	0	0			0				0			
Storage Cap Reductn	0	0			0				0			
Reduced v/c Ratio	0.11	0.26			0.09				0.19			

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 38 (38%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.35

Intersection Signal Delay: 8.2

Intersection LOS: A

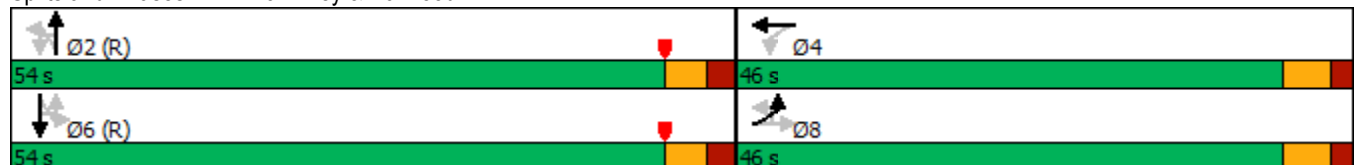
Intersection Capacity Utilization 55.3%

ICU Level of Service B

Analysis Period (min) 15

! Phase conflict between lane groups.

Splits and Phases: 1: McKinney & Harwood



North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour

1: McKinney & Harwood

	↓	↙
Lane Group	SBT	SBR
Queue Delay	0.3	
Total Delay	5.7	
LOS	A	
Approach Delay	5.7	
Approach LOS	A	
Queue Length 50th (ft)	25	
Queue Length 95th (ft)	39	
Internal Link Dist (ft)	268	
Turn Bay Length (ft)		
Base Capacity (vph)	1378	
Starvation Cap Reductn	377	
Spillback Cap Reductn	0	
Storage Cap Reductn	0	
Reduced v/c Ratio	0.49	
Intersection Summary		

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour

2: Cedar Springs & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	334	0	0	0	67	0	513	28	0	0	0
Future Volume (vph)	36	334	0	0	0	67	0	513	28	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	0.88	1.00	0.81	0.81	1.00	1.00	1.00
Ped Bike Factor		1.00				0.96		1.00				
Frt						0.850		0.992				
Flt Protected		0.995										
Satd. Flow (prot)	0	3522	0	0	0	2787	0	7465	0	0	0	0
Flt Permitted		0.995										
Satd. Flow (perm)	0	3511	0	0	0	2671	0	7465	0	0	0	0
Right Turn on Red	Yes		Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25				393		18				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		269			424			493			445	
Travel Time (s)		6.1			9.6			11.2			10.1	
Confl. Peds. (#/hr)	16		21	21		16	16		18	18		16
Peak Hour Factor	0.93	0.93	0.93	0.77	0.77	0.77	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	39	359	0	0	0	87	0	558	30	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	398	0	0	0	87	0	588	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			-24			24	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA				Perm		NA				
Protected Phases		4						2				
Permitted Phases	4					4						
Minimum Split (s)	21.4	21.4				21.4		21.3				
Total Split (s)	47.0	47.0				47.0		53.0				
Total Split (%)	47.0%	47.0%				47.0%		53.0%				
Maximum Green (s)	41.6	41.6				41.6		47.7				
Yellow Time (s)	3.6	3.6				3.6		3.6				
All-Red Time (s)	1.8	1.8				1.8		1.7				
Lost Time Adjust (s)		-1.4				-1.4		-1.3				
Total Lost Time (s)		4.0				4.0		4.0				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0	4.0				4.0		4.0				
Flash Dont Walk (s)	12.0	12.0				12.0		10.0				
Pedestrian Calls (#/hr)	0	0				0		0				
Act Effct Green (s)		43.0				43.0		49.0				
Actuated g/C Ratio		0.43				0.43		0.49				
v/c Ratio		0.26				0.06		0.16				
Control Delay		13.5				0.1		4.1				

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour

2: Cedar Springs & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0				0.0		0.0				
Total Delay		13.5				0.1		4.1				
LOS		B				A		A				
Approach Delay		13.5			0.1			4.1				
Approach LOS		B			A			A				
Queue Length 50th (ft)		49				0		25				
Queue Length 95th (ft)		81				0		32				
Internal Link Dist (ft)		189			344			413			365	
Turn Bay Length (ft)												
Base Capacity (vph)		1523				1372		3667				
Starvation Cap Reductn		0				0		0				
Spillback Cap Reductn		0				0		0				
Storage Cap Reductn		0				0		0				
Reduced v/c Ratio		0.26				0.06		0.16				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 40 (40%), Referenced to phase 2:NBT, Start of Yellow

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.26

Intersection Signal Delay: 7.2

Intersection LOS: A

Intersection Capacity Utilization 42.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: Cedar Springs & Harwood



North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour

3: McKinney & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	82	601	232	24	174	0	0	266	81
Future Volume (vph)	0	0	0	82	601	232	24	174	0	0	266	81
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor					0.98	0.94		0.99			0.96	
Frt						0.850					0.965	
Flt Protected					0.994			0.994				
Satd. Flow (prot)	0	0	0	0	3518	1583	0	3518	0	0	3276	0
Flt Permitted					0.994			0.875				
Satd. Flow (perm)	0	0	0	0	3461	1487	0	3065	0	0	3276	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						247					47	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		536			836			348			457	
Travel Time (s)		12.2			19.0			7.9			10.4	
Confl. Peds. (#/hr)				81		30	100					100
Peak Hour Factor	0.92	0.92	0.92	0.94	0.94	0.94	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	0	0	0	87	639	247	29	207	0	0	317	96
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	726	247	0	236	0	0	413	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		16			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					4			2			2	
Permitted Phases				4		4	2					
Minimum Split (s)				23.3	23.3	23.3	23.4	23.4			23.4	
Total Split (s)				57.0	57.0	57.0	43.0	43.0			43.0	
Total Split (%)				57.0%	57.0%	57.0%	43.0%	43.0%			43.0%	
Maximum Green (s)				51.7	51.7	51.7	37.6	37.6			37.6	
Yellow Time (s)				3.2	3.2	3.2	3.2	3.2			3.2	
All-Red Time (s)				2.1	2.1	2.1	2.2	2.2			2.2	
Lost Time Adjust (s)					-1.3	-1.3		-1.4			-1.4	
Total Lost Time (s)					4.0	4.0		4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	
Flash Dont Walk (s)				14.0	14.0	14.0	14.0	14.0			14.0	
Pedestrian Calls (#/hr)				0	0	0	0	0			0	
Act Effect Green (s)					53.0	53.0		39.0			39.0	
Actuated g/C Ratio					0.53	0.53		0.39			0.39	
v/c Ratio					0.40	0.27		0.20			0.32	
Control Delay					9.4	0.9		26.3			7.9	

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour

3: McKinney & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay					0.0	0.0		0.0			0.0	
Total Delay					9.4	0.9		26.3			7.9	
LOS					A	A		C			A	
Approach Delay					7.2			26.3			7.9	
Approach LOS					A			C			A	
Queue Length 50th (ft)					100	3		58			24	
Queue Length 95th (ft)					118	7		81			m37	
Internal Link Dist (ft)		456			756			268			377	
Turn Bay Length (ft)												
Base Capacity (vph)					1834	904		1195			1306	
Starvation Cap Reductn					0	0		0			0	
Spillback Cap Reductn					0	0		0			0	
Storage Cap Reductn					0	0		0			0	
Reduced v/c Ratio					0.40	0.27		0.20			0.32	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 19 (19%), Referenced to phase 2:NBSB and 6:, Start of Yellow

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.40

Intersection Signal Delay: 10.2

Intersection LOS: B

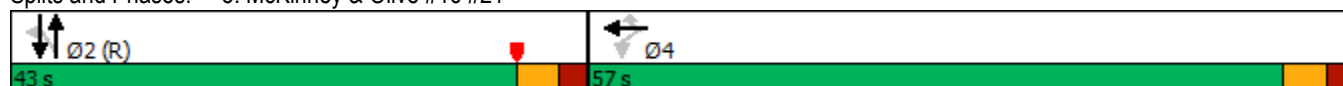
Intersection Capacity Utilization 49.2%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: McKinney & Olive #16 #21



North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour
4: Cedar Springs & Akard & St Paul

									
Lane Group	EBU	EBL	EBT	EBR	WBR	WBR2	NBL	NBT	NBR
Lane Configurations									
Traffic Volume (vph)	5	606	998	83	338	3	197	14	57
Future Volume (vph)	5	606	998	83	338	3	197	14	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.97	0.91	0.91	0.76	1.00	0.97	1.00	1.00
Ped Bike Factor		0.99	1.00		0.91		0.98	0.97	
Frt			0.988		0.850			0.879	
Flt Protected		0.950					0.950		
Satd. Flow (prot)	0	3433	5008	0	3610	0	3433	1583	0
Flt Permitted		0.950					0.950		
Satd. Flow (perm)	0	3404	5008	0	3287	0	3376	1583	0
Right Turn on Red				Yes		Yes			Yes
Satd. Flow (RTOR)			31		96			63	
Link Speed (mph)			30					30	
Link Distance (ft)			345					581	
Travel Time (s)			7.8					13.2	
Confl. Peds. (#/hr)		5		18		17	10		18
Peak Hour Factor	0.98	0.98	0.98	0.98	0.82	0.82	0.91	0.91	0.91
Adj. Flow (vph)	5	618	1018	85	412	4	216	15	63
Shared Lane Traffic (%)									
Lane Group Flow (vph)	0	623	1103	0	416	0	216	78	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	Right	Right	Left	Left	Right
Median Width(ft)			0					24	
Link Offset(ft)			24					0	
Crosswalk Width(ft)			16					16	
Two way Left Turn Lane									
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15		9	9	9	15		9
Turn Type	custom	Prot	NA		Perm		Prot	NA	
Protected Phases		5					4		
Permitted Phases	5		2		6			4	
Minimum Split (s)	23.9	23.9	23.0		21.5		23.9	23.9	
Total Split (s)	36.0	36.0	73.0		37.0		27.0	27.0	
Total Split (%)	36.0%	36.0%	73.0%		37.0%		27.0%	27.0%	
Maximum Green (s)	30.1	30.1	68.0		31.5		21.1	21.1	
Yellow Time (s)	3.6	3.6	3.6		3.6		3.6	3.6	
All-Red Time (s)	2.3	2.3	1.4		1.9		2.3	2.3	
Lost Time Adjust (s)		-1.9	-1.0		-1.5		-1.9	-1.9	
Total Lost Time (s)		4.0	4.0		4.0		4.0	4.0	
Lead/Lag	Lead	Lead			Lag				
Lead-Lag Optimize?	Yes	Yes			Yes				
Walk Time (s)	4.0	4.0	4.0		4.0		4.0	4.0	
Flash Dont Walk (s)	14.0	14.0	14.0		8.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0	0		0		0	0	
Act Effect Green (s)		32.0	69.0		33.0		23.0	23.0	
Actuated g/C Ratio		0.32	0.69		0.33		0.23	0.23	
v/c Ratio		0.57	0.32		0.36		0.27	0.19	
Control Delay		46.1	3.9		14.1		32.8	12.2	

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour
4: Cedar Springs & Akard & St Paul



Lane Group	EBU	EBL	EBT	EBR	WBR	WBR2	NBL	NBT	NBR
Queue Delay		0.3	0.0		0.0		0.0	0.0	
Total Delay		46.4	3.9		14.1		32.8	12.2	
LOS		D	A		B		C	B	
Approach Delay			19.2					27.3	
Approach LOS			B					C	
Queue Length 50th (ft)		196	49		38		58	7	
Queue Length 95th (ft)		255	56		46		91	45	
Internal Link Dist (ft)			265					501	
Turn Bay Length (ft)									
Base Capacity (vph)		1089	3465		1149		789	412	
Starvation Cap Reductn		0	0		0		0	0	
Spillback Cap Reductn		101	0		0		0	7	
Storage Cap Reductn		0	0		0		0	0	
Reduced v/c Ratio		0.63	0.32		0.36		0.27	0.19	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBR, Start of Yellow

Natural Cycle: 70

Control Type: Pretimed

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 19.3

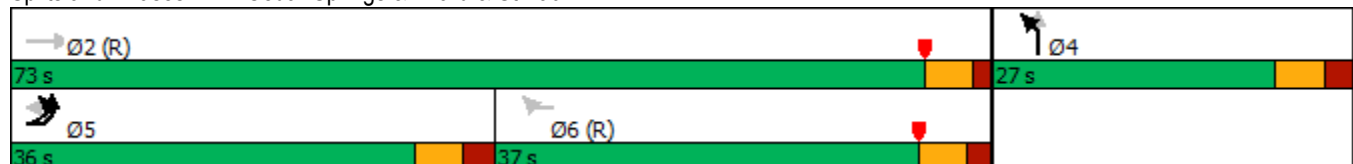
Intersection LOS: B

Intersection Capacity Utilization 51.3%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4: Cedar Springs & Akard & St Paul



North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour

5: McKinney & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	598	2	0	0	0	0	178	72	77	156	2
Future Volume (vph)	53	598	2	0	0	0	0	178	72	77	156	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor	0.98	1.00						0.98			0.99	
Frt								0.957			0.999	
Flt Protected	0.950										0.984	
Satd. Flow (prot)	1770	3539	0	0	0	0	0	3325	0	0	3476	0
Flt Permitted	0.950										0.770	
Satd. Flow (perm)	1734	3539	0	0	0	0	0	3325	0	0	2689	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)								69			1	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		323			197			264			526	
Travel Time (s)		7.3			4.5			6.0			12.0	
Confl. Peds. (#/hr)	10		10				33		33	33		33
Peak Hour Factor	0.89	0.89	0.89	0.92	0.92	0.92	0.96	0.96	0.96	0.89	0.89	0.89
Adj. Flow (vph)	60	672	2	0	0	0	0	185	75	87	175	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	674	0	0	0	0	0	260	0	0	264	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			24			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA						NA		Perm	NA	
Protected Phases	4							2			2	
Permitted Phases		4					2			2		
Minimum Split (s)	21.2	21.2					24.6	24.6		24.6	24.6	
Total Split (s)	38.0	38.0					41.0	41.0		41.0	41.0	
Total Split (%)	38.0%	38.0%					41.0%	41.0%		41.0%	41.0%	
Maximum Green (s)	33.1	33.1					35.6	35.6		35.6	35.6	
Yellow Time (s)	3.2	3.2					3.2	3.2		3.2	3.2	
All-Red Time (s)	1.7	1.7					2.2	2.2		2.2	2.2	
Lost Time Adjust (s)	-0.9	-0.9						-1.4			-1.4	
Total Lost Time (s)	4.0	4.0						4.0			4.0	
Lead/Lag	Lag	Lag										
Lead-Lag Optimize?	Yes	Yes										
Walk Time (s)	4.0	4.0					4.0	4.0		4.0	4.0	
Flash Dont Walk (s)	11.0	11.0					15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0					0	0		0	0	
Act Effct Green (s)	34.0	34.0						37.0			37.0	
Actuated g/C Ratio	0.34	0.34						0.37			0.37	
v/c Ratio	0.10	0.56						0.20			0.27	
Control Delay	23.8	32.5						15.2			15.4	

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour

5: McKinney & St Paul

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Minimum Split (s)	9.5
Total Split (s)	21.0
Total Split (%)	21%
Maximum Green (s)	17.0
Yellow Time (s)	3.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour

5: McKinney & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	22.0						0.0			0.0	
Total Delay	23.8	54.5						15.2			15.4	
LOS	C	D						B			B	
Approach Delay		52.0						15.2			15.4	
Approach LOS		D						B			B	
Queue Length 50th (ft)	38	238						53			62	
Queue Length 95th (ft)	m71	295						87			83	
Internal Link Dist (ft)		243			117			184			446	
Turn Bay Length (ft)												
Base Capacity (vph)	601	1203						1273			995	
Starvation Cap Reductn	0	538						0			0	
Spillback Cap Reductn	0	0						0			0	
Storage Cap Reductn	0	0						0			0	
Reduced v/c Ratio	0.10	1.01						0.20			0.27	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 45 (45%), Referenced to phase 2:NBSB and 6:, Start of Yellow

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.56

Intersection Signal Delay: 36.7

Intersection LOS: D

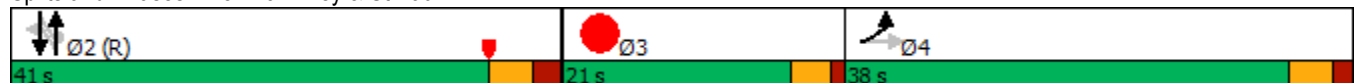
Intersection Capacity Utilization 58.3%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: McKinney & St Paul



Lane Group	Ø3
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour

6: McKinney & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	903	21	8	391	238	5	9	9	82	49	25
Future Volume (vph)	4	903	21	8	391	238	5	9	9	82	49	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor		1.00			0.98			0.98			0.98	
Frt		0.997			0.944			0.941			0.976	
Flt Protected					0.999			0.989			0.974	
Satd. Flow (prot)	0	5060	0	0	4708	0	0	3252	0	0	3333	0
Flt Permitted		0.938			0.925			0.915			0.800	
Satd. Flow (perm)	0	4746	0	0	4358	0	0	2985	0	0	2709	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			230			11			26	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		383			222			432			264	
Travel Time (s)		8.7			5.0			9.8			6.0	
Confl. Peds. (#/hr)	19		37	37		19	30		13	13		30
Peak Hour Factor	0.92	0.92	0.92	0.89	0.89	0.89	0.82	0.82	0.82	0.83	0.83	0.83
Adj. Flow (vph)	4	982	23	9	439	267	6	11	11	99	59	30
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1009	0	0	715	0	0	28	0	0	188	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			6			2	
Permitted Phases	4			4			6			2		
Minimum Split (s)	21.2	21.2		21.2	21.2		24.4	24.4		24.4	24.4	
Total Split (s)	57.0	57.0		57.0	57.0		43.0	43.0		43.0	43.0	
Total Split (%)	57.0%	57.0%		57.0%	57.0%		43.0%	43.0%		43.0%	43.0%	
Maximum Green (s)	51.8	51.8		51.8	51.8		37.6	37.6		37.6	37.6	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.6	1.6		1.6	1.6		2.4	2.4		2.4	2.4	
Lost Time Adjust (s)		-1.2			-1.2			-1.4			-1.4	
Total Lost Time (s)		4.0			4.0			4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)		53.0			53.0			39.0			39.0	
Actuated g/C Ratio		0.53			0.53			0.39			0.39	
v/c Ratio		0.40			0.30			0.02			0.18	
Control Delay		9.6			11.0			13.5			10.9	

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour
6: McKinney & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.4			1.6			0.0			0.0	
Total Delay		10.0			12.7			13.5			10.9	
LOS		A			B			B			B	
Approach Delay		10.0			12.7			13.5			10.9	
Approach LOS		A			B			B			B	
Queue Length 50th (ft)		86			67			3			54	
Queue Length 95th (ft)		101			93			11			76	
Internal Link Dist (ft)		303			142			352			184	
Turn Bay Length (ft)												
Base Capacity (vph)		2517			2417			1170			1072	
Starvation Cap Reductn		904			1471			0			0	
Spillback Cap Reductn		529			0			0			1	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.63			0.76			0.02			0.18	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 68 (68%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.40

Intersection Signal Delay: 11.1

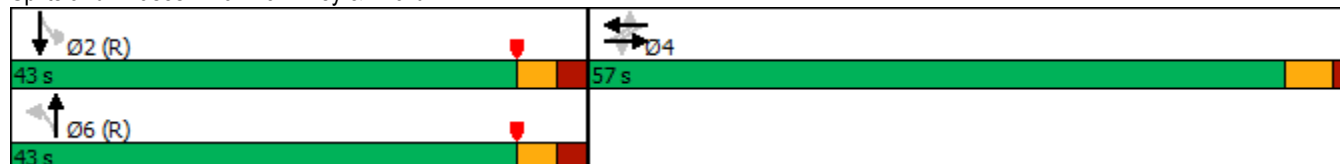
Intersection LOS: B

Intersection Capacity Utilization 43.2%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: McKinney & Akard



North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour

7: Woodall WBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑									↑↑↑	
Traffic Volume (vph)	0	654	9	0	0	0	0	0	0	205	530	0
Future Volume (vph)	0	654	9	0	0	0	0	0	0	205	530	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00
Ped Bike Factor		1.00										
Frt		0.998										
Flt Protected											0.986	
Satd. Flow (prot)	0	5069	0	0	0	0	0	0	0	0	5014	0
Flt Permitted											0.986	
Satd. Flow (perm)	0	5069	0	0	0	0	0	0	0	0	5014	0
Right Turn on Red			Yes			Yes				Yes	No	No
Satd. Flow (RTOR)		2										
Link Speed (mph)		30			30			24			26	
Link Distance (ft)		183			58			216			216	
Travel Time (s)		4.2			1.3			6.1			5.7	
Confl. Peds. (#/hr)			34									
Peak Hour Factor	0.86	0.86	0.86	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	760	10	0	0	0	0	0	0	223	576	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	770	0	0	0	0	0	0	0	0	799	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		-24			24			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type		NA								Split	NA	
Protected Phases		2								4	4	
Permitted Phases												
Minimum Split (s)		21.6								21.3	21.3	
Total Split (s)		32.0								38.0	38.0	
Total Split (%)		32.0%								38.0%	38.0%	
Maximum Green (s)		26.4								32.7	32.7	
Yellow Time (s)		3.6								3.6	3.6	
All-Red Time (s)		2.0								1.7	1.7	
Lost Time Adjust (s)		-1.6									-1.3	
Total Lost Time (s)		4.0									4.0	
Lead/Lag		Lag										
Lead-Lag Optimize?		Yes										
Walk Time (s)		4.0								4.0	4.0	
Flash Dont Walk (s)		8.0								9.0	9.0	
Pedestrian Calls (#/hr)		0								0	0	
Act Effct Green (s)		28.0									34.0	
Actuated g/C Ratio		0.28									0.34	
v/c Ratio		0.54									0.47	
Control Delay		20.3									14.7	

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour

7: Woodall WBFR & St Paul

Lane Group	Ø1
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	1
Permitted Phases	
Minimum Split (s)	21.3
Total Split (s)	30.0
Total Split (%)	30%
Maximum Green (s)	24.7
Yellow Time (s)	3.6
All-Red Time (s)	1.7
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour

7: Woodall WBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0									0.4	
Total Delay		20.3									15.1	
LOS		C									B	
Approach Delay		20.3									15.1	
Approach LOS		C									B	
Queue Length 50th (ft)		141									127	
Queue Length 95th (ft)		142									147	
Internal Link Dist (ft)		103			1			136			136	
Turn Bay Length (ft)												
Base Capacity (vph)		1420									1704	
Starvation Cap Reductn		0									0	
Spillback Cap Reductn		41									436	
Storage Cap Reductn		0									0	
Reduced v/c Ratio		0.56									0.63	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 14 (14%), Referenced to phase 2:EBT and 6:, Start of Yellow

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 17.7

Intersection LOS: B

Intersection Capacity Utilization 33.9%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 7: Woodall WBFR & St Paul



Lane Group	Ø1
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour

8: Woodall EBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑						↑↑↑				
Traffic Volume (vph)	255	971	1	0	0	0	0	560	153	0	0	0
Future Volume (vph)	255	971	1	0	0	0	0	560	153	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	0.91	1.00	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00
Ped Bike Factor		0.96						0.96				
Frt								0.968				
Flt Protected		0.990										
Satd. Flow (prot)	0	5034	0	0	0	0	0	4733	0	0	0	0
Flt Permitted		0.990										
Satd. Flow (perm)	0	4831	0	0	0	0	0	4733	0	0	0	0
Right Turn on Red	Yes		Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		100						81				
Link Speed (mph)		30			30			26			30	
Link Distance (ft)		204			1246			248			416	
Travel Time (s)		4.6			28.3			6.5			9.5	
Confl. Peds. (#/hr)	78								91			
Peak Hour Factor	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95	0.92	0.92	0.92
Adj. Flow (vph)	268	1022	1	0	0	0	0	589	161	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1291	0	0	0	0	0	750	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		-24			24			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA						NA				
Protected Phases		2						4				
Permitted Phases	2											
Minimum Split (s)	21.0	21.0						21.8				
Total Split (s)	57.0	57.0						43.0				
Total Split (%)	57.0%	57.0%						43.0%				
Maximum Green (s)	52.0	52.0						37.2				
Yellow Time (s)	3.6	3.6						3.6				
All-Red Time (s)	1.4	1.4						2.2				
Lost Time Adjust (s)		-1.0						-1.8				
Total Lost Time (s)		4.0						4.0				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0	4.0						4.0				
Flash Dont Walk (s)	8.0	8.0						12.0				
Pedestrian Calls (#/hr)	0	0						0				
Act Effct Green (s)		53.0						39.0				
Actuated g/C Ratio		0.53						0.39				
v/c Ratio		0.50						0.40				
Control Delay		3.6						13.0				

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour

8: Woodall EBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.9						0.6				
Total Delay		4.5						13.6				
LOS		A						B				
Approach Delay		4.5						13.6				
Approach LOS		A						B				
Queue Length 50th (ft)		25						52				
Queue Length 95th (ft)		31						106				
Internal Link Dist (ft)		124			1166			168			336	
Turn Bay Length (ft)												
Base Capacity (vph)		2607						1895				
Starvation Cap Reductn		929						713				
Spillback Cap Reductn		0						0				
Storage Cap Reductn		0						0				
Reduced v/c Ratio		0.77						0.63				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 40 (40%), Referenced to phase 2:EBTL and 6:, Start of Yellow

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.50

Intersection Signal Delay: 7.8

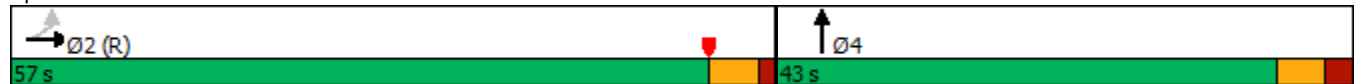
Intersection LOS: A

Intersection Capacity Utilization 46.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: Woodall EBFR & St Paul



North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour
9: Woodall WBFR & Akard WB On-Ramp & Akard

	→	↘	↙	←	↖	↗	↘	↓	↙
Lane Group	EBT	EBR	WBL	WBT	WBR	SBU	SBL	SBT	SBR
Lane Configurations	↑↑↑			↑↑↑			↘	↑↑	
Traffic Volume (vph)	926	56	33	16	569	144	122	209	77
Future Volume (vph)	926	56	33	16	569	144	122	209	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.95	1.00	0.95	0.95
Ped Bike Factor	0.99			0.91			1.00		
Frt	0.991			0.862				0.960	
Flt Protected				0.997			0.950		
Satd. Flow (prot)	5002	0	0	3987	0	0	1770	3398	0
Flt Permitted				0.871			0.950		
Satd. Flow (perm)	5002	0	0	3481	0	0	1764	3398	0
Right Turn on Red					Yes				Yes
Satd. Flow (RTOR)				515				51	
Link Speed (mph)	30			30				30	
Link Distance (ft)	222			279				216	
Travel Time (s)	5.0			6.3				4.9	
Confl. Peds. (#/hr)		34	34		20		1		
Peak Hour Factor	0.93	0.93	0.86	0.86	0.86	0.95	0.95	0.95	0.95
Adj. Flow (vph)	996	60	38	19	662	152	128	220	81
Shared Lane Traffic (%)									
Lane Group Flow (vph)	1056	0	0	719	0	0	280	301	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Right	R NA	Left	Left	Right
Median Width(ft)	0			0				12	
Link Offset(ft)	0			0				0	
Crosswalk Width(ft)	16			16				16	
Two way Left Turn Lane									
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		9	9	15		9
Turn Type	NA		pm+pt	NA		Perm	Split	NA	
Protected Phases	2		1	6			4	4	
Permitted Phases			6			4			
Minimum Split (s)	21.3		8.0	21.3		22.5	22.5	22.5	
Total Split (s)	46.0		24.0	70.0		30.0	30.0	30.0	
Total Split (%)	46.0%		24.0%	70.0%		30.0%	30.0%	30.0%	
Maximum Green (s)	40.7		20.0	64.7		24.5	24.5	24.5	
Yellow Time (s)	3.6		3.5	3.6		3.6	3.6	3.6	
All-Red Time (s)	1.7		0.5	1.7		1.9	1.9	1.9	
Lost Time Adjust (s)	-1.3			-1.3			-1.5	-1.5	
Total Lost Time (s)	4.0			4.0			4.0	4.0	
Lead/Lag	Lag		Lead						
Lead-Lag Optimize?	Yes		Yes						
Walk Time (s)	4.0			4.0		4.0	4.0	4.0	
Flash Dont Walk (s)	11.0			9.0		13.0	13.0	13.0	
Pedestrian Calls (#/hr)	0			0		0	0	0	
Act Effect Green (s)	42.0			66.0			26.0	26.0	
Actuated g/C Ratio	0.42			0.66			0.26	0.26	
v/c Ratio	0.50			0.28			0.61	0.33	
Control Delay	13.9			2.2			13.7	5.6	

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour
9: Woodall WBFR & Akard WB On-Ramp & Akard

	→	↘	↙	←	↖	↗	↘	↓	↙
Lane Group	EBT	EBR	WBL	WBT	WBR	SBU	SBL	SBT	SBR
Queue Delay	0.3			0.2			0.9	0.5	
Total Delay	14.2			2.3			14.6	6.2	
LOS	B			A			B	A	
Approach Delay	14.2			2.3				10.2	
Approach LOS	B			A				B	
Queue Length 50th (ft)	231			13			140	54	
Queue Length 95th (ft)	278			20			235	69	
Internal Link Dist (ft)	142			199				136	
Turn Bay Length (ft)									
Base Capacity (vph)	2100			2573			458	921	
Starvation Cap Reductn	443			880			45	299	
Spillback Cap Reductn	0			0			0	0	
Storage Cap Reductn	0			0			0	0	
Reduced v/c Ratio	0.64			0.42			0.68	0.48	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 29 (29%), Referenced to phase 2:EBT and 6:WBTL, Start of Yellow

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.61

Intersection Signal Delay: 9.6

Intersection LOS: A

Intersection Capacity Utilization 59.7%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 9: Woodall WBFR & Akard WB On-Ramp & Akard



North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour

10: Woodall EBFR & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↑↑↑			↑↑↑				↑↑↑			
Traffic Volume (vph)	202	892	0	0	439	72	6	163	438	44	0	0
Future Volume (vph)	202	892	0	0	439	72	6	163	438	44	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	1.00	1.00	0.91	0.91	0.91	0.91	0.91	0.91	1.00	1.00
Ped Bike Factor		1.00			0.99				0.98			
Frt					0.979				0.990			
Flt Protected		0.991							0.987			
Satd. Flow (prot)	0	5040	0	0	4935	0	0	0	4869	0	0	0
Flt Permitted		0.720							0.987			
Satd. Flow (perm)	0	3648	0	0	4935	0	0	0	4869	0	0	0
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)					38				11			
Link Speed (mph)		30			30				26			30
Link Distance (ft)		279			374				181			248
Travel Time (s)		6.3			8.5				4.7			5.6
Confl. Peds. (#/hr)	27		44	44		27				117		
Peak Hour Factor	0.91	0.91	0.91	0.88	0.88	0.88	0.95	0.95	0.95	0.95	0.92	0.92
Adj. Flow (vph)	222	980	0	0	499	82	6	172	461	46	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1202	0	0	581	0	0	0	685	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	Left	Left
Median Width(ft)		0			0				0			0
Link Offset(ft)		0			0				-24			24
Crosswalk Width(ft)		16			16				16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	9	15		9	15	
Turn Type	pm+pt	NA			NA		Perm	Perm	NA			
Protected Phases	15	2			6				4			
Permitted Phases	2						4	4				
Minimum Split (s)	8.2	21.1			21.1		21.6	21.6	21.6			
Total Split (s)	23.0	67.0			44.0		33.0	33.0	33.0			
Total Split (%)	23.0%	67.0%			44.0%		33.0%	33.0%	33.0%			
Maximum Green (s)	17.8	61.9			38.9		27.4	27.4	27.4			
Yellow Time (s)	3.2	3.6			3.6		3.6	3.6	3.6			
All-Red Time (s)	2.0	1.5			1.5		2.0	2.0	2.0			
Lost Time Adjust (s)		-1.1			-1.1				-1.6			
Total Lost Time (s)		4.0			4.0				4.0			
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		4.0			4.0		4.0	4.0	4.0			
Flash Dont Walk (s)		8.0			12.0		8.0	8.0	8.0			
Pedestrian Calls (#/hr)		0			0		0	0	0			
Act Effct Green (s)		63.0			40.0				29.0			
Actuated g/C Ratio		0.63			0.40				0.29			
v/c Ratio		0.47			0.29				0.48			
Control Delay		4.5			16.0				30.2			

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour

10: Woodall EBFR & Akard

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	0
Future Volume (vph)	0
Ideal Flow (vphpl)	1900
Lane Util. Factor	1.00
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	0.92
Adj. Flow (vph)	0
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Enter Blocked Intersection	No
Lane Alignment	Right
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	1.00
Turning Speed (mph)	9
Turn Type	
Protected Phases	
Permitted Phases	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Maximum Green (s)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour

10: Woodall EBFR & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Queue Delay		0.0			0.0				0.0			
Total Delay		4.6			16.0				30.2			
LOS		A			B				C			
Approach Delay		4.6			16.0				30.2			
Approach LOS		A			B				C			
Queue Length 50th (ft)		55			56				129			
Queue Length 95th (ft)		39			71				167			
Internal Link Dist (ft)		199			294				101			168
Turn Bay Length (ft)												
Base Capacity (vph)		2562			1996				1419			
Starvation Cap Reductn		187			0				0			
Spillback Cap Reductn		0			0				0			
Storage Cap Reductn		0			0				0			
Reduced v/c Ratio		0.51			0.29				0.48			

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 8 (8%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.48

Intersection Signal Delay: 14.4

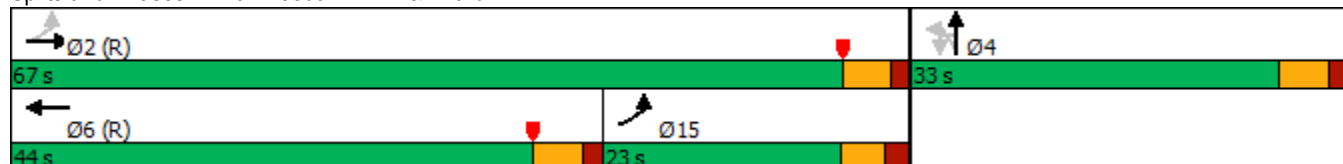
Intersection LOS: B

Intersection Capacity Utilization 58.0%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 10: Woodall EBFR & Akard





Lane Group	SBR
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour
11: Field/Field #11 #12 & Woodall WBFR

												
Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↑↑↑	↗		↖	↗↑↑					↖	↗
Traffic Volume (vph)	0	682	161	2	102	719	0	0	0	0	199	388
Future Volume (vph)	0	682	161	2	102	719	0	0	0	0	199	388
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		200		0		0	0		0	0	
Storage Lanes	1		3		1		0	0		0	1	
Taper Length (ft)	25				25			25			25	
Lane Util. Factor	1.00	0.86	1.00	0.91	0.86	0.86	1.00	1.00	1.00	1.00	0.95	0.91
Ped Bike Factor			0.93		0.99	1.00						1.00
Frt			0.850									0.989
Flt Protected					0.950	0.999					0.950	0.998
Satd. Flow (prot)	0	6408	1583	0	1522	4801	0	0	0	0	1681	1670
Flt Permitted					0.221	0.940					0.950	0.998
Satd. Flow (perm)	0	6408	1477	0	349	4517	0	0	0	0	1681	1670
Right Turn on Red			Yes				Yes			Yes		
Satd. Flow (RTOR)			175									3
Link Speed (mph)		30				30			30			26
Link Distance (ft)		675				234			238			187
Travel Time (s)		15.3				5.3			5.4			4.9
Confl. Peds. (#/hr)			26		26							
Peak Hour Factor	0.92	0.92	0.92	0.91	0.91	0.91	0.91	0.92	0.92	0.92	0.96	0.96
Adj. Flow (vph)	0	741	175	2	112	790	0	0	0	0	207	404
Shared Lane Traffic (%)					10%						10%	
Lane Group Flow (vph)	0	741	175	0	103	801	0	0	0	0	186	457
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	R NA	Left	Left	Right	Left	Left	Right	Left	Left
Median Width(ft)		20				20			12			12
Link Offset(ft)		0				0			-20			24
Crosswalk Width(ft)		16				16			16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	9	15		9	15		9	15	
Turn Type		NA	Perm	custom	pm+pt	NA					Split	NA
Protected Phases		2			1	2 1					4 12	4 12
Permitted Phases			2	1	2 1							
Minimum Split (s)		23.2	23.2	8.0	8.0							
Total Split (s)		32.0	32.0	56.0	56.0							
Total Split (%)		24.6%	24.6%	43.1%	43.1%							
Maximum Green (s)		26.8	26.8	52.0	52.0							
Yellow Time (s)		5.2	5.2	3.5	3.5							
All-Red Time (s)		0.0	0.0	0.5	0.5							
Lost Time Adjust (s)		-1.2	-1.2		-1.0							
Total Lost Time (s)		4.0	4.0		3.0							
Lead/Lag		Lead	Lead	Lag	Lag							
Lead-Lag Optimize?		Yes	Yes	Yes	Yes							
Walk Time (s)		4.0	4.0									
Flash Dont Walk (s)		14.0	14.0									
Pedestrian Calls (#/hr)		0	0									
Act Effect Green (s)		28.0	28.0		82.0	79.6					38.0	38.0

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour
11: Field/Field #11 #12 & Woodall WBFR

Lane Group	SBR	Ø4	Ø5	Ø6	Ø8	Ø12	Ø16
Lane Configurations							
Traffic Volume (vph)	308						
Future Volume (vph)	308						
Ideal Flow (vphpl)	1900						
Storage Length (ft)	0						
Storage Lanes	1						
Taper Length (ft)							
Lane Util. Factor	0.95						
Ped Bike Factor	0.97						
Frt	0.850						
Flt Protected							
Satd. Flow (prot)	1504						
Flt Permitted							
Satd. Flow (perm)	1460						
Right Turn on Red	Yes						
Satd. Flow (RTOR)	201						
Link Speed (mph)							
Link Distance (ft)							
Travel Time (s)							
Confl. Peds. (#/hr)	15						
Peak Hour Factor	0.96						
Adj. Flow (vph)	321						
Shared Lane Traffic (%)	10%						
Lane Group Flow (vph)	289						
Enter Blocked Intersection	No						
Lane Alignment	Right						
Median Width(ft)							
Link Offset(ft)							
Crosswalk Width(ft)							
Two way Left Turn Lane							
Headway Factor	1.00						
Turning Speed (mph)	9						
Turn Type	Perm						
Protected Phases		4	5	6	8	12	16
Permitted Phases	4 12						
Minimum Split (s)		40.1	8.0	21.9	31.0	6.0	6.0
Total Split (s)		36.0	62.0	34.0	28.0	6.0	6.0
Total Split (%)		28%	48%	26%	22%	5%	5%
Maximum Green (s)		29.9	57.0	28.6	22.0	1.0	1.0
Yellow Time (s)		6.1	5.0	5.4	6.0	5.0	5.0
All-Red Time (s)		0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)							
Total Lost Time (s)							
Lead/Lag		Lag	Lag	Lead	Lag	Lead	Lead
Lead-Lag Optimize?		Yes	Yes	Yes	Yes	Yes	Yes
Walk Time (s)		4.0		4.0	4.0		
Flash Dont Walk (s)		29.0		12.0	20.0		
Pedestrian Calls (#/hr)		0		0	0		
Act Effect Green (s)	38.0						

Existing Conditions - AM Peak Hour

Intersection Summary	
Area Type:	Other
Cycle Length: 130	
Actuated Cycle Length: 130	
Offset: 58 (45%), Referenced to phase 2:EBWB, Start of Yellow	
Natural Cycle: 120	
Control Type: Pretimed	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 24.1	Intersection LOS: C
Intersection Capacity Utilization 66.6%	ICU Level of Service C
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

32 s	36 s	6 s	56 s
6 s	62 s	34 s	28 s

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour
11: Field/Field #11 #12 & Woodall WBFR

Lane Group	SBR	Ø4	Ø5	Ø6	Ø8	Ø12	Ø16
Actuated g/C Ratio	0.29						
v/c Ratio	0.51						
Control Delay	15.2						
Queue Delay	0.0						
Total Delay	15.2						
LOS	B						
Approach Delay							
Approach LOS							
Queue Length 50th (ft)	58						
Queue Length 95th (ft)	152						
Internal Link Dist (ft)							
Turn Bay Length (ft)							
Base Capacity (vph)	569						
Starvation Cap Reductn	0						
Spillback Cap Reductn	0						
Storage Cap Reductn	0						
Reduced v/c Ratio	0.51						
Intersection Summary							

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour
12: Woodall EBFR & Field #11 #12 & Field EB On-Ramp

												
Lane Group	EBU	EBL2	EBL	EBT	WBU	WBT	WBR	WBR2	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Volume (vph)	1	127	0	775	2	655	80	77	52	158	541	212
Future Volume (vph)	1	127	0	775	2	655	80	77	52	158	541	212
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)			0				0			0		0
Storage Lanes			1				1			1		0
Taper Length (ft)			25							25		
Lane Util. Factor	0.91	0.91	1.00	0.91	0.91	0.91	1.00	0.91	0.91	0.86	0.86	0.91
Ped Bike Factor			1.00				0.97					
Frt							0.850				0.959	
Flt Protected			0.950							0.950	0.999	
Satd. Flow (prot)	0	0	1770	5085	0	5085	1583	0	0	1522	4604	0
Flt Permitted			0.194			0.938				0.950	0.999	
Satd. Flow (perm)	0	0	360	5085	0	4770	1530	0	0	1522	4604	0
Right Turn on Red								Yes				Yes
Satd. Flow (RTOR)							162				69	
Link Speed (mph)				30		30					30	
Link Distance (ft)				234		419					191	
Travel Time (s)				5.3		9.5					4.3	
Confl. Peds. (#/hr)		9					9					
Peak Hour Factor	0.92	0.92	0.92	0.92	0.89	0.89	0.89	0.89	0.87	0.87	0.87	0.87
Adj. Flow (vph)	1	138	0	842	2	736	90	87	60	182	622	244
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	0	0	139	842	0	738	177	0	0	224	884	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Left	R NA	Left	Right	Right	R NA	Left	Left	Right
Median Width(ft)				20		12					12	
Link Offset(ft)				0		12					-24	
Crosswalk Width(ft)				16		16					16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15	15		9		9	9	9	15		9
Turn Type	custom	pm+pt	pm+pt	NA	Perm	NA	Perm		Perm	Split	NA	
Protected Phases		5	5	5 6		6				8 16	8 16	
Permitted Phases	5	5 6	5 6		6		6		8 16			
Minimum Split (s)	8.0	8.0	8.0		21.9	21.9	21.9					
Total Split (s)	62.0	62.0	62.0		34.0	34.0	34.0					
Total Split (%)	47.7%	47.7%	47.7%		26.2%	26.2%	26.2%					
Maximum Green (s)	57.0	57.0	57.0		28.6	28.6	28.6					
Yellow Time (s)	5.0	5.0	5.0		5.4	5.4	5.4					
All-Red Time (s)	0.0	0.0	0.0		0.0	0.0	0.0					
Lost Time Adjust (s)			-1.0			-1.4	-1.4					
Total Lost Time (s)			4.0			4.0	4.0					
Lead/Lag	Lag	Lag	Lag		Lead	Lead	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes	Yes					
Walk Time (s)					4.0	4.0	4.0					
Flash Dont Walk (s)					12.0	12.0	12.0					
Pedestrian Calls (#/hr)					0	0	0					
Act Effect Green (s)			88.0	92.0		30.0	30.0			30.0	30.0	

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour
12: Woodall EBFR & Field #11 #12 & Field EB On-Ramp

Lane Group	Ø1	Ø2	Ø4	Ø8	Ø12	Ø16
Lane Configurations						
Traffic Volume (vph)						
Future Volume (vph)						
Ideal Flow (vphpl)						
Storage Length (ft)						
Storage Lanes						
Taper Length (ft)						
Lane Util. Factor						
Ped Bike Factor						
Frt						
Flt Protected						
Satd. Flow (prot)						
Flt Permitted						
Satd. Flow (perm)						
Right Turn on Red						
Satd. Flow (RTOR)						
Link Speed (mph)						
Link Distance (ft)						
Travel Time (s)						
Confl. Peds. (#/hr)						
Peak Hour Factor						
Adj. Flow (vph)						
Shared Lane Traffic (%)						
Lane Group Flow (vph)						
Enter Blocked Intersection						
Lane Alignment						
Median Width(ft)						
Link Offset(ft)						
Crosswalk Width(ft)						
Two way Left Turn Lane						
Headway Factor						
Turning Speed (mph)						
Turn Type						
Protected Phases	1	2	4	8	12	16
Permitted Phases						
Minimum Split (s)	8.0	23.2	40.1	31.0	6.0	6.0
Total Split (s)	56.0	32.0	36.0	28.0	6.0	6.0
Total Split (%)	43%	25%	28%	22%	5%	5%
Maximum Green (s)	52.0	26.8	29.9	22.0	1.0	1.0
Yellow Time (s)	3.5	5.2	6.1	6.0	5.0	5.0
All-Red Time (s)	0.5	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)						
Total Lost Time (s)						
Lead/Lag	Lag	Lead	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes
Walk Time (s)		4.0	4.0	4.0		
Flash Dont Walk (s)		14.0	29.0	20.0		
Pedestrian Calls (#/hr)		0	0	0		
Act Effect Green (s)						

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour
12: Woodall EBFR & Field #11 #12 & Field EB On-Ramp

												
Lane Group	EBU	EBL2	EBL	EBT	WBU	WBT	WBR	WBR2	NBU	NBL	NBT	NBR
Actuated g/C Ratio			0.68	0.71		0.23	0.23			0.23	0.23	
v/c Ratio			0.16	0.23		0.67	0.37			0.64	0.79	
Control Delay			0.6	1.4		42.6	7.9			54.5	49.4	
Queue Delay			0.6	0.5		0.1	0.0			0.0	1.1	
Total Delay			1.2	1.9		42.7	7.9			54.5	50.5	
LOS			A	A		D	A			D	D	
Approach Delay				1.8		36.0					51.3	
Approach LOS				A		D					D	
Queue Length 50th (ft)			1	2		222	17			200	253	
Queue Length 95th (ft)			m2	m2		266	51			293	296	
Internal Link Dist (ft)				154		339					111	
Turn Bay Length (ft)												
Base Capacity (vph)			872	3598		1100	477			351	1115	
Starvation Cap Reductn			466	2195		0	0			0	0	
Spillback Cap Reductn			0	280		27	0			0	80	
Storage Cap Reductn			0	0		0	0			0	0	
Reduced v/c Ratio			0.34	0.60		0.69	0.37			0.64	0.85	

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 58 (45%), Referenced to phase 2:EBWB, Start of Yellow

Natural Cycle: 120

Control Type: Pretimed

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 30.5

Intersection LOS: C

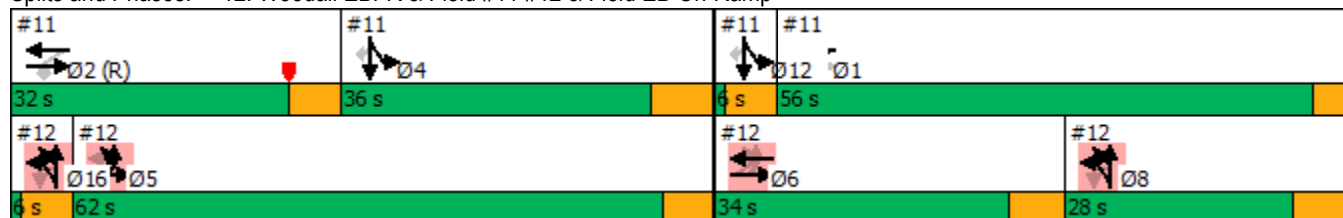
Intersection Capacity Utilization 52.9%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: Woodall EBFR & Field #11 #12 & Field EB On-Ramp



Lane Group	Ø1	Ø2	Ø4	Ø8	Ø12	Ø16
Actuated g/C Ratio						
v/c Ratio						
Control Delay						
Queue Delay						
Total Delay						
LOS						
Approach Delay						
Approach LOS						
Queue Length 50th (ft)						
Queue Length 95th (ft)						
Internal Link Dist (ft)						
Turn Bay Length (ft)						
Base Capacity (vph)						
Starvation Cap Reductn						
Spillback Cap Reductn						
Storage Cap Reductn						
Reduced v/c Ratio						
Intersection Summary						

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour

13: Woodall WBFR & Harwood

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↑↑			↑↑↑	
Traffic Volume (vph)	0	46	0	0	655	269
Future Volume (vph)	0	46	0	0	655	269
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.88	1.00	1.00	0.91	0.91
Ped Bike Factor		0.90			0.99	
Frt		0.850			0.956	
Flt Protected						
Satd. Flow (prot)	0	2787	0	0	4806	0
Flt Permitted						
Satd. Flow (perm)	0	2513	0	0	4806	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		300			177	
Link Speed (mph)	30			30	24	
Link Distance (ft)	242			217	260	
Travel Time (s)	5.5			4.9	7.4	
Confl. Peds. (#/hr)		47				15
Peak Hour Factor	0.77	0.77	0.92	0.92	0.83	0.83
Adj. Flow (vph)	0	60	0	0	789	324
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	60	0	0	1113	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			12	-12	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Turn Type		Perm			NA	
Protected Phases					4	
Permitted Phases		2				
Minimum Split (s)		20.0			20.0	
Total Split (s)		38.0			62.0	
Total Split (%)		38.0%			62.0%	
Maximum Green (s)		34.0			58.0	
Yellow Time (s)		3.5			3.5	
All-Red Time (s)		0.5			0.5	
Lost Time Adjust (s)		0.0			0.0	
Total Lost Time (s)		4.0			4.0	
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)		5.0			5.0	
Flash Dont Walk (s)		11.0			11.0	
Pedestrian Calls (#/hr)		0			0	
Act Effct Green (s)		34.0			58.0	
Actuated g/C Ratio		0.34			0.58	
v/c Ratio		0.06			0.39	
Control Delay		0.1			2.8	

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour

13: Woodall WBFR & Harwood

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Queue Delay		0.0			0.3	
Total Delay		0.1			3.0	
LOS		A			A	
Approach Delay	0.1				3.0	
Approach LOS	A				A	
Queue Length 50th (ft)		0			21	
Queue Length 95th (ft)		0			27	
Internal Link Dist (ft)	162			137	180	
Turn Bay Length (ft)						
Base Capacity (vph)		1052			2861	
Starvation Cap Reductn		0			919	
Spillback Cap Reductn		0			0	
Storage Cap Reductn		0			0	
Reduced v/c Ratio		0.06			0.57	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 91 (91%), Referenced to phase 2:EBR, Start of Yellow

Natural Cycle: 40

Control Type: Pretimed

Maximum v/c Ratio: 0.39

Intersection Signal Delay: 2.9

Intersection LOS: A

Intersection Capacity Utilization 39.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 13: Woodall WBFR & Harwood



North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour

14: Woodall EBFR & Harwood

							
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø2
Lane Configurations			↑↑↑				
Traffic Volume (vph)	0	0	498	222	0	0	
Future Volume (vph)	0	0	498	222	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	0.91	0.91	1.00	1.00	
Ped Bike Factor			0.99				
Frt			0.954				
Flt Protected							
Satd. Flow (prot)	0	0	4802	0	0	0	
Flt Permitted							
Satd. Flow (perm)	0	0	4802	0	0	0	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)			249				
Link Speed (mph)	30		26			30	
Link Distance (ft)	974		416			261	
Travel Time (s)	22.1		10.9			5.9	
Confl. Peds. (#/hr)				17			
Peak Hour Factor	0.92	0.92	0.89	0.89	0.92	0.92	
Adj. Flow (vph)	0	0	560	249	0	0	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	0	809	0	0	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Right	Left	Left	
Median Width(ft)	0		0			0	
Link Offset(ft)	24		0			0	
Crosswalk Width(ft)	16		16			16	
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9		9	15		
Turn Type			NA				
Protected Phases			4			2	
Permitted Phases							
Minimum Split (s)			20.9			21.0	
Total Split (s)			27.0			23.0	
Total Split (%)			54.0%			46%	
Maximum Green (s)			22.1			18.0	
Yellow Time (s)			3.6			3.6	
All-Red Time (s)			1.3			1.4	
Lost Time Adjust (s)			-0.9				
Total Lost Time (s)			4.0				
Lead/Lag							
Lead-Lag Optimize?							
Walk Time (s)			4.0			4.0	
Flash Dont Walk (s)			8.0			8.0	
Pedestrian Calls (#/hr)			0			0	
Act Effct Green (s)			23.0				
Actuated g/C Ratio			0.46				
v/c Ratio			0.35				
Control Delay			11.9				

North Harwood Tower
Lanes, Volumes, Timings

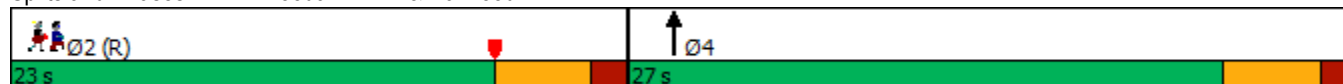
Existing Conditions - AM Peak Hour
14: Woodall EBFR & Harwood

							
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø2
Queue Delay			0.0				
Total Delay			11.9				
LOS			B				
Approach Delay			11.9				
Approach LOS			B				
Queue Length 50th (ft)			71				
Queue Length 95th (ft)			100				
Internal Link Dist (ft)	894		336			181	
Turn Bay Length (ft)							
Base Capacity (vph)			2343				
Starvation Cap Reductn			0				
Spillback Cap Reductn			0				
Storage Cap Reductn			0				
Reduced v/c Ratio			0.35				

Intersection Summary

Area Type:	Other
Cycle Length: 50	
Actuated Cycle Length: 50	
Offset: 32 (64%), Referenced to phase 2:Ped, Start of Yellow	
Natural Cycle: 45	
Control Type: Pretimed	
Maximum v/c Ratio: 0.35	
Intersection Signal Delay: 11.9	Intersection LOS: B
Intersection Capacity Utilization 18.4%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 14: Woodall EBFR & Harwood



North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour

15: Woodall WBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑						↑↑↑	
Traffic Volume (vph)	0	0	0	174	711	0	0	0	0	0	756	316
Future Volume (vph)	0	0	0	174	711	0	0	0	0	0	756	316
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	0.91	0.91
Ped Bike Factor					0.97						0.97	
Frt											0.956	
Flt Protected					0.990							
Satd. Flow (prot)	0	0	0	0	5034	0	0	0	0	0	4707	0
Flt Permitted					0.990							
Satd. Flow (perm)	0	0	0	0	4896	0	0	0	0	0	4707	0
Right Turn on Red			Yes	Yes		Yes			Yes			Yes
Satd. Flow (RTOR)					64						130	
Link Speed (mph)		30			30			30			24	
Link Distance (ft)		836			267			260			433	
Travel Time (s)		19.0			6.1			5.9			12.3	
Confl. Peds. (#/hr)				56								39
Peak Hour Factor	0.92	0.92	0.92	0.91	0.91	0.91	0.92	0.92	0.92	0.85	0.85	0.85
Adj. Flow (vph)	0	0	0	191	781	0	0	0	0	0	889	372
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	972	0	0	0	0	0	1261	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		20			-20			12			-12	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type				Perm	NA						NA	
Protected Phases					2						4	
Permitted Phases				2								
Minimum Split (s)				21.2	21.2						21.2	
Total Split (s)				54.0	54.0						46.0	
Total Split (%)				54.0%	54.0%						46.0%	
Maximum Green (s)				48.8	48.8						40.8	
Yellow Time (s)				3.6	3.6						3.6	
All-Red Time (s)				1.6	1.6						1.6	
Lost Time Adjust (s)					-1.2						-1.2	
Total Lost Time (s)					4.0						4.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)				4.0	4.0						4.0	
Flash Dont Walk (s)				8.0	8.0						8.0	
Pedestrian Calls (#/hr)				0	0						0	
Act Effect Green (s)					50.0						42.0	
Actuated g/C Ratio					0.50						0.42	
v/c Ratio					0.39						0.61	
Control Delay					5.8						23.1	

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour

15: Woodall WBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay					0.2						0.2	
Total Delay					5.9						23.3	
LOS					A						C	
Approach Delay					5.9						23.3	
Approach LOS					A						C	
Queue Length 50th (ft)					17						167	
Queue Length 95th (ft)					25						m176	
Internal Link Dist (ft)		756			187			180			353	
Turn Bay Length (ft)												
Base Capacity (vph)					2480						2052	
Starvation Cap Reductn					579						218	
Spillback Cap Reductn					0						0	
Storage Cap Reductn					0						0	
Reduced v/c Ratio					0.51						0.69	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 87 (87%), Referenced to phase 2:WBTL and 6:, Start of Yellow

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.61

Intersection Signal Delay: 15.8

Intersection LOS: B

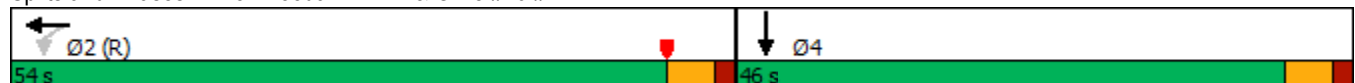
Intersection Capacity Utilization 46.6%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 15: Woodall WBFR & Olive #16 #21



North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour

16: Woodall EBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑	↑		↑↑↑				
Traffic Volume (vph)	0	0	0	0	821	793	79	413	0	0	0	0
Future Volume (vph)	0	0	0	0	821	793	79	413	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00
Ped Bike Factor						0.95		0.99				
Frt						0.850						
Flt Protected								0.992				
Satd. Flow (prot)	0	0	0	0	5085	1583	0	5045	0	0	0	0
Flt Permitted								0.992				
Satd. Flow (perm)	0	0	0	0	5085	1510	0	5004	0	0	0	0
Right Turn on Red			Yes			Yes	Yes		Yes			Yes
Satd. Flow (RTOR)						188		46				
Link Speed (mph)		30			30			26			30	
Link Distance (ft)		267			231			261			427	
Travel Time (s)		6.1			5.3			6.8			9.7	
Confl. Peds. (#/hr)						14	20					
Peak Hour Factor	0.92	0.92	0.92	0.95	0.95	0.95	0.80	0.80	0.80	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	864	835	99	516	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	864	835	0	615	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		20			-20			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type					NA	Perm	Perm	NA				
Protected Phases					2			4				
Permitted Phases						2	4					
Minimum Split (s)					22.1	22.1	21.1	21.1				
Total Split (s)					57.5	57.5	42.5	42.5				
Total Split (%)					57.5%	57.5%	42.5%	42.5%				
Maximum Green (s)					51.4	51.4	37.4	37.4				
Yellow Time (s)					3.6	3.6	3.6	3.6				
All-Red Time (s)					2.5	2.5	1.5	1.5				
Lost Time Adjust (s)					-2.1	-2.1		-1.1				
Total Lost Time (s)					4.0	4.0		4.0				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)					4.0	4.0	4.0	4.0				
Flash Dont Walk (s)					8.0	8.0	8.0	8.0				
Pedestrian Calls (#/hr)					0	0	0	0				
Act Effct Green (s)					53.5	53.5		38.5				
Actuated g/C Ratio					0.54	0.54		0.38				
v/c Ratio					0.32	0.93		0.31				
Control Delay					13.4	35.7		15.1				

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour
16: Woodall EBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay					0.0	0.8		0.6				
Total Delay					13.4	36.5		15.7				
LOS					B	D		B				
Approach Delay					24.8			15.7				
Approach LOS					C			B				
Queue Length 50th (ft)					107	390		62				
Queue Length 95th (ft)					134	#690		64				
Internal Link Dist (ft)		187			151			181			347	
Turn Bay Length (ft)												
Base Capacity (vph)					2720	895		1954				
Starvation Cap Reductn					0	0		896				
Spillback Cap Reductn					0	9		245				
Storage Cap Reductn					0	0		0				
Reduced v/c Ratio					0.32	0.94		0.58				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 85 (85%), Referenced to phase 2:WBT and 6:, Start of Yellow

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 22.4

Intersection LOS: C

Intersection Capacity Utilization 66.8%

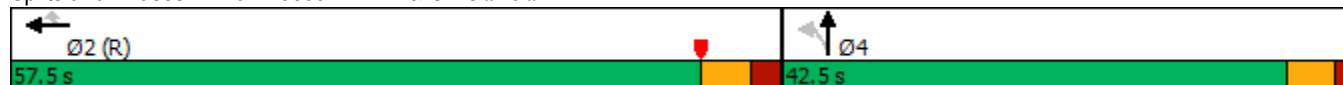
ICU Level of Service C

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 16: Woodall EBFR & Olive #16 #21



North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour

17: Woodall WBFR & Pearl #17 #18

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations			↑↑↑	↑	↑	↑↑↑						↑↑↑
Traffic Volume (vph)	1	0	852	84	121	876	0	0	0	0	140	888
Future Volume (vph)	1	0	852	84	121	876	0	0	0	0	140	888
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		250		0	0		0	0		0	0	
Storage Lanes		1		1	1		0	0		0	0	
Taper Length (ft)		25			25			25			25	
Lane Util. Factor	0.91	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	0.91	0.91
Ped Bike Factor				0.98								0.93
Frt				0.850								0.943
Flt Protected					0.950							0.996
Satd. Flow (prot)	0	0	5085	1583	1770	5085	0	0	0	0	0	4454
Flt Permitted			0.939		0.179							0.996
Satd. Flow (perm)	0	0	4775	1546	333	5085	0	0	0	0	0	4454
Right Turn on Red				Yes			Yes			Yes		
Satd. Flow (RTOR)				97								101
Link Speed (mph)			30			30			30			30
Link Distance (ft)			1034			257			433			138
Travel Time (s)			23.5			5.8			9.8			3.1
Confl. Peds. (#/hr)				4	4							
Peak Hour Factor	0.87	0.87	0.87	0.87	0.94	0.94	0.94	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	0	979	97	129	932	0	0	0	0	152	965
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	980	97	129	932	0	0	0	0	0	1809
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left
Median Width(ft)			12			12			0			0
Link Offset(ft)			0			0			0			0
Crosswalk Width(ft)			16			16			16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15		9	15		9	15		9	15	
Turn Type	Perm		NA	Perm	pm+pt	NA					Split	NA
Protected Phases			2		11	6 11					4	4
Permitted Phases	2			2	6 11							
Minimum Split (s)	21.1		21.1	21.1	8.0						22.0	22.0
Total Split (s)	36.0		36.0	36.0	20.0						44.0	44.0
Total Split (%)	36.0%		36.0%	36.0%	20.0%						44.0%	44.0%
Maximum Green (s)	30.9		30.9	30.9	16.0						38.0	38.0
Yellow Time (s)	3.6		3.6	3.6	3.5						3.9	3.9
All-Red Time (s)	1.5		1.5	1.5	0.5						2.1	2.1
Lost Time Adjust (s)			-1.1	-1.1	-1.0							-2.0
Total Lost Time (s)			4.0	4.0	3.0							4.0
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0		4.0	4.0							4.0	4.0
Flash Dont Walk (s)	6.0		6.0	6.0							6.0	6.0
Pedestrian Calls (#/hr)	0		0	0							0	0
Act Effect Green (s)			32.0	32.0	53.0	51.9						40.0

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour

17: Woodall WBFR & Pearl #17 #18

Lane Group	SBR	Ø6
Lane Configurations		
Traffic Volume (vph)	637	
Future Volume (vph)	637	
Ideal Flow (vphpl)	1900	
Storage Length (ft)	0	
Storage Lanes	0	
Taper Length (ft)		
Lane Util. Factor	0.91	
Ped Bike Factor		
Frt		
Flt Protected		
Satd. Flow (prot)	0	
Flt Permitted		
Satd. Flow (perm)	0	
Right Turn on Red	Yes	
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)	56	
Peak Hour Factor	0.92	
Adj. Flow (vph)	692	
Shared Lane Traffic (%)		
Lane Group Flow (vph)	0	
Enter Blocked Intersection	No	
Lane Alignment	Right	
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor	1.00	
Turning Speed (mph)	9	
Turn Type		
Protected Phases	6	
Permitted Phases		
Minimum Split (s)	21.1	
Total Split (s)	56.0	
Total Split (%)	56%	
Maximum Green (s)	50.9	
Yellow Time (s)	3.6	
All-Red Time (s)	1.5	
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Walk Time (s)	4.0	
Flash Dont Walk (s)	6.0	
Pedestrian Calls (#/hr)	0	
Act Effect Green (s)		

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour

17: Woodall WBFR & Pearl #17 #18

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Actuated g/C Ratio			0.32	0.32	0.53	0.52						0.40
v/c Ratio			0.64	0.17	0.31	0.35						1.05dr
Control Delay			11.9	0.5	11.6	7.0						45.8
Queue Delay			0.0	0.0	0.0	0.1						0.0
Total Delay			11.9	0.5	11.6	7.0						45.8
LOS			B	A	B	A						D
Approach Delay			10.9			7.6						45.8
Approach LOS			B			A						D
Queue Length 50th (ft)			50	0	18	49						393
Queue Length 95th (ft)			57	m0	m46	m58						#516
Internal Link Dist (ft)			954			177			353			58
Turn Bay Length (ft)												
Base Capacity (vph)			1528	560	420	2639						1842
Starvation Cap Reductn			0	0	0	528						0
Spillback Cap Reductn			0	0	0	0						0
Storage Cap Reductn			0	0	0	0						0
Reduced v/c Ratio			0.64	0.17	0.31	0.44						0.98

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 77 (77%), Referenced to phase 2:EBTU and 6:WBTL, Start of Yellow

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.98

Intersection Signal Delay: 26.0

Intersection LOS: C

Intersection Capacity Utilization 69.1%

ICU Level of Service C

Analysis Period (min) 15

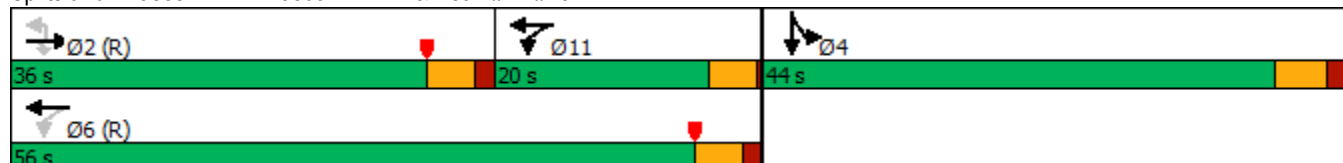
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 17: Woodall WBFR & Pearl #17 #18





Lane Group	SBR	Ø6
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour

18: Woodall EBFR & Pearl #17 #18

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 			  			  				
Traffic Volume (vph)	281	721	0	0	832	51	175	674	347	0	0	0
Future Volume (vph)	281	721	0	0	832	51	175	674	347	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	250		0	0		0	0		0
Storage Lanes	2		0	1		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	1.00	0.91	1.00	0.91	0.91	0.91	1.00	1.00	1.00
Ped Bike Factor	0.97					0.87		0.98				
Frt						0.850		0.957				
Flt Protected	0.950							0.993				
Satd. Flow (prot)	3433	3539	0	0	5085	1583	0	4751	0	0	0	0
Flt Permitted	0.210							0.993				
Satd. Flow (perm)	740	3539	0	0	5085	1376	0	4751	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						87		105				
Link Speed (mph)		30			30			26			30	
Link Distance (ft)		257			1016			427			143	
Travel Time (s)		5.8			23.1			11.2			3.3	
Confl. Peds. (#/hr)	89					89			19			
Peak Hour Factor	0.89	0.89	0.89	0.96	0.96	0.96	0.91	0.91	0.91	0.92	0.92	0.92
Adj. Flow (vph)	316	810	0	0	867	53	192	741	381	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	316	810	0	0	867	53	0	1314	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			0			0	
Link Offset(ft)		0			0			-12			12	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA			NA	Perm	Perm	NA				
Protected Phases	5	2			6			4				
Permitted Phases	2					6	4					
Minimum Split (s)	8.0	21.4			27.0	27.0	23.1	23.1				
Total Split (s)	25.0	66.0			41.0	41.0	34.0	34.0				
Total Split (%)	25.0%	66.0%			41.0%	41.0%	34.0%	34.0%				
Maximum Green (s)	20.0	60.6			36.0	36.0	28.0	28.0				
Yellow Time (s)	3.0	3.6			3.6	3.6	3.6	3.6				
All-Red Time (s)	2.0	1.8			1.4	1.4	2.4	2.4				
Lost Time Adjust (s)	-1.0	-1.4			-1.0	-1.0		-2.0				
Total Lost Time (s)	4.0	4.0			4.0	4.0		4.0				
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Walk Time (s)		4.0			4.0	4.0	4.0	4.0				
Flash Dont Walk (s)		8.0			18.0	18.0	8.0	8.0				
Pedestrian Calls (#/hr)		0			0	0	0	0				
Act Effect Green (s)	62.0	62.0			37.0	37.0		30.0				

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - AM Peak Hour

18: Woodall EBFR & Pearl #17 #18

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.62	0.62			0.37	0.37		0.30				
v/c Ratio	0.31	0.37			0.46	0.09		0.88				
Control Delay	8.2	1.7			24.9	2.0		32.4				
Queue Delay	0.3	0.2			0.0	0.0		0.1				
Total Delay	8.5	1.9			24.9	2.0		32.5				
LOS	A	A			C	A		C				
Approach Delay		3.7			23.6			32.5				
Approach LOS		A			C			C				
Queue Length 50th (ft)	25	22			151	0		297				
Queue Length 95th (ft)	m47	m25			190	11		m336				
Internal Link Dist (ft)		177			936			347			63	
Turn Bay Length (ft)												
Base Capacity (vph)	1024	2194			1881	563		1498				
Starvation Cap Reductn	259	588			0	0		8				
Spillback Cap Reductn	0	0			0	0		0				
Storage Cap Reductn	0	0			0	0		0				
Reduced v/c Ratio	0.41	0.50			0.46	0.09		0.88				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 95 (95%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 20.4

Intersection LOS: C

Intersection Capacity Utilization 69.1%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Woodall EBFR & Pearl #17 #18



Intersection												
Int Delay, s/veh	0											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑↑								↑	↑		
Traffic Vol, veh/h	0	608	89	0	0	0	0	0	1	0	1	0
Future Vol, veh/h	0	608	89	0	0	0	0	0	1	0	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	0	-	-
Veh in Median Storage, #	-	0	-	-	16979	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	661	97	0	0	0	0	0	1	0	1	0

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	0	0	0	-	-	379	264	758	-
Stage 1	-	-	-	-	-	-	0	0	-
Stage 2	-	-	-	-	-	-	264	758	-
Critical Hdwy	5.34	-	-	-	-	7.14	6.44	6.54	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-
Follow-up Hdwy	3.12	-	-	-	-	3.92	3.82	4.02	-
Pot Cap-1 Maneuver	-	-	-	0	0	529	674	335	0
Stage 1	-	-	-	0	0	-	-	-	0
Stage 2	-	-	-	0	0	-	659	413	0
Platoon blocked, %	-	-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	529	673	335	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	673	335	-
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	658	413	-

Approach	EB	NB	SB
HCM Control Delay, s	0	11.8	0
HCM LOS		B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	529	-	-	-	-
HCM Lane V/C Ratio	0.002	-	-	-	-
HCM Control Delay (s)	11.8	0	-	-	0
HCM Lane LOS	B	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗			↑↑↑	
Traffic Vol, veh/h	0	2	0	0	698	4
Future Vol, veh/h	0	2	0	0	698	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	16974	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	2	0	0	759	4
Major/Minor	Minor2		Major2			
Conflicting Flow All	-	382	-	-	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.14	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.92	-	-	-	-
Pot Cap-1 Maneuver	0	526	-	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	526	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		SB			
HCM Control Delay, s	11.9		0			
HCM LOS	B					
Minor Lane/Major Mvmt	EBLn1	SBT	SBR			
Capacity (veh/h)	526	-	-			
HCM Lane V/C Ratio	0.004	-	-			
HCM Control Delay (s)	11.9	-	-			
HCM Lane LOS	B	-	-			
HCM 95th %tile Q(veh)	0	-	-			

North Harwood Tower
HCM 6th TWSC

Existing Conditions - AM Peak Hour
21: North Drive/South Drive & Harwood

Intersection												
Int Delay, s/veh	0.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔			↕			↕	
Traffic Vol, veh/h	5	45	1	3	259	7	3	0	0	2	0	5
Future Vol, veh/h	5	45	1	3	259	7	3	0	0	2	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	49	1	3	282	8	3	0	0	2	0	5
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	290	0	0	50	0	0	207	356	25	327	352	145
Stage 1	-	-	-	-	-	-	60	60	-	292	292	-
Stage 2	-	-	-	-	-	-	147	296	-	35	60	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1269	-	-	1555	-	-	732	568	1045	602	571	876
Stage 1	-	-	-	-	-	-	944	844	-	692	670	-
Stage 2	-	-	-	-	-	-	841	667	-	976	844	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1269	-	-	1555	-	-	724	565	1045	599	568	876
Mov Cap-2 Maneuver	-	-	-	-	-	-	724	565	-	599	568	-
Stage 1	-	-	-	-	-	-	940	841	-	689	669	-
Stage 2	-	-	-	-	-	-	834	666	-	972	841	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.8			0.1			10			9.7		
HCM LOS							B			A		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	724	1269	-	-	1555	-	-	774				
HCM Lane V/C Ratio	0.005	0.004	-	-	0.002	-	-	0.01				
HCM Control Delay (s)	10	7.8	0	-	7.3	0	-	9.7				
HCM Lane LOS	B	A	A	-	A	A	-	A				
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0				

North Harwood Tower
HCM 6th TWSC

Existing Conditions - AM Peak Hour
22: Adjacent North Drive/Adjacent South Drive & Harwood

Intersection														
Int Delay, s/veh	2.7													
Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↔↔			↔↔				↕			↕	
Traffic Vol, veh/h	2	127	54	37	26	104	132	1	1	1	0	0	0	0
Future Vol, veh/h	2	127	54	37	26	104	132	1	1	1	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	-	None	-	-	None	-	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	-	0	-	-	0	-	-	-	0	-	-	0	-
Grade, %	-	-	0	-	-	0	-	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	138	59	40	28	113	143	1	1	1	0	0	0	0
Major/Minor	Major1			Major2			Minor1			Minor2				
Conflicting Flow All	257	256	0	0	99	0	0	0	472	671	50	551	620	128
Stage 1	-	-	-	-	-	-	-	0	359	359	-	241	241	-
Stage 2	-	-	-	-	-	-	-	0	113	312	-	310	379	-
Critical Hdwy	6.44	4.14	-	-	4.14	-	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.52	2.22	-	-	2.22	-	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	986	1306	-	-	1492	-	-	0	475	376	1008	417	402	898
Stage 1	-	-	-	-	-	-	-	0	632	626	-	741	705	-
Stage 2	-	-	-	-	-	-	-	0	880	656	-	675	613	-
Platoon blocked, %			-	-		-	-	-						
Mov Cap-1 Maneuver	1299	1299	-	-	1492	-	-	0	426	326	1008	373	348	898
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	0	426	326	-	373	348	-
Stage 1	-	-	-	-	-	-	-	0	559	554	-	656	689	-
Stage 2	-	-	-	-	-	-	-	0	861	642	-	596	543	-
Approach	EB			WB			NB			SB				
HCM Control Delay, s	4.8			0.8			14.8			0				
HCM LOS							B			A				
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1						
Capacity (veh/h)	369	1299	-	-	1492	-	-	-						
HCM Lane V/C Ratio	0.006	0.106	-	-	0.019	-	-	-						
HCM Control Delay (s)	14.8	8.1	0.2	-	7.5	0.1	-	0						
HCM Lane LOS	B	A	A	-	A	A	-	A						
HCM 95th %tile Q(veh)	0	0.4	-	-	0.1	-	-	-						

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour

1: McKinney & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	149	89	87	13	30	48	20	213	14	9	54	288
Future Volume (vph)	149	89	87	13	30	48	20	213	14	9	54	288
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor	0.93	0.94			0.94			0.99				0.97
Frt		0.926			0.920			0.992				0.978
Flt Protected	0.950				0.993			0.996				0.992
Satd. Flow (prot)	1770	1627	0	0	3076	0	0	3470	0	0	0	3370
Flt Permitted	0.950				0.905			0.919				0.841
Satd. Flow (perm)	1649	1627	0	0	2776	0	0	3191	0	0	0	2819
Right Turn on Red			Yes			Yes			Yes			
Satd. Flow (RTOR)		58			68			9				20
Link Speed (mph)		30			30			30				30
Link Distance (ft)		424			269			526				348
Travel Time (s)		9.6			6.1			12.0				7.9
Confl. Peds. (#/hr)	46		59	59		46	67		72		72	
Peak Hour Factor	0.80	0.80	0.80	0.71	0.71	0.71	0.92	0.92	0.92	0.84	0.84	0.84
Adj. Flow (vph)	186	111	109	18	42	68	22	232	15	11	64	343
Shared Lane Traffic (%)												
Lane Group Flow (vph)	186	220	0	0	128	0	0	269	0	0	0	489
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	R NA	Left	Left
Median Width(ft)		12			12			0				0
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	9	15	
Turn Type	Prot	NA		Perm	NA		pm+pt	NA		Perm	Perm	NA
Protected Phases	8!				4!		5	2				6
Permitted Phases		8		4			2			6	6	
Minimum Split (s)	23.4	23.4		23.4	23.4		8.0	23.4		23.4	23.4	23.4
Total Split (s)	44.0	44.0		44.0	44.0		19.0	56.0		37.0	37.0	37.0
Total Split (%)	44.0%	44.0%		44.0%	44.0%		19.0%	56.0%		37.0%	37.0%	37.0%
Maximum Green (s)	38.6	38.6		38.6	38.6		15.0	50.6		31.6	31.6	31.6
Yellow Time (s)	3.6	3.6		3.6	3.6		3.5	3.2		3.2	3.2	3.2
All-Red Time (s)	1.8	1.8		1.8	1.8		0.5	2.2		2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0			0.0			0.0				0.0
Total Lost Time (s)	5.4	5.4			5.4			5.4				5.4
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Walk Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	4.0
Flash Dont Walk (s)	13.0	13.0		13.0	13.0			13.0		13.0	13.0	13.0
Pedestrian Calls (#/hr)	0	0		0	0			0		0	0	0
Act Effect Green (s)	38.6	38.6			38.6			50.6				31.6
Actuated g/C Ratio	0.39	0.39			0.39			0.51				0.32
v/c Ratio	0.27	0.33			0.12			0.16				0.54
Control Delay	15.9	10.8			9.3			3.3				22.6

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour

1: McKinney & Harwood

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	60
Future Volume (vph)	60
Ideal Flow (vphpl)	1900
Lane Util. Factor	0.95
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	67
Peak Hour Factor	0.84
Adj. Flow (vph)	71
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Enter Blocked Intersection	No
Lane Alignment	Right
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	1.00
Turning Speed (mph)	9
Turn Type	
Protected Phases	
Permitted Phases	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Maximum Green (s)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour

1: McKinney & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Queue Delay	0.0	0.0			0.0			0.0				0.2
Total Delay	15.9	10.8			9.3			3.3				22.9
LOS	B	B			A			A				C
Approach Delay		13.1			9.3			3.3				22.9
Approach LOS		B			A			A				C
Queue Length 50th (ft)	48	32			12			18				110
Queue Length 95th (ft)	69	54			21			8				154
Internal Link Dist (ft)		344			189			446				268
Turn Bay Length (ft)												
Base Capacity (vph)	683	663			1113			1657				904
Starvation Cap Reductn	0	0			0			0				79
Spillback Cap Reductn	0	0			0			0				0
Storage Cap Reductn	0	0			0			0				0
Reduced v/c Ratio	0.27	0.33			0.12			0.16				0.59

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 48 (48%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.54

Intersection Signal Delay: 14.4

Intersection LOS: B

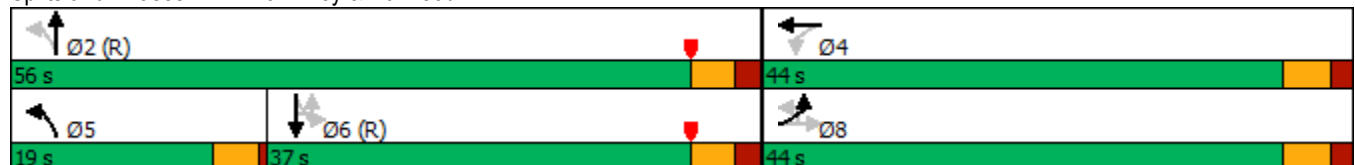
Intersection Capacity Utilization 58.6%

ICU Level of Service B

Analysis Period (min) 15

! Phase conflict between lane groups.

Splits and Phases: 1: McKinney & Harwood





Lane Group	SBR
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour

2: Cedar Springs & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	64	187	0	0	0	199	1	994	22	0	0	0
Future Volume (vph)	64	187	0	0	0	199	1	994	22	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	0.88	0.81	0.81	0.81	1.00	1.00	1.00
Ped Bike Factor		0.98				0.91		1.00				
Frt						0.850		0.997				
Flt Protected		0.987										
Satd. Flow (prot)	0	3493	0	0	0	2787	0	7505	0	0	0	0
Flt Permitted		0.987										
Satd. Flow (perm)	0	3425	0	0	0	2543	0	7504	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						79		7				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		269			424			493			445	
Travel Time (s)		6.1			9.6			11.2			10.1	
Confl. Peds. (#/hr)	41		44	44		41	34		44			
Peak Hour Factor	0.80	0.80	0.80	0.94	0.94	0.94	0.95	0.95	0.95	0.92	0.92	0.92
Adj. Flow (vph)	80	234	0	0	0	212	1	1046	23	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	314	0	0	0	212	0	1070	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			-24			24	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA				Perm	Perm	NA				
Protected Phases		4						2				
Permitted Phases	4					4	2					
Minimum Split (s)	21.4	21.4				21.4	21.3	21.3				
Total Split (s)	47.0	47.0				47.0	53.0	53.0				
Total Split (%)	47.0%	47.0%				47.0%	53.0%	53.0%				
Maximum Green (s)	41.6	41.6				41.6	47.7	47.7				
Yellow Time (s)	3.6	3.6				3.6	3.6	3.6				
All-Red Time (s)	1.8	1.8				1.8	1.7	1.7				
Lost Time Adjust (s)		0.0				0.0		0.0				
Total Lost Time (s)		5.4				5.4		5.3				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0	4.0				4.0	4.0	4.0				
Flash Dont Walk (s)	12.0	12.0				12.0	10.0	10.0				
Pedestrian Calls (#/hr)	0	0				0	0	0				
Act Effct Green (s)		41.6				41.6		47.7				
Actuated g/C Ratio		0.42				0.42		0.48				
v/c Ratio		0.22				0.19		0.30				
Control Delay		6.9				12.9		15.2				

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour
2: Cedar Springs & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0				0.0		0.0				
Total Delay		6.9				12.9		15.2				
LOS		A				B		B				
Approach Delay		6.9			12.9			15.2				
Approach LOS		A			B			B				
Queue Length 50th (ft)		12				40		137				
Queue Length 95th (ft)		23				68		141				
Internal Link Dist (ft)		189			344			413			365	
Turn Bay Length (ft)												
Base Capacity (vph)		1424				1104		3583				
Starvation Cap Reductn		0				0		0				
Spillback Cap Reductn		0				0		0				
Storage Cap Reductn		0				0		0				
Reduced v/c Ratio		0.22				0.19		0.30				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 52 (52%), Referenced to phase 2:NBTL, Start of Yellow

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.30

Intersection Signal Delay: 13.3

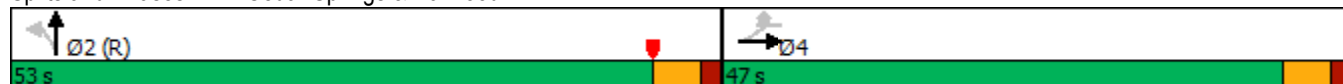
Intersection LOS: B

Intersection Capacity Utilization 51.2%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: Cedar Springs & Harwood



North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour

3: McKinney & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	0	0	0	68	645	310	1	34	349	0	0	244
Future Volume (vph)	0	0	0	68	645	310	1	34	349	0	0	244
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	0.95	1.00	1.00	0.95
Ped Bike Factor					0.99	0.95			0.99			0.96
Frt						0.850						0.959
Flt Protected					0.995				0.995			
Satd. Flow (prot)	0	0	0	0	3522	1583	0	0	3522	0	0	3252
Flt Permitted					0.995				0.886			
Satd. Flow (perm)	0	0	0	0	3472	1507	0	0	3113	0	0	3252
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)						180						63
Link Speed (mph)		30			30				30			30
Link Distance (ft)		536			836				348			457
Travel Time (s)		12.2			19.0				7.9			10.4
Confl. Peds. (#/hr)				88		22		86		69		
Peak Hour Factor	0.92	0.92	0.92	0.88	0.88	0.88	0.92	0.92	0.92	0.92	0.91	0.91
Adj. Flow (vph)	0	0	0	77	733	352	1	37	379	0	0	268
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	810	352	0	0	417	0	0	369
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	Left	Left
Median Width(ft)		0			0				0			0
Link Offset(ft)		16			0				0			0
Crosswalk Width(ft)		16			16				16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	9	15		9	15	
Turn Type				Perm	NA	Perm	Perm	Perm	NA			NA
Protected Phases					4				2			2
Permitted Phases				4		4	2	2				
Minimum Split (s)				23.3	23.3	23.3	23.4	23.4	23.4			23.4
Total Split (s)				57.0	57.0	57.0	43.0	43.0	43.0			43.0
Total Split (%)				57.0%	57.0%	57.0%	43.0%	43.0%	43.0%			43.0%
Maximum Green (s)				51.7	51.7	51.7	37.6	37.6	37.6			37.6
Yellow Time (s)				3.2	3.2	3.2	3.2	3.2	3.2			3.2
All-Red Time (s)				2.1	2.1	2.1	2.2	2.2	2.2			2.2
Lost Time Adjust (s)					0.0	0.0			0.0			0.0
Total Lost Time (s)					5.3	5.3			5.4			5.4
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)				4.0	4.0	4.0	4.0	4.0	4.0			4.0
Flash Dont Walk (s)				14.0	14.0	14.0	14.0	14.0	14.0			14.0
Pedestrian Calls (#/hr)				0	0	0	0	0	0			0
Act Effect Green (s)					51.7	51.7			37.6			37.6
Actuated g/C Ratio					0.52	0.52			0.38			0.38
v/c Ratio					0.45	0.41			0.36			0.29
Control Delay					12.3	4.9			21.4			17.2

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour

3: McKinney & Olive #16 #21

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	92
Future Volume (vph)	92
Ideal Flow (vphpl)	1900
Lane Util. Factor	0.95
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	86
Peak Hour Factor	0.91
Adj. Flow (vph)	101
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Enter Blocked Intersection	No
Lane Alignment	Right
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	1.00
Turning Speed (mph)	9
Turn Type	
Protected Phases	
Permitted Phases	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Maximum Green (s)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour

3: McKinney & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Queue Delay					0.0	0.0			0.0			0.0
Total Delay					12.3	4.9			21.4			17.2
LOS					B	A			C			B
Approach Delay					10.0				21.4			17.2
Approach LOS					B				C			B
Queue Length 50th (ft)					110	25			92			88
Queue Length 95th (ft)					130	54			125			m123
Internal Link Dist (ft)		456			756				268			377
Turn Bay Length (ft)												
Base Capacity (vph)					1795	866			1170			1262
Starvation Cap Reductn					0	0			0			0
Spillback Cap Reductn					0	0			0			0
Storage Cap Reductn					0	0			0			0
Reduced v/c Ratio					0.45	0.41			0.36			0.29

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 47 (47%), Referenced to phase 2:NBSB and 6:, Start of Yellow

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 13.8

Intersection LOS: B

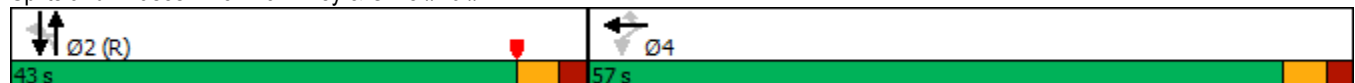
Intersection Capacity Utilization 63.2%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: McKinney & Olive #16 #21





Lane Group	SBR
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour
4: Cedar Springs & Akard /Akard & St Paul

									
Lane Group	EBU	EBL	EBT	EBR	WBR	WBR2	NBL	NBT	NBR
Lane Configurations									
Traffic Volume (vph)	15	672	761	115	699	1	294	31	74
Future Volume (vph)	15	672	761	115	699	1	294	31	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.97	0.91	0.91	0.76	1.00	0.97	1.00	1.00
Ped Bike Factor		0.99	0.98				0.95	0.97	
Frt			0.980		0.850			0.895	
Flt Protected		0.950					0.950		
Satd. Flow (prot)	0	3433	4906	0	3610	0	3433	1611	0
Flt Permitted		0.950					0.950		
Satd. Flow (perm)	0	3385	4906	0	3610	0	3250	1611	0
Right Turn on Red				Yes		Yes			Yes
Satd. Flow (RTOR)			65		96			80	
Link Speed (mph)			30					30	
Link Distance (ft)			385					581	
Travel Time (s)			8.8					13.2	
Confl. Peds. (#/hr)		14		58	14	26	32		22
Peak Hour Factor	0.97	0.97	0.97	0.97	0.93	0.93	0.92	0.92	0.92
Adj. Flow (vph)	15	693	785	119	752	1	320	34	80
Shared Lane Traffic (%)									
Lane Group Flow (vph)	0	708	904	0	753	0	320	114	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	Right	Right	Left	Left	Right
Median Width(ft)			0					24	
Link Offset(ft)			24					0	
Crosswalk Width(ft)			16					16	
Two way Left Turn Lane									
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15		9	9	9	15		9
Turn Type	custom	Prot	NA		Prot		Prot	NA	
Protected Phases		5			6		4		
Permitted Phases	5		2					4	
Minimum Split (s)	11.9	11.9	20.0		21.5		23.9	23.9	
Total Split (s)	36.0	36.0	73.0		37.0		27.0	27.0	
Total Split (%)	36.0%	36.0%	73.0%		37.0%		27.0%	27.0%	
Maximum Green (s)	30.1	30.1	69.0		31.5		21.1	21.1	
Yellow Time (s)	3.6	3.6	3.5		3.6		3.6	3.6	
All-Red Time (s)	2.3	2.3	0.5		1.9		2.3	2.3	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)		5.9	4.0		5.5		5.9	5.9	
Lead/Lag	Lag	Lag			Lead				
Lead-Lag Optimize?	Yes	Yes			Yes				
Walk Time (s)			5.0		4.0		4.0	4.0	
Flash Dont Walk (s)			11.0		8.0		14.0	14.0	
Pedestrian Calls (#/hr)			0		0		0	0	
Act Effect Green (s)		30.1	69.0		31.5		21.1	21.1	
Actuated g/C Ratio		0.30	0.69		0.32		0.21	0.21	
v/c Ratio		0.70	0.27		0.63		0.44	0.28	
Control Delay		49.7	9.9		17.3		36.6	14.4	

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour

4: Cedar Springs & Akard /Akard & St Paul



Lane Group	EBU	EBL	EBT	EBR	WBR	WBR2	NBL	NBT	NBR
Queue Delay		4.3	0.0		0.0		0.0	6.6	
Total Delay		54.0	9.9		17.3		36.6	21.0	
LOS		D	A		B		D	C	
Approach Delay			29.2					32.5	
Approach LOS			C					C	
Queue Length 50th (ft)		246	133		163		92	18	
Queue Length 95th (ft)		306	154		217		134	64	
Internal Link Dist (ft)			305					501	
Turn Bay Length (ft)									
Base Capacity (vph)		1018	3405		1202		724	403	
Starvation Cap Reductn		0	0		0		0	0	
Spillback Cap Reductn		231	0		0		0	239	
Storage Cap Reductn		0	0		0		0	0	
Reduced v/c Ratio		0.90	0.27		0.63		0.44	0.70	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 17 (17%), Referenced to phase 2:EBT and 6:WBR, Start of Yellow

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 26.5

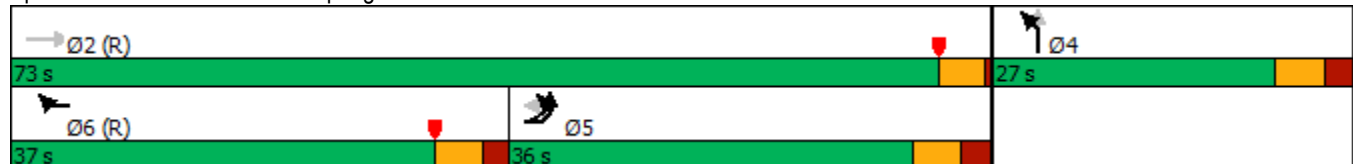
Intersection LOS: C

Intersection Capacity Utilization 65.2%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 4: Cedar Springs & Akard /Akard & St Paul



North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour

5: McKinney & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	680	5	0	0	0	0	197	16	144	214	0
Future Volume (vph)	45	680	5	0	0	0	0	197	16	144	214	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	1.00
Ped Bike Factor	0.98	1.00						0.99			0.98	
Frt		0.999						0.989				
Flt Protected	0.950										0.980	
Satd. Flow (prot)	1770	3534	0	0	0	0	0	3477	0	0	3468	0
Flt Permitted	0.950										0.708	
Satd. Flow (perm)	1727	3534	0	0	0	0	0	3477	0	0	2455	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1						9				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		323			182			264			526	
Travel Time (s)		7.3			4.1			6.0			12.0	
Confl. Peds. (#/hr)	12		22	22		12	44		49	49		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.72	0.72	0.72	0.77	0.77	0.77
Adj. Flow (vph)	49	739	5	0	0	0	0	274	22	187	278	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	49	744	0	0	0	0	0	296	0	0	465	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			24			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA						NA		Perm	NA	
Protected Phases	4							2			2	
Permitted Phases		4					2			2		
Minimum Split (s)	21.2	21.2					24.6	24.6		24.6	24.6	
Total Split (s)	38.0	38.0					41.0	41.0		41.0	41.0	
Total Split (%)	38.0%	38.0%					41.0%	41.0%		41.0%	41.0%	
Maximum Green (s)	33.1	33.1					35.6	35.6		35.6	35.6	
Yellow Time (s)	3.2	3.2					3.2	3.2		3.2	3.2	
All-Red Time (s)	1.7	1.7					2.2	2.2		2.2	2.2	
Lost Time Adjust (s)	0.0	0.0						0.0			0.0	
Total Lost Time (s)	4.9	4.9						5.4			5.4	
Lead/Lag	Lag	Lag										
Lead-Lag Optimize?	Yes	Yes										
Walk Time (s)	4.0	4.0					4.0	4.0		4.0	4.0	
Flash Dont Walk (s)	11.0	11.0					15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0					0	0		0	0	
Act Effct Green (s)	33.1	33.1						35.6			35.6	
Actuated g/C Ratio	0.33	0.33						0.36			0.36	
v/c Ratio	0.08	0.64						0.24			0.53	
Control Delay	37.1	48.0						29.5			14.1	

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Minimum Split (s)	9.5
Total Split (s)	21.0
Total Split (%)	21%
Maximum Green (s)	17.0
Yellow Time (s)	3.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour

5: McKinney & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	51.9						0.0			0.0	
Total Delay	37.1	99.9						29.5			14.1	
LOS	D	F						C			B	
Approach Delay		96.1						29.5			14.1	
Approach LOS		F						C			B	
Queue Length 50th (ft)	33	266						87			51	
Queue Length 95th (ft)	m51	328						100			57	
Internal Link Dist (ft)		243			102			184			446	
Turn Bay Length (ft)												
Base Capacity (vph)	585	1170						1243			873	
Starvation Cap Reductn	0	511						0			0	
Spillback Cap Reductn	0	0						0			0	
Storage Cap Reductn	0	0						0			0	
Reduced v/c Ratio	0.08	1.13						0.24			0.53	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 52 (52%), Referenced to phase 2:NBSB and 6:, Start of Yellow

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 58.8

Intersection LOS: E

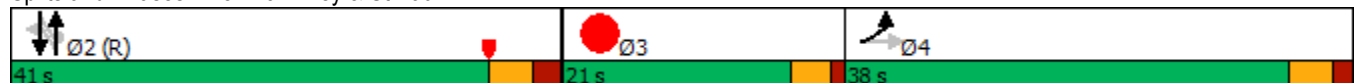
Intersection Capacity Utilization 58.0%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: McKinney & St Paul



Lane Group	Ø3
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour

6: McKinney & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	699	45	10	670	171	3	14	22	90	99	27
Future Volume (vph)	18	699	45	10	670	171	3	14	22	90	99	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor		0.99			0.98			0.97			0.97	
Frt		0.991			0.970			0.916			0.981	
Flt Protected		0.999			0.999			0.996			0.980	
Satd. Flow (prot)	0	5007	0	0	4850	0	0	3138	0	0	3366	0
Flt Permitted		0.907			0.928			0.937			0.805	
Satd. Flow (perm)	0	4544	0	0	4504	0	0	2940	0	0	2723	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14			90			29			18	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		383			222			432			264	
Travel Time (s)		8.7			5.0			9.8			6.0	
Confl. Peds. (#/hr)	34		42	42		34	47		25	25		47
Peak Hour Factor	0.93	0.93	0.93	0.98	0.98	0.98	0.75	0.75	0.75	0.78	0.78	0.78
Adj. Flow (vph)	19	752	48	10	684	174	4	19	29	115	127	35
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	819	0	0	868	0	0	52	0	0	277	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			6			2	
Permitted Phases	4			4			6			2		
Minimum Split (s)	21.2	21.2		21.2	21.2		24.4	24.4		24.4	24.4	
Total Split (s)	57.0	57.0		57.0	57.0		43.0	43.0		43.0	43.0	
Total Split (%)	57.0%	57.0%		57.0%	57.0%		43.0%	43.0%		43.0%	43.0%	
Maximum Green (s)	51.8	51.8		51.8	51.8		37.6	37.6		37.6	37.6	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.6	1.6		1.6	1.6		2.4	2.4		2.4	2.4	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.2			5.2			5.4			5.4	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)		51.8			51.8			37.6			37.6	
Actuated g/C Ratio		0.52			0.52			0.38			0.38	
v/c Ratio		0.35			0.37			0.05			0.27	
Control Delay		6.0			14.1			11.2			0.6	

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour
6: McKinney & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0			4.3			0.0			0.0	
Total Delay		6.0			18.4			11.2			0.6	
LOS		A			B			B			A	
Approach Delay		6.0			18.4			11.2			0.6	
Approach LOS		A			B			B			A	
Queue Length 50th (ft)		33			105			4			0	
Queue Length 95th (ft)		37			135			13			0	
Internal Link Dist (ft)		303			142			352			184	
Turn Bay Length (ft)												
Base Capacity (vph)		2360			2376			1123			1035	
Starvation Cap Reductn		0			1408			0			0	
Spillback Cap Reductn		214			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.38			0.90			0.05			0.27	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 57 (57%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.37

Intersection Signal Delay: 10.7

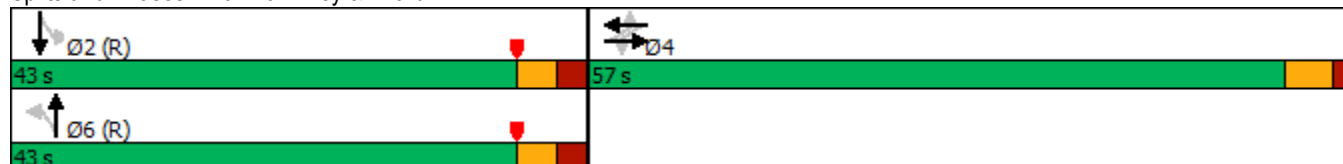
Intersection LOS: B

Intersection Capacity Utilization 52.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: McKinney & Akard



North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour

7: Woodall WBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑									↑↑↑	
Traffic Volume (vph)	0	881	75	0	0	0	0	0	0	167	627	0
Future Volume (vph)	0	881	75	0	0	0	0	0	0	167	627	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00
Ped Bike Factor		1.00									1.00	
Frt		0.988										
Flt Protected											0.990	
Satd. Flow (prot)	0	5016	0	0	0	0	0	0	0	0	5034	0
Flt Permitted											0.990	
Satd. Flow (perm)	0	5016	0	0	0	0	0	0	0	0	5032	0
Right Turn on Red			Yes			Yes				Yes	No	No
Satd. Flow (RTOR)		13										
Link Speed (mph)		30			30			24			26	
Link Distance (ft)		196			58			216			231	
Travel Time (s)		4.5			1.3			6.1			6.1	
Confl. Peds. (#/hr)			4							1		
Peak Hour Factor	0.95	0.95	0.95	0.92	0.92	0.92	0.92	0.92	0.92	0.89	0.89	0.89
Adj. Flow (vph)	0	927	79	0	0	0	0	0	0	188	704	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1006	0	0	0	0	0	0	0	0	892	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		-24			24			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type		NA								Split	NA	
Protected Phases		2								4	4	
Permitted Phases												
Minimum Split (s)		21.6								21.3	21.3	
Total Split (s)		32.0								41.0	41.0	
Total Split (%)		32.0%								41.0%	41.0%	
Maximum Green (s)		26.4								35.7	35.7	
Yellow Time (s)		3.6								3.6	3.6	
All-Red Time (s)		2.0								1.7	1.7	
Lost Time Adjust (s)		0.0									0.0	
Total Lost Time (s)		5.6									5.3	
Lead/Lag		Lag										
Lead-Lag Optimize?		Yes										
Walk Time (s)		4.0								4.0	4.0	
Flash Dont Walk (s)		8.0								9.0	9.0	
Pedestrian Calls (#/hr)		0								0	0	
Act Effct Green (s)		26.4									35.7	
Actuated g/C Ratio		0.26									0.36	
v/c Ratio		0.75									0.50	
Control Delay		42.4									21.3	

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour

7: Woodall WBFR & St Paul

Lane Group	Ø1
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	1
Permitted Phases	
Minimum Split (s)	21.3
Total Split (s)	27.0
Total Split (%)	27%
Maximum Green (s)	21.7
Yellow Time (s)	3.6
All-Red Time (s)	1.7
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour

7: Woodall WBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.3									0.4	
Total Delay		42.7									21.7	
LOS		D									C	
Approach Delay		42.7									21.7	
Approach LOS		D									C	
Queue Length 50th (ft)		177									127	
Queue Length 95th (ft)		228									153	
Internal Link Dist (ft)		116			1			136			151	
Turn Bay Length (ft)												
Base Capacity (vph)		1333									1797	
Starvation Cap Reductn		53									0	
Spillback Cap Reductn		46									427	
Storage Cap Reductn		0									0	
Reduced v/c Ratio		0.79									0.65	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 96 (96%), Referenced to phase 2:EBT and 6:, Start of Yellow

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 32.9

Intersection LOS: C

Intersection Capacity Utilization 43.3%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 7: Woodall WBFR & St Paul



Lane Group	Ø1
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour

8: Woodall EBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑						↑↑↑				
Traffic Volume (vph)	248	1000	0	0	0	0	0	394	161	0	0	0
Future Volume (vph)	248	1000	0	0	0	0	0	394	161	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00
Ped Bike Factor		0.97						0.97				
Frt								0.956				
Flt Protected		0.990										
Satd. Flow (prot)	0	5034	0	0	0	0	0	4702	0	0	0	0
Flt Permitted		0.990										
Satd. Flow (perm)	0	4874	0	0	0	0	0	4702	0	0	0	0
Right Turn on Red	Yes		Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		89						63				
Link Speed (mph)		30			30			26			30	
Link Distance (ft)		204			1246			248			416	
Travel Time (s)		4.6			28.3			6.5			9.5	
Confl. Peds. (#/hr)	64								55			
Peak Hour Factor	0.90	0.90	0.90	0.92	0.92	0.92	0.81	0.81	0.81	0.92	0.92	0.92
Adj. Flow (vph)	276	1111	0	0	0	0	0	486	199	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1387	0	0	0	0	0	685	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		-24			24			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA						NA				
Protected Phases		2						4				
Permitted Phases	2											
Minimum Split (s)	21.0	21.0						21.8				
Total Split (s)	57.0	57.0						43.0				
Total Split (%)	57.0%	57.0%						43.0%				
Maximum Green (s)	52.0	52.0						37.2				
Yellow Time (s)	3.6	3.6						3.6				
All-Red Time (s)	1.4	1.4						2.2				
Lost Time Adjust (s)		0.0						0.0				
Total Lost Time (s)		5.0						5.8				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0	4.0						4.0				
Flash Dont Walk (s)	8.0	8.0						12.0				
Pedestrian Calls (#/hr)	0	0						0				
Act Effct Green (s)		52.0						37.2				
Actuated g/C Ratio		0.52						0.37				
v/c Ratio		0.54						0.38				
Control Delay		8.6						16.2				

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour

8: Woodall EBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		1.2						0.7				
Total Delay		9.8						16.9				
LOS		A						B				
Approach Delay		9.8						16.9				
Approach LOS		A						B				
Queue Length 50th (ft)		79						78				
Queue Length 95th (ft)		95						90				
Internal Link Dist (ft)		124			1166			168			336	
Turn Bay Length (ft)												
Base Capacity (vph)		2577						1788				
Starvation Cap Reductn		893						727				
Spillback Cap Reductn		0						0				
Storage Cap Reductn		0						0				
Reduced v/c Ratio		0.82						0.65				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 23 (23%), Referenced to phase 2:EBTL and 6:, Start of Yellow

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.54

Intersection Signal Delay: 12.2

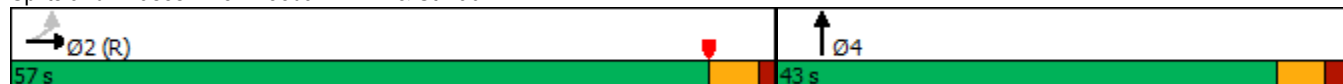
Intersection LOS: B

Intersection Capacity Utilization 46.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: Woodall EBFR & St Paul



North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour
9: Woodall WBFR & Akard WB On-Ramp & Akard

	→	↗	↘	←	↖	↗	↘	↓	↘
Lane Group	EBT	EBR	WBL	WBT	WBR	SBU	SBL	SBT	SBR
Lane Configurations	↑↑↑			↑↑↑			↘	↑↑	
Traffic Volume (vph)	684	188	224	50	774	31	422	172	75
Future Volume (vph)	684	188	224	50	774	31	422	172	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.95	1.00	0.95	0.95
Ped Bike Factor	0.97			0.87				0.98	
Frt	0.968			0.889				0.954	
Flt Protected				0.989			0.950		
Satd. Flow (prot)	4752	0	0	3907	0	0	1770	3304	0
Flt Permitted				0.673			0.950		
Satd. Flow (perm)	4752	0	0	2659	0	0	1770	3304	0
Right Turn on Red					Yes				Yes
Satd. Flow (RTOR)				860				73	
Link Speed (mph)	30			30				30	
Link Distance (ft)	222			279				216	
Travel Time (s)	5.0			6.3				4.9	
Confl. Peds. (#/hr)		43	43		40				34
Peak Hour Factor	0.93	0.93	0.90	0.90	0.90	0.88	0.88	0.88	0.88
Adj. Flow (vph)	735	202	249	56	860	35	480	195	85
Shared Lane Traffic (%)									
Lane Group Flow (vph)	937	0	0	1165	0	0	515	280	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Right	R NA	Left	Left	Right
Median Width(ft)	0			0				12	
Link Offset(ft)	0			0				0	
Crosswalk Width(ft)	16			16				16	
Two way Left Turn Lane									
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		9	9	15		9
Turn Type	NA		pm+pt	NA		Perm	Split	NA	
Protected Phases	2		1	6			4	4	
Permitted Phases			6			4			
Minimum Split (s)	21.3		8.0	21.3		22.5	22.5	22.5	
Total Split (s)	30.0		32.0	62.0		38.0	38.0	38.0	
Total Split (%)	30.0%		32.0%	62.0%		38.0%	38.0%	38.0%	
Maximum Green (s)	24.7		28.0	56.7		32.5	32.5	32.5	
Yellow Time (s)	3.6		3.5	3.6		3.6	3.6	3.6	
All-Red Time (s)	1.7		0.5	1.7		1.9	1.9	1.9	
Lost Time Adjust (s)	0.0			0.0			0.0	0.0	
Total Lost Time (s)	5.3			5.3			5.5	5.5	
Lead/Lag	Lag		Lead						
Lead-Lag Optimize?	Yes		Yes						
Walk Time (s)	4.0			4.0		4.0	4.0	4.0	
Flash Dont Walk (s)	11.0			9.0		13.0	13.0	13.0	
Pedestrian Calls (#/hr)	0			0		0	0	0	
Act Effect Green (s)	24.7			56.7			32.5	32.5	
Actuated g/C Ratio	0.25			0.57			0.32	0.32	
v/c Ratio	0.80			0.53			0.90	0.25	
Control Delay	23.5			1.7			44.9	12.4	

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour
9: Woodall WBFR & Akard WB On-Ramp & Akard

	→	↘	↙	←	↖	↗	↓	↘	
Lane Group	EBT	EBR	WBL	WBT	WBR	SBU	SBL	SBT	SBR
Queue Delay	35.7			0.5			53.6	1.5	
Total Delay	59.2			2.3			98.5	14.0	
LOS	E			A			F	B	
Approach Delay	59.2			2.3				68.7	
Approach LOS	E			A				E	
Queue Length 50th (ft)	93			2			358	74	
Queue Length 95th (ft)	127			2			#506	m116	
Internal Link Dist (ft)	142			199				136	
Turn Bay Length (ft)									
Base Capacity (vph)	1173			2213			575	1123	
Starvation Cap Reductn	294			559			292	654	
Spillback Cap Reductn	0			83			0	2	
Storage Cap Reductn	0			0			0	0	
Reduced v/c Ratio	1.07			0.70			1.82	0.60	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 21 (21%), Referenced to phase 2:EBT and 6:WBTL, Start of Yellow

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 38.9

Intersection LOS: D

Intersection Capacity Utilization 82.2%

ICU Level of Service E

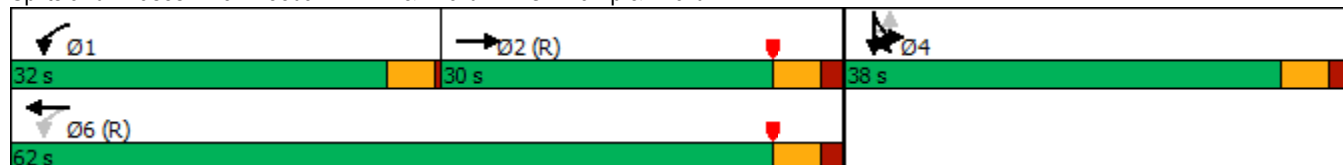
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Woodall WBFR & Akard WB On-Ramp & Akard



North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour

10: Woodall EBFR & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↑↑↑			↑↑↑				↑↑↑			
Traffic Volume (vph)	162	543	0	0	910	127	28	105	246	52	0	0
Future Volume (vph)	162	543	0	0	910	127	28	105	246	52	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	1.00	1.00	0.91	0.91	0.91	0.91	0.91	0.91	1.00	1.00
Ped Bike Factor		1.00			0.99				0.98			
Frt					0.982				0.982			0.850
Flt Protected		0.989							0.985			
Satd. Flow (prot)	0	5029	0	0	4947	0	0	0	4830	0	0	0
Flt Permitted		0.651							0.985			
Satd. Flow (perm)	0	3304	0	0	4947	0	0	0	4826	0	0	0
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)					31				24			141
Link Speed (mph)		30			30				26			30
Link Distance (ft)		279			374				181			248
Travel Time (s)		6.3			8.5				4.7			5.6
Confl. Peds. (#/hr)	35					35		1		56		
Peak Hour Factor	0.94	0.94	0.94	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.92
Adj. Flow (vph)	172	578	0	0	1011	141	31	117	273	58	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	750	0	0	1152	0	0	0	479	0	0	1
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	Left	Left
Median Width(ft)		0			0				0			0
Link Offset(ft)		0			0				-24			24
Crosswalk Width(ft)		16			16				16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	9	15		9	15	
Turn Type	pm+pt	NA			NA		Perm	Perm	NA			
Protected Phases	15	2			6				4			
Permitted Phases	2						4	4				
Minimum Split (s)	8.2	21.1			21.1		21.6	21.6	21.6			
Total Split (s)	22.0	69.0			47.0		31.0	31.0	31.0			
Total Split (%)	22.0%	69.0%			47.0%		31.0%	31.0%	31.0%			
Maximum Green (s)	16.8	63.9			41.9		25.4	25.4	25.4			
Yellow Time (s)	3.2	3.6			3.6		3.6	3.6	3.6			
All-Red Time (s)	2.0	1.5			1.5		2.0	2.0	2.0			
Lost Time Adjust (s)		0.0			0.0				0.0			
Total Lost Time (s)		5.1			5.1				5.6			
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		4.0			4.0		4.0	4.0	4.0			
Flash Dont Walk (s)		8.0			12.0		8.0	8.0	8.0			
Pedestrian Calls (#/hr)		0			0		0	0	0			
Act Effct Green (s)		63.9			41.9				25.4			0.0
Actuated g/C Ratio		0.64			0.42				0.25			0.00
v/c Ratio		0.31			0.55				0.39			0.01
Control Delay		6.0			18.2				30.3			0.0

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour

10: Woodall EBFR & Akard

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	1
Future Volume (vph)	1
Ideal Flow (vphpl)	1900
Lane Util. Factor	1.00
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	0.92
Adj. Flow (vph)	1
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Enter Blocked Intersection	No
Lane Alignment	Right
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	1.00
Turning Speed (mph)	9
Turn Type	
Protected Phases	
Permitted Phases	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Maximum Green (s)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour

10: Woodall EBFR & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Queue Delay		0.3			0.2				0.0			0.0
Total Delay		6.3			18.5				30.3			0.0
LOS		A			B				C			A
Approach Delay		6.3			18.5				30.3			
Approach LOS		A			B				C			
Queue Length 50th (ft)		22			126				87			0
Queue Length 95th (ft)		68			148				120			0
Internal Link Dist (ft)		199			294				101			168
Turn Bay Length (ft)												
Base Capacity (vph)		2402			2090				1243			141
Starvation Cap Reductn		988			314				0			0
Spillback Cap Reductn		0			0				30			0
Storage Cap Reductn		0			0				0			0
Reduced v/c Ratio		0.53			0.65				0.39			0.01

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 98 (98%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.55

Intersection Signal Delay: 17.0

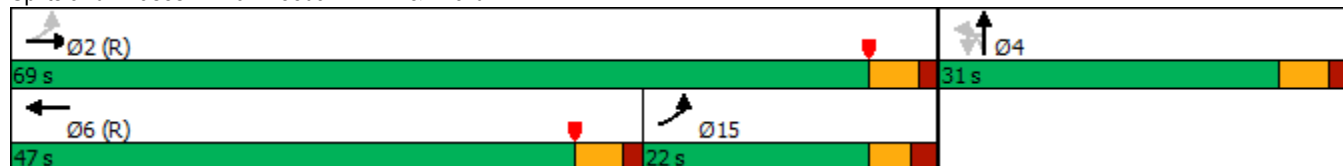
Intersection LOS: B

Intersection Capacity Utilization Err%

ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 10: Woodall EBFR & Akard





Lane Group	SBR
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour
11: Field /Field #11 #12 & Woodall WBFR

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations			↑↑↑↑	↑	↑	↑↑↑↑					↑	↑
Traffic Volume (vph)	2	0	1067	323	400	568	0	0	0	0	142	380
Future Volume (vph)	2	0	1067	323	400	568	0	0	0	0	142	380
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		150		200	0		0	0		0	0	
Storage Lanes		1		3	1		0	0		0	1	
Taper Length (ft)		25			25			25			25	
Lane Util. Factor	0.86	1.00	0.86	1.00	0.86	0.86	1.00	1.00	1.00	1.00	0.95	0.91
Ped Bike Factor				0.92	0.99	1.00						1.00
Frt				0.850								0.990
Flt Protected					0.950	0.987					0.950	0.998
Satd. Flow (prot)	0	0	6408	1583	1522	4743	0	0	0	0	1681	1668
Flt Permitted			0.931		0.107	0.672					0.950	0.998
Satd. Flow (perm)	0	0	5966	1453	170	3224	0	0	0	0	1681	1668
Right Turn on Red				Yes			Yes			Yes		
Satd. Flow (RTOR)				169								3
Link Speed (mph)			30			30			30			26
Link Distance (ft)			675			234			238			187
Travel Time (s)			15.3			5.3			5.4			4.9
Confl. Peds. (#/hr)				33	33							
Peak Hour Factor	0.86	0.86	0.86	0.86	0.84	0.84	0.84	0.92	0.92	0.92	0.95	0.95
Adj. Flow (vph)	2	0	1241	376	476	676	0	0	0	0	149	400
Shared Lane Traffic (%)					50%						10%	
Lane Group Flow (vph)	0	0	1243	376	238	914	0	0	0	0	134	445
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left
Median Width(ft)			20			20			12			12
Link Offset(ft)			0			0			-20			24
Crosswalk Width(ft)			16			16			16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15		9	15		9	15		9	15	
Turn Type	Perm		NA	Perm	pm+pt	NA					Split	NA
Protected Phases			2		3 11	2 3 11					4	4
Permitted Phases	2			2	11 2 3							
Minimum Split (s)	23.2		23.2	23.2							40.1	40.1
Total Split (s)	44.0		44.0	44.0							44.0	44.0
Total Split (%)	33.8%		33.8%	33.8%							33.8%	33.8%
Maximum Green (s)	38.8		38.8	38.8							37.9	37.9
Yellow Time (s)	5.2		5.2	5.2							6.1	6.1
All-Red Time (s)	0.0		0.0	0.0							0.0	0.0
Lost Time Adjust (s)			0.0	0.0							0.0	0.0
Total Lost Time (s)			5.2	5.2							6.1	6.1
Lead/Lag											Lag	Lag
Lead-Lag Optimize?											Yes	Yes
Walk Time (s)	4.0		4.0	4.0							4.0	4.0
Flash Dont Walk (s)	14.0		14.0	14.0							29.0	29.0
Pedestrian Calls (#/hr)	0		0	0							0	0
Act Effect Green (s)			38.8	38.8	78.0	75.6					37.9	37.9

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour
11: Field /Field #11 #12 & Woodall WBFR

Lane Group	SBR	Ø3	Ø5	Ø6	Ø8	Ø11
Lane Configurations						
Traffic Volume (vph)	287					
Future Volume (vph)	287					
Ideal Flow (vphpl)	1900					
Storage Length (ft)	0					
Storage Lanes	1					
Taper Length (ft)						
Lane Util. Factor	0.95					
Ped Bike Factor	0.94					
Frt	0.850					
Flt Protected						
Satd. Flow (prot)	1504					
Flt Permitted						
Satd. Flow (perm)	1416					
Right Turn on Red	Yes					
Satd. Flow (RTOR)	248					
Link Speed (mph)						
Link Distance (ft)						
Travel Time (s)						
Confl. Peds. (#/hr)	40					
Peak Hour Factor	0.95					
Adj. Flow (vph)	302					
Shared Lane Traffic (%)	10%					
Lane Group Flow (vph)	272					
Enter Blocked Intersection	No					
Lane Alignment	Right					
Median Width(ft)						
Link Offset(ft)						
Crosswalk Width(ft)						
Two way Left Turn Lane						
Headway Factor	1.00					
Turning Speed (mph)	9					
Turn Type	Perm					
Protected Phases		3	5	6	8	11
Permitted Phases	4					
Minimum Split (s)	40.1	8.0	8.0	21.9	31.0	8.0
Total Split (s)	44.0	9.0	35.0	42.0	53.0	33.0
Total Split (%)	33.8%	7%	27%	32%	41%	25%
Maximum Green (s)	37.9	5.0	30.0	36.6	47.0	29.0
Yellow Time (s)	6.1	3.5	5.0	5.4	6.0	3.5
All-Red Time (s)	0.0	0.5	0.0	0.0	0.0	0.5
Lost Time Adjust (s)	0.0					
Total Lost Time (s)	6.1					
Lead/Lag	Lag	Lead	Lead	Lag		
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		
Walk Time (s)	4.0			4.0	4.0	
Flash Dont Walk (s)	29.0			12.0	20.0	
Pedestrian Calls (#/hr)	0			0	0	
Act Effect Green (s)	37.9					

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour
11: Field /Field #11 #12 & Woodall WBFR

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Actuated g/C Ratio			0.30	0.30	0.60	0.58					0.29	0.29
v/c Ratio			0.70	0.68	0.48	0.40					0.27	0.91
Control Delay			29.1	16.4	5.5	3.5					37.3	68.5
Queue Delay			0.0	0.0	0.0	0.3					0.0	0.0
Total Delay			29.1	16.4	5.5	3.7					37.3	68.5
LOS			C	B	A	A					D	E
Approach Delay			26.1			4.1						44.4
Approach LOS			C			A						D
Queue Length 50th (ft)			292	176	13	18					91	395
Queue Length 95th (ft)			322	286	18	20					151	#617
Internal Link Dist (ft)			595			154			158			107
Turn Bay Length (ft)				200								
Base Capacity (vph)			1780	552	497	2304					490	488
Starvation Cap Reductn			0	0	0	695					0	0
Spillback Cap Reductn			0	0	0	0					0	0
Storage Cap Reductn			0	0	0	0					0	0
Reduced v/c Ratio			0.70	0.68	0.48	0.57					0.27	0.91

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 72 (55%), Referenced to phase 2:EBWB, Start of Yellow

Natural Cycle: 80

Control Type: Pretimed

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 23.4

Intersection LOS: C

Intersection Capacity Utilization 78.5%

ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 11: Field /Field #11 #12 & Woodall WBFR

#11  Ø2 (R)	#11  Ø11	#11  Ø3	#11  Ø4
44 s	33 s	9 s	44 s
#12  Ø5	#12  Ø6	#12  Ø8	
35 s	42 s	53 s	

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour
11: Field /Field #11 #12 & Woodall WBFR

Lane Group	SBR	Ø3	Ø5	Ø6	Ø8	Ø11
Actuated g/C Ratio	0.29					
v/c Ratio	0.46					
Control Delay	8.6					
Queue Delay	0.0					
Total Delay	8.6					
LOS	A					
Approach Delay						
Approach LOS						
Queue Length 50th (ft)	15					
Queue Length 95th (ft)	93					
Internal Link Dist (ft)						
Turn Bay Length (ft)						
Base Capacity (vph)	588					
Starvation Cap Reductn	0					
Spillback Cap Reductn	0					
Storage Cap Reductn	0					
Reduced v/c Ratio	0.46					
Intersection Summary						

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour
12: Woodall EBFR & Field #11 #12 & Field EB On-Ramp

												
Lane Group	EBU	EBL2	EBL	EBT	WBU	WBT	WBR	WBR2	NBU	NBL	NBT	NBR
Lane Configurations				  		  					  	
Traffic Volume (vph)	1	0	313	919	3	877	175	174	123	83	759	86
Future Volume (vph)	1	0	313	919	3	877	175	174	123	83	759	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)			0				0			0		0
Storage Lanes			1				1			1		0
Taper Length (ft)			25							25		
Lane Util. Factor	0.91	1.00	0.91	0.91	0.91	0.91	1.00	0.91	0.91	0.86	0.86	0.91
Frt							0.850				0.985	
Flt Protected		0.950		0.987						0.950		
Satd. Flow (prot)	0	1770	0	5019	0	5085	1583	0	0	1522	4734	0
Flt Permitted		0.078		0.666		0.935				0.950		
Satd. Flow (perm)	0	145	0	3387	0	4755	1583	0	0	1522	4734	0
Right Turn on Red								Yes				Yes
Satd. Flow (RTOR)							102				15	
Link Speed (mph)				30		30					30	
Link Distance (ft)				234		419					191	
Travel Time (s)				5.3		9.5					4.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	0	340	999	3	953	190	189	134	90	825	93
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	0	1	0	1339	0	956	379	0	0	215	927	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Left	R NA	Left	Right	Right	R NA	Left	Left	Right
Median Width(ft)				20		12					12	
Link Offset(ft)				0		12					-24	
Crosswalk Width(ft)				16		16					16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15	15		9		9	9	9	15		9
Turn Type	custom	pm+pt	pm+pt	NA	Perm	NA	Perm		Perm	Split	NA	
Protected Phases		5	5	5 6		6				8	8	
Permitted Phases	5	5 6	5 6		6		6		8			
Minimum Split (s)	8.0	8.0	8.0		21.9	21.9	21.9		31.0	31.0	31.0	
Total Split (s)	35.0	35.0	35.0		42.0	42.0	42.0		53.0	53.0	53.0	
Total Split (%)	26.9%	26.9%	26.9%		32.3%	32.3%	32.3%		40.8%	40.8%	40.8%	
Maximum Green (s)	30.0	30.0	30.0		36.6	36.6	36.6		47.0	47.0	47.0	
Yellow Time (s)	5.0	5.0	5.0		5.4	5.4	5.4		6.0	6.0	6.0	
All-Red Time (s)	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	
Lost Time Adjust (s)		0.0				0.0	0.0			0.0	0.0	
Total Lost Time (s)		5.0				5.4	5.4			6.0	6.0	
Lead/Lag	Lead	Lead	Lead		Lag	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes	Yes					
Walk Time (s)					4.0	4.0	4.0		4.0	4.0	4.0	
Flash Dont Walk (s)					12.0	12.0	12.0		20.0	20.0	20.0	
Pedestrian Calls (#/hr)					0	0	0		0	0	0	
Act Effect Green (s)		72.0		67.0		36.6	36.6			47.0	47.0	
Actuated g/C Ratio		0.55		0.52		0.28	0.28			0.36	0.36	
v/c Ratio		0.01		0.63		0.71	0.73			0.39	0.54	

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour
12: Woodall EBFR & Field #11 #12 & Field EB On-Ramp

Lane Group	Ø2	Ø3	Ø4	Ø11
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Ideal Flow (vphpl)				
Storage Length (ft)				
Storage Lanes				
Taper Length (ft)				
Lane Util. Factor				
Frt				
Flt Protected				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (mph)				
Link Distance (ft)				
Travel Time (s)				
Peak Hour Factor				
Adj. Flow (vph)				
Shared Lane Traffic (%)				
Lane Group Flow (vph)				
Enter Blocked Intersection				
Lane Alignment				
Median Width(ft)				
Link Offset(ft)				
Crosswalk Width(ft)				
Two way Left Turn Lane				
Headway Factor				
Turning Speed (mph)				
Turn Type				
Protected Phases	2	3	4	11
Permitted Phases				
Minimum Split (s)	23.2	8.0	40.1	8.0
Total Split (s)	44.0	9.0	44.0	33.0
Total Split (%)	34%	7%	34%	25%
Maximum Green (s)	38.8	5.0	37.9	29.0
Yellow Time (s)	5.2	3.5	6.1	3.5
All-Red Time (s)	0.0	0.5	0.0	0.5
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag		Lead	Lag	
Lead-Lag Optimize?		Yes	Yes	
Walk Time (s)	4.0		4.0	
Flash Dont Walk (s)	14.0		29.0	
Pedestrian Calls (#/hr)	0		0	
Act Effect Green (s)				
Actuated g/C Ratio				
v/c Ratio				

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour
12: Woodall EBFR & Field #11 #12 & Field EB On-Ramp

												
Lane Group	EBU	EBL2	EBL	EBT	WBU	WBT	WBR	WBR2	NBU	NBL	NBT	NBR
Control Delay		3.0		7.2		40.5	34.3			33.5	33.7	
Queue Delay		0.0		0.9		0.7	1.6			0.0	0.0	
Total Delay		3.0		8.2		41.2	35.9			33.5	33.7	
LOS		A		A		D	D			C	C	
Approach Delay				8.2		39.7					33.7	
Approach LOS				A		D					C	
Queue Length 50th (ft)		0		67		289	245			155	234	
Queue Length 95th (ft)		m0		m117		328	156			240	282	
Internal Link Dist (ft)				154		339					111	
Turn Bay Length (ft)												
Base Capacity (vph)		80		2122		1338	518			550	1721	
Starvation Cap Reductn		0		466		134	44			0	0	
Spillback Cap Reductn		0		141		26	0			0	0	
Storage Cap Reductn		0		0		0	0			0	0	
Reduced v/c Ratio		0.01		0.81		0.79	0.80			0.39	0.54	

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 72 (55%), Referenced to phase 2:EBWB, Start of Yellow

Natural Cycle: 80

Control Type: Pretimed

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 26.8

Intersection LOS: C

Intersection Capacity Utilization 75.0%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: Woodall EBFR & Field #11 #12 & Field EB On-Ramp

#11  Ø2 (R)	#11  Ø11	#11  Ø3	#11  Ø4
44 s	33 s	9 s	44 s
#12  Ø5	#12  Ø6	#12  Ø8	
35 s	42 s	53 s	

Lane Group	Ø2	Ø3	Ø4	Ø11
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				
Queue Length 50th (ft)				
Queue Length 95th (ft)				
Internal Link Dist (ft)				
Turn Bay Length (ft)				
Base Capacity (vph)				
Starvation Cap Reductn				
Spillback Cap Reductn				
Storage Cap Reductn				
Reduced v/c Ratio				
Intersection Summary				

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour

13: Woodall WBFR & Harwood

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗↗			↖↖↖	
Traffic Volume (vph)	0	212	0	0	643	54
Future Volume (vph)	0	212	0	0	643	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.88	1.00	1.00	0.91	0.91
Ped Bike Factor		0.91			1.00	
Frt		0.850			0.988	
Flt Protected						
Satd. Flow (prot)	0	2787	0	0	5005	0
Flt Permitted						
Satd. Flow (perm)	0	2543	0	0	5005	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		192			34	
Link Speed (mph)	30			30	24	
Link Distance (ft)	246			202	260	
Travel Time (s)	5.6			4.6	7.4	
Confl. Peds. (#/hr)		82				41
Peak Hour Factor	0.82	0.82	0.92	0.92	0.94	0.94
Adj. Flow (vph)	0	259	0	0	684	57
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	259	0	0	741	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			12	-12	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Turn Type		Perm			NA	
Protected Phases					8	
Permitted Phases		6				
Minimum Split (s)		20.0			20.0	
Total Split (s)		24.0			26.0	
Total Split (%)		48.0%			52.0%	
Maximum Green (s)		20.0			22.0	
Yellow Time (s)		3.5			3.5	
All-Red Time (s)		0.5			0.5	
Lost Time Adjust (s)		0.0			0.0	
Total Lost Time (s)		4.0			4.0	
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)		5.0			5.0	
Flash Dont Walk (s)		11.0			11.0	
Pedestrian Calls (#/hr)		0			0	
Act Effct Green (s)		20.0			22.0	
Actuated g/C Ratio		0.40			0.44	
v/c Ratio		0.23			0.33	
Control Delay		1.8			9.0	

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour
13: Woodall WBFR & Harwood

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Queue Delay		0.0			0.0	
Total Delay		1.8			9.0	
LOS		A			A	
Approach Delay	1.8				9.0	
Approach LOS	A				A	
Queue Length 50th (ft)		0			61	
Queue Length 95th (ft)		0			70	
Internal Link Dist (ft)	166			122	180	
Turn Bay Length (ft)						
Base Capacity (vph)		1132			2221	
Starvation Cap Reductn		0			0	
Spillback Cap Reductn		0			0	
Storage Cap Reductn		0			0	
Reduced v/c Ratio		0.23			0.33	

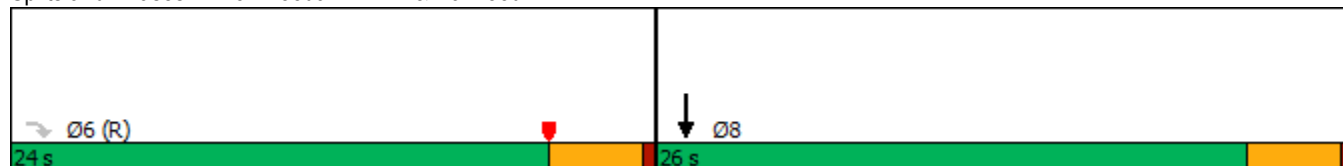
Intersection Summary

Area Type: Other
Cycle Length: 50
Actuated Cycle Length: 50
Offset: 1 (2%), Referenced to phase 6:EBR, Start of Yellow
Natural Cycle: 40
Control Type: Pretimed
Maximum v/c Ratio: 0.33
Intersection Signal Delay: 7.2
Intersection Capacity Utilization 33.9%
Analysis Period (min) 15

Intersection LOS: A

ICU Level of Service A

Splits and Phases: 13: Woodall WBFR & Harwood



North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour

14: Woodall EBFR & Harwood

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø2
Lane Configurations			↑↑↑				
Traffic Volume (vph)	0	0	746	129	0	0	
Future Volume (vph)	0	0	746	129	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	0.91	0.91	1.00	1.00	
Ped Bike Factor			0.99				
Frt			0.978				
Flt Protected							
Satd. Flow (prot)	0	0	4907	0	0	0	
Flt Permitted							
Satd. Flow (perm)	0	0	4907	0	0	0	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)			81				
Link Speed (mph)	30		26			30	
Link Distance (ft)	974		416			261	
Travel Time (s)	22.1		10.9			5.9	
Confl. Peds. (#/hr)				32			
Peak Hour Factor	0.92	0.92	0.96	0.96	0.92	0.92	
Adj. Flow (vph)	0	0	777	134	0	0	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	0	911	0	0	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Right	Left	Left	
Median Width(ft)	0		0			0	
Link Offset(ft)	24		0			0	
Crosswalk Width(ft)	16		16			16	
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9		9	15		
Turn Type			NA				
Protected Phases			4			2	
Permitted Phases							
Minimum Split (s)			20.9			21.0	
Total Split (s)			75.0			25.0	
Total Split (%)			75.0%			25%	
Maximum Green (s)			70.1			20.0	
Yellow Time (s)			3.6			3.6	
All-Red Time (s)			1.3			1.4	
Lost Time Adjust (s)			0.0				
Total Lost Time (s)			4.9				
Lead/Lag							
Lead-Lag Optimize?							
Walk Time (s)			4.0			4.0	
Flash Dont Walk (s)			8.0			8.0	
Pedestrian Calls (#/hr)			0			0	
Act Effect Green (s)			70.1				
Actuated g/C Ratio			0.70				
v/c Ratio			0.26				
Control Delay			2.4				

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour
14: Woodall EBFR & Harwood

							
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø2
Queue Delay			0.0				
Total Delay			2.4				
LOS			A				
Approach Delay			2.4				
Approach LOS			A				
Queue Length 50th (ft)			22				
Queue Length 95th (ft)			33				
Internal Link Dist (ft)	894		336			181	
Turn Bay Length (ft)							
Base Capacity (vph)			3464				
Starvation Cap Reductn			0				
Spillback Cap Reductn			240				
Storage Cap Reductn			0				
Reduced v/c Ratio			0.28				

Intersection Summary

Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 30 (30%), Referenced to phase 2:Ped, Start of Yellow	
Natural Cycle: 45	
Control Type: Pretimed	
Maximum v/c Ratio: 0.26	
Intersection Signal Delay: 2.4	Intersection LOS: A
Intersection Capacity Utilization 21.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 14: Woodall EBFR & Harwood



North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour

15: Woodall WBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑						↑↑↑	
Traffic Volume (vph)	0	0	0	273	545	0	0	0	0	0	452	111
Future Volume (vph)	0	0	0	273	545	0	0	0	0	0	452	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	0.91	0.91
Ped Bike Factor					0.92						0.96	
Frt											0.970	
Flt Protected					0.984							
Satd. Flow (prot)	0	0	0	0	5004	0	0	0	0	0	4712	0
Flt Permitted					0.984							
Satd. Flow (perm)	0	0	0	0	4612	0	0	0	0	0	4712	0
Right Turn on Red			Yes	Yes		Yes			Yes			Yes
Satd. Flow (RTOR)					176						71	
Link Speed (mph)		30			30			30			24	
Link Distance (ft)		836			267			260			433	
Travel Time (s)		19.0			6.1			5.9			12.3	
Confl. Peds. (#/hr)				94								88
Peak Hour Factor	0.92	0.92	0.92	0.97	0.97	0.97	0.92	0.92	0.92	0.82	0.82	0.82
Adj. Flow (vph)	0	0	0	281	562	0	0	0	0	0	551	135
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	843	0	0	0	0	0	686	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		20			-20			12			-12	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type				Perm	NA						NA	
Protected Phases					2						4	
Permitted Phases				2								
Minimum Split (s)				21.2	21.2						21.2	
Total Split (s)				54.0	54.0						46.0	
Total Split (%)				54.0%	54.0%						46.0%	
Maximum Green (s)				48.8	48.8						40.8	
Yellow Time (s)				3.6	3.6						3.6	
All-Red Time (s)				1.6	1.6						1.6	
Lost Time Adjust (s)					0.0						0.0	
Total Lost Time (s)					5.2						5.2	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)				4.0	4.0						4.0	
Flash Dont Walk (s)				8.0	8.0						8.0	
Pedestrian Calls (#/hr)				0	0						0	
Act Effect Green (s)					48.8						40.8	
Actuated g/C Ratio					0.49						0.41	
v/c Ratio					0.36						0.35	
Control Delay					2.0						18.1	

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour
15: Woodall WBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay					0.1						0.0	
Total Delay					2.1						18.1	
LOS					A						B	
Approach Delay					2.1						18.1	
Approach LOS					A						B	
Queue Length 50th (ft)					6						90	
Queue Length 95th (ft)					9						m94	
Internal Link Dist (ft)		756			187			180			353	
Turn Bay Length (ft)												
Base Capacity (vph)					2340						1964	
Starvation Cap Reductn					531						0	
Spillback Cap Reductn					0						0	
Storage Cap Reductn					0						0	
Reduced v/c Ratio					0.47						0.35	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 87 (87%), Referenced to phase 2:WBTL and 6:, Start of Yellow

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.36

Intersection Signal Delay: 9.3

Intersection LOS: A

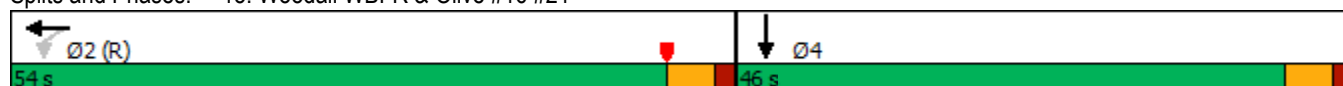
Intersection Capacity Utilization 37.1%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 15: Woodall WBFR & Olive #16 #21



North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour

16: Woodall EBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑	↑		↑↑↑				
Traffic Volume (vph)	0	0	0	0	778	347	53	670	0	0	0	0
Future Volume (vph)	0	0	0	0	778	347	53	670	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00
Ped Bike Factor						0.96		1.00				
Frt						0.850						
Flt Protected								0.996				
Satd. Flow (prot)	0	0	0	0	5085	1583	0	5065	0	0	0	0
Flt Permitted								0.996				
Satd. Flow (perm)	0	0	0	0	5085	1522	0	5043	0	0	0	0
Right Turn on Red			Yes			Yes	Yes		Yes			Yes
Satd. Flow (RTOR)						74		34				
Link Speed (mph)		30			30			26			30	
Link Distance (ft)		267			231			261			427	
Travel Time (s)		6.1			5.3			6.8			9.7	
Confl. Peds. (#/hr)						11	24					
Peak Hour Factor	0.92	0.92	0.92	0.96	0.96	0.96	0.90	0.90	0.90	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	810	361	59	744	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	810	361	0	803	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		20			-20			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type					NA	Perm	Perm	NA				
Protected Phases					2			4				
Permitted Phases						2	4					
Minimum Split (s)					22.1	22.1	21.1	21.1				
Total Split (s)					58.0	58.0	42.0	42.0				
Total Split (%)					58.0%	58.0%	42.0%	42.0%				
Maximum Green (s)					51.9	51.9	36.9	36.9				
Yellow Time (s)					3.6	3.6	3.6	3.6				
All-Red Time (s)					2.5	2.5	1.5	1.5				
Lost Time Adjust (s)					0.0	0.0		0.0				
Total Lost Time (s)					6.1	6.1		5.1				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)					4.0	4.0	4.0	4.0				
Flash Dont Walk (s)					8.0	8.0	8.0	8.0				
Pedestrian Calls (#/hr)					0	0	0	0				
Act Effct Green (s)					51.9	51.9		36.9				
Actuated g/C Ratio					0.52	0.52		0.37				
v/c Ratio					0.31	0.44		0.43				
Control Delay					14.2	13.6		31.0				

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour
16: Woodall EBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay					0.0	0.0		3.6				
Total Delay					14.2	13.6		34.6				
LOS					B	B		C				
Approach Delay					14.0			34.6				
Approach LOS					B			C				
Queue Length 50th (ft)					103	106		159				
Queue Length 95th (ft)					130	177		210				
Internal Link Dist (ft)		187			151			181			347	
Turn Bay Length (ft)												
Base Capacity (vph)					2639	825		1882				
Starvation Cap Reductn					0	0		963				
Spillback Cap Reductn					0	0		0				
Storage Cap Reductn					0	0		0				
Reduced v/c Ratio					0.31	0.44		0.87				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 85 (85%), Referenced to phase 2:WBT and 6:, Start of Yellow

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.44

Intersection Signal Delay: 22.4

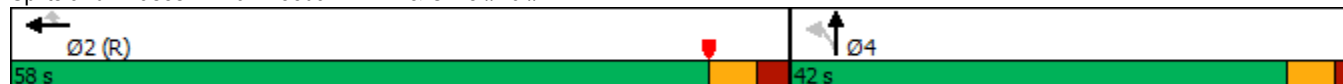
Intersection LOS: C

Intersection Capacity Utilization 46.0%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 16: Woodall EBFR & Olive #16 #21



North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour

17: Woodall WBFR & Pearl #17 #18

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations			↑↑↑↑	↑	↑	↑↑↑↑						↑↑↑↑
Traffic Volume (vph)	1	0	1474	168	151	839	0	0	0	0	84	261
Future Volume (vph)	1	0	1474	168	151	839	0	0	0	0	84	261
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		250		0	0		0	0		0	0	
Storage Lanes		1		1	1		0	0		0	0	
Taper Length (ft)		25			25			25			25	
Lane Util. Factor	0.91	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	0.91	0.91
Ped Bike Factor				0.95								0.90
Frt				0.850								0.936
Flt Protected					0.950							0.993
Satd. Flow (prot)	0	0	5085	1583	1770	5085	0	0	0	0	0	4243
Flt Permitted			0.940		0.089							0.993
Satd. Flow (perm)	0	0	4780	1504	166	5085	0	0	0	0	0	4243
Right Turn on Red				Yes			Yes			Yes		
Satd. Flow (RTOR)				171								162
Link Speed (mph)			30			30			30			30
Link Distance (ft)			1034			257			433			138
Travel Time (s)			23.5			5.8			9.8			3.1
Confl. Peds. (#/hr)				13	13							
Peak Hour Factor	0.98	0.98	0.98	0.98	0.92	0.92	0.92	0.92	0.92	0.92	0.78	0.78
Adj. Flow (vph)	1	0	1504	171	164	912	0	0	0	0	108	335
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	1505	171	164	912	0	0	0	0	0	776
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left
Median Width(ft)			12			12			0			0
Link Offset(ft)			0			0			0			0
Crosswalk Width(ft)			16			16			16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15		9	15		9	15		9	15	
Turn Type	Perm		NA	Perm	pm+pt	NA					Split	NA
Protected Phases			2		1 11	6					4	4
Permitted Phases	2			2	6							
Minimum Split (s)	21.1		21.1	21.1		28.1					22.0	22.0
Total Split (s)	40.0		40.0	40.0		78.0					22.0	22.0
Total Split (%)	40.0%		40.0%	40.0%		78.0%					22.0%	22.0%
Maximum Green (s)	34.9		34.9	34.9		72.9					16.0	16.0
Yellow Time (s)	3.6		3.6	3.6		3.6					3.9	3.9
All-Red Time (s)	1.5		1.5	1.5		1.5					2.1	2.1
Lost Time Adjust (s)			0.0	0.0		0.0						0.0
Total Lost Time (s)			5.1	5.1		5.1						6.0
Lead/Lag	Lag		Lag	Lag								
Lead-Lag Optimize?	Yes		Yes	Yes								
Walk Time (s)	4.0		4.0	4.0		4.0					4.0	4.0
Flash Dont Walk (s)	6.0		6.0	6.0		19.0					6.0	6.0
Pedestrian Calls (#/hr)	0		0	0		0					0	0
Act Effect Green (s)			34.9	34.9	73.0	72.9						16.0

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour

17: Woodall WBFR & Pearl #17 #18

Lane Group	SBR	Ø1	Ø11
Lane Configurations			
Traffic Volume (vph)	260		
Future Volume (vph)	260		
Ideal Flow (vphpl)	1900		
Storage Length (ft)	0		
Storage Lanes	0		
Taper Length (ft)			
Lane Util. Factor	0.91		
Ped Bike Factor			
Frt			
Flt Protected			
Satd. Flow (prot)	0		
Flt Permitted			
Satd. Flow (perm)	0		
Right Turn on Red	Yes		
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Peds. (#/hr)	77		
Peak Hour Factor	0.78		
Adj. Flow (vph)	333		
Shared Lane Traffic (%)			
Lane Group Flow (vph)	0		
Enter Blocked Intersection	No		
Lane Alignment	Right		
Median Width(ft)			
Link Offset(ft)			
Crosswalk Width(ft)			
Two way Left Turn Lane			
Headway Factor	1.00		
Turning Speed (mph)	9		
Turn Type			
Protected Phases	1	11	
Permitted Phases			
Minimum Split (s)	8.0	8.0	
Total Split (s)	20.0	18.0	
Total Split (%)	20%	18%	
Maximum Green (s)	15.0	14.0	
Yellow Time (s)	3.0	3.5	
All-Red Time (s)	2.0	0.5	
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead		
Lead-Lag Optimize?	Yes		
Walk Time (s)			
Flash Dont Walk (s)			
Pedestrian Calls (#/hr)			
Act Effect Green (s)			

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour
17: Woodall WBFR & Pearl #17 #18

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Actuated g/C Ratio			0.35	0.35	0.73	0.73						0.16
v/c Ratio			0.90	0.27	0.29	0.25						0.95
Control Delay			20.1	1.1	18.2	1.8						55.7
Queue Delay			0.0	0.0	1.9	0.3						0.0
Total Delay			20.1	1.1	20.0	2.2						55.7
LOS			C	A	C	A						E
Approach Delay			18.2			4.9						55.7
Approach LOS			B			A						E
Queue Length 50th (ft)			361	2	40	26						146
Queue Length 95th (ft)			m#431	m2	m89	26						#160
Internal Link Dist (ft)			954			177			353			58
Turn Bay Length (ft)												
Base Capacity (vph)			1668	636	570	3706						814
Starvation Cap Reductn			0	0	274	1976						0
Spillback Cap Reductn			0	0	0	0						0
Storage Cap Reductn			0	0	0	0						0
Reduced v/c Ratio			0.90	0.27	0.55	0.53						0.95

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 88 (88%), Referenced to phase 2:EBTU and 6:WBTL, Start of Yellow

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 22.4

Intersection LOS: C

Intersection Capacity Utilization 68.2%

ICU Level of Service C

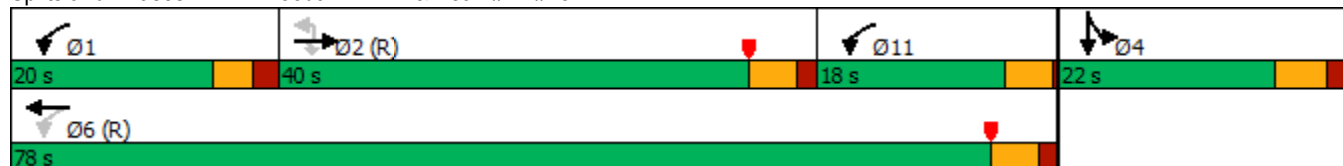
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 17: Woodall WBFR & Pearl #17 #18





Lane Group	SBR	Ø1	Ø11
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)			
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			
Intersection Summary			

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour

18: Woodall EBFR & Pearl #17 #18

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 			  			  				
Traffic Volume (vph)	625	1004	0	0	868	133	134	778	111	0	0	0
Future Volume (vph)	625	1004	0	0	868	133	134	778	111	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	250		0	0		0	0		0
Storage Lanes	2		0	1		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	1.00	0.91	1.00	0.91	0.91	0.91	1.00	1.00	1.00
Frt						0.850		0.984				
Flt Protected	0.950							0.993				
Satd. Flow (prot)	3433	3539	0	0	5085	1583	0	4969	0	0	0	0
Flt Permitted	0.179							0.993				
Satd. Flow (perm)	647	3539	0	0	5085	1583	0	4969	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						92		21				
Link Speed (mph)		30			30			26			30	
Link Distance (ft)		257			1016			427			143	
Travel Time (s)		5.8			23.1			11.2			3.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	679	1091	0	0	943	145	146	846	121	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	679	1091	0	0	943	145	0	1113	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			0			0	
Link Offset(ft)		0			0			-12			12	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA			NA	Perm	Perm	NA				
Protected Phases	15	2			6			4				
Permitted Phases	2					6	4					
Minimum Split (s)	8.0	21.4			27.0	27.0	23.1	23.1				
Total Split (s)	34.0	66.0			32.0	32.0	34.0	34.0				
Total Split (%)	34.0%	66.0%			32.0%	32.0%	34.0%	34.0%				
Maximum Green (s)	29.0	60.6			27.0	27.0	28.0	28.0				
Yellow Time (s)	3.0	3.6			3.6	3.6	3.6	3.6				
All-Red Time (s)	2.0	1.8			1.4	1.4	2.4	2.4				
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0				
Total Lost Time (s)	5.0	5.4			5.0	5.0		6.0				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		4.0			4.0	4.0	4.0	4.0				
Flash Dont Walk (s)		8.0			18.0	18.0	8.0	8.0				
Pedestrian Calls (#/hr)		0			0	0	0	0				
Act Effct Green (s)	61.0	60.6			27.0	27.0		28.0				
Actuated g/C Ratio	0.61	0.61			0.27	0.27		0.28				
v/c Ratio	0.56	0.51			0.69	0.29		0.79				

North Harwood Tower
Lanes, Volumes, Timings

Existing Conditions - PM Peak Hour

18: Woodall EBFR & Pearl #17 #18

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	5.2	2.0			35.8	13.6		24.5				
Queue Delay	0.0	0.5			0.0	0.0		0.0				
Total Delay	5.2	2.5			35.8	13.6		24.5				
LOS	A	A			D	B		C				
Approach Delay		3.5			32.8			24.5				
Approach LOS		A			C			C				
Queue Length 50th (ft)	36	33			197	26		267				
Queue Length 95th (ft)	m38	m37			245	76		323				
Internal Link Dist (ft)		177			936			347			63	
Turn Bay Length (ft)												
Base Capacity (vph)	1202	2144			1372	494		1406				
Starvation Cap Reductn	0	550			0	0		0				
Spillback Cap Reductn	0	0			0	0		0				
Storage Cap Reductn	0	0			0	0		0				
Reduced v/c Ratio	0.56	0.68			0.69	0.29		0.79				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 65 (65%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 17.4

Intersection LOS: B

Intersection Capacity Utilization 68.2%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Woodall EBFR & Pearl #17 #18



Intersection												
Int Delay, s/veh	1.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑↑								↑↑	↑		
Traffic Vol, veh/h	0	705	3	0	0	0	0	0	92	0	13	0
Future Vol, veh/h	0	705	3	0	0	0	0	0	92	0	13	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	0	-	-
Veh in Median Storage, #	-	0	-	-	16979	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	766	3	0	0	0	0	0	100	0	14	0

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	0	0	0	-	-	-	385	306	769
Stage 1	-	-	-	-	-	-	-	0	0
Stage 2	-	-	-	-	-	-	-	306	769
Critical Hdwy	5.34	-	-	-	-	-	7.14	6.44	6.54
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	6.74	5.54
Follow-up Hdwy	3.12	-	-	-	-	-	3.92	3.82	4.02
Pot Cap-1 Maneuver	-	-	-	0	0	0	524	638	330
Stage 1	-	-	-	0	0	-	-	-	0
Stage 2	-	-	-	0	0	-	622	409	0
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	-	-	524	516	330
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	516	330
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	503	409

Approach	EB	NB	SB
HCM Control Delay, s	0	13.5	0
HCM LOS		B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	524	-	-	-	-
HCM Lane V/C Ratio	0.191	-	-	-	-
HCM Control Delay (s)	13.5	0	-	-	0
HCM Lane LOS	B	A	-	-	A
HCM 95th %tile Q(veh)	0.7	-	-	-	-

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗			↑↑↑	
Traffic Vol, veh/h	0	5	0	0	850	3
Future Vol, veh/h	0	5	0	0	850	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	16974	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	5	0	0	924	3
Major/Minor	Minor2		Major2			
Conflicting Flow All	-	464	-	-	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.14	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.92	-	-	-	-
Pot Cap-1 Maneuver	0	466	-	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	466	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		SB			
HCM Control Delay, s	12.8		0			
HCM LOS	B					
Minor Lane/Major Mvmt	EBLn1	SBT	SBR			
Capacity (veh/h)	466	-	-			
HCM Lane V/C Ratio	0.012	-	-			
HCM Control Delay (s)	12.8	-	-			
HCM Lane LOS	B	-	-			
HCM 95th %tile Q(veh)	0	-	-			

North Harwood Tower
HCM 6th TWSC

Existing Conditions - PM Peak Hour
21: North Drive/South Drive & Harwood

Intersection												
Int Delay, s/veh	1.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔			↔			↔	
Traffic Vol, veh/h	4	180	5	0	53	2	1	0	6	27	0	9
Future Vol, veh/h	4	180	5	0	53	2	1	0	6	27	0	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	196	5	0	58	2	1	0	7	29	0	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	60	0	0	201	0	0	236	267	101	165	268	30
Stage 1	-	-	-	-	-	-	207	207	-	59	59	-
Stage 2	-	-	-	-	-	-	29	60	-	106	209	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1542	-	-	1368	-	-	699	638	935	784	637	1038
Stage 1	-	-	-	-	-	-	776	729	-	946	845	-
Stage 2	-	-	-	-	-	-	984	844	-	888	728	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1542	-	-	1368	-	-	691	636	935	777	635	1038
Mov Cap-2 Maneuver	-	-	-	-	-	-	691	636	-	777	635	-
Stage 1	-	-	-	-	-	-	774	727	-	943	845	-
Stage 2	-	-	-	-	-	-	975	844	-	879	726	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0	9.1	9.6
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	890	1542	-	-	1368	-	-	829
HCM Lane V/C Ratio	0.009	0.003	-	-	-	-	-	0.047
HCM Control Delay (s)	9.1	7.3	0	-	0	-	-	9.6
HCM Lane LOS	A	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.1

North Harwood Tower
HCM 6th TWSC

Existing Conditions - PM Peak Hour
22: Adjacent North Drive/Adjacent South Drive & Harwood

Intersection													
Int Delay, s/veh	2.5												
Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↔↔			↔↔			↔↔			↔↔	
Traffic Vol, veh/h	2	14	174	1	1	50	12	45	0	17	0	0	0
Future Vol, veh/h	2	14	174	1	1	50	12	45	0	17	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	15	189	1	1	54	13	49	0	18	0	0	0
Major/Minor	Major1			Major2			Minor1			Minor2			
Conflicting Flow All	67	67	0	0	190	0	0	253	293	95	192	287	34
Stage 1	-	-	-	-	-	-	-	224	224	-	63	63	-
Stage 2	-	-	-	-	-	-	-	29	69	-	129	224	-
Critical Hdwy	6.44	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.52	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1297	1533	-	-	1381	-	-	680	617	943	750	621	1032
Stage 1	-	-	-	-	-	-	-	758	717	-	941	842	-
Stage 2	-	-	-	-	-	-	-	984	837	-	861	717	-
Platoon blocked, %			-	-		-	-						
Mov Cap-1 Maneuver	1499	1499	-	-	1381	-	-	673	608	943	728	612	1032
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	673	608	-	728	612	-
Stage 1	-	-	-	-	-	-	-	748	708	-	929	841	-
Stage 2	-	-	-	-	-	-	-	983	836	-	833	708	-
Approach	EB			WB			NB			SB			
HCM Control Delay, s	0.7			0.1			10.4			0			
HCM LOS							B			A			
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1					
Capacity (veh/h)	730	1499	-	-	1381	-	-	-					
HCM Lane V/C Ratio	0.092	0.01	-	-	0.001	-	-	-					
HCM Control Delay (s)	10.4	7.4	0.1	-	7.6	0	-	0					
HCM Lane LOS	B	A	A	-	A	A	-	A					
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	-					



SynchroTM Output - 2022 Background Traffic

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background - AM Peak Hour

1: McKinney & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	83	160	34	11	102	4	1	31	160	56	6	81
Future Volume (vph)	83	160	34	11	102	4	1	31	160	56	6	81
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor	0.92	0.99			0.99				0.96			
Frt		0.974			0.995				0.966			
Flt Protected	0.950				0.995				0.994			
Satd. Flow (prot)	1770	1790	0	0	3492	0	0	0	3275	0	0	0
Flt Permitted	0.950				0.928				0.849			
Satd. Flow (perm)	1628	1790	0	0	3243	0	0	0	2782	0	0	0
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)		13			4				54			
Link Speed (mph)		30			30				30			
Link Distance (ft)		424			278				526			
Travel Time (s)		9.6			6.3				12.0			
Confl. Peds. (#/hr)	54		37	37		54		60		86		86
Peak Hour Factor	0.96	0.96	0.96	0.92	0.92	0.92	0.86	0.86	0.86	0.86	0.93	0.93
Adj. Flow (vph)	86	167	35	12	111	4	1	36	186	65	6	87
Shared Lane Traffic (%)												
Lane Group Flow (vph)	86	202	0	0	127	0	0	0	288	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	R NA	Left
Median Width(ft)		12			12				0			
Link Offset(ft)		0			0				0			
Crosswalk Width(ft)		16			16				16			
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	9	15		9	9	15
Turn Type	Prot	NA		Perm	NA		Perm	Perm	NA		Perm	Perm
Protected Phases	8!				4!				2			
Permitted Phases		8		4			2	2			6	6
Minimum Split (s)	23.4	23.4		23.4	23.4		23.4	23.4	23.4		23.4	23.4
Total Split (s)	46.0	46.0		46.0	46.0		54.0	54.0	54.0		54.0	54.0
Total Split (%)	46.0%	46.0%		46.0%	46.0%		54.0%	54.0%	54.0%		54.0%	54.0%
Maximum Green (s)	40.6	40.6		40.6	40.6		48.6	48.6	48.6		48.6	48.6
Yellow Time (s)	3.6	3.6		3.6	3.6		3.2	3.2	3.2		3.2	3.2
All-Red Time (s)	1.8	1.8		1.8	1.8		2.2	2.2	2.2		2.2	2.2
Lost Time Adjust (s)	-1.4	0.0			-1.4				-1.4			
Total Lost Time (s)	4.0	5.4			4.0				4.0			
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0		4.0	4.0
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		13.0	13.0	13.0		13.0	13.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0		0	0
Act Effect Green (s)	42.0	40.6			42.0				50.0			
Actuated g/C Ratio	0.42	0.41			0.42				0.50			
v/c Ratio	0.12	0.28			0.09				0.20			
Control Delay	12.6	13.7			15.5				4.0			

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background - AM Peak Hour

1: McKinney & Harwood

	↓	↙
Lane Group	SBT	SBR
Lane Configurations	4T	
Traffic Volume (vph)	254	143
Future Volume (vph)	254	143
Ideal Flow (vphpl)	1900	1900
Lane Util. Factor	0.95	0.95
Ped Bike Factor	0.95	
Frt	0.956	
Flt Protected	0.991	
Satd. Flow (prot)	3238	0
Flt Permitted	0.825	
Satd. Flow (perm)	2647	0
Right Turn on Red		Yes
Satd. Flow (RTOR)	92	
Link Speed (mph)	30	
Link Distance (ft)	348	
Travel Time (s)	7.9	
Confl. Peds. (#/hr)		60
Peak Hour Factor	0.93	0.93
Adj. Flow (vph)	273	154
Shared Lane Traffic (%)		
Lane Group Flow (vph)	520	0
Enter Blocked Intersection	No	No
Lane Alignment	Left	Right
Median Width(ft)	0	
Link Offset(ft)	0	
Crosswalk Width(ft)	16	
Two way Left Turn Lane		
Headway Factor	1.00	1.00
Turning Speed (mph)		9
Turn Type	NA	
Protected Phases	6	
Permitted Phases		
Minimum Split (s)	23.4	
Total Split (s)	54.0	
Total Split (%)	54.0%	
Maximum Green (s)	48.6	
Yellow Time (s)	3.2	
All-Red Time (s)	2.2	
Lost Time Adjust (s)	-1.4	
Total Lost Time (s)	4.0	
Lead/Lag		
Lead-Lag Optimize?		
Walk Time (s)	4.0	
Flash Dont Walk (s)	13.0	
Pedestrian Calls (#/hr)	0	
Act Effct Green (s)	50.0	
Actuated g/C Ratio	0.50	
v/c Ratio	0.38	
Control Delay	5.9	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background - AM Peak Hour

1: McKinney & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Queue Delay	0.0	0.0			0.0				0.0			
Total Delay	12.6	13.7			15.5				4.0			
LOS	B	B			B				A			
Approach Delay		13.4			15.5				4.0			
Approach LOS		B			B				A			
Queue Length 50th (ft)	16	36			28				18			
Queue Length 95th (ft)	32	63			53				17			
Internal Link Dist (ft)		344			198				446			
Turn Bay Length (ft)												
Base Capacity (vph)	743	734			1364				1418			
Starvation Cap Reductn	0	0			0				0			
Spillback Cap Reductn	0	0			0				0			
Storage Cap Reductn	0	0			0				0			
Reduced v/c Ratio	0.12	0.28			0.09				0.20			

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 38 (38%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.38

Intersection Signal Delay: 8.4

Intersection LOS: A

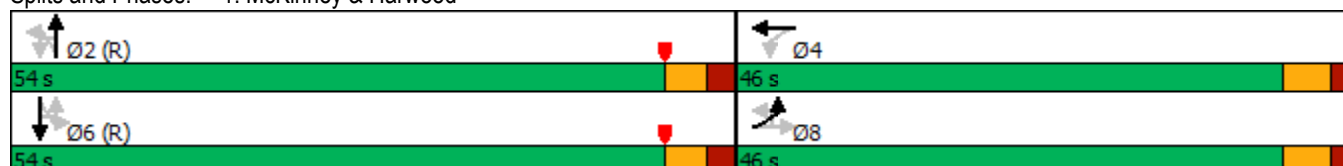
Intersection Capacity Utilization 55.8%

ICU Level of Service B

Analysis Period (min) 15

! Phase conflict between lane groups.

Splits and Phases: 1: McKinney & Harwood





Lane Group	SBT	SBR
Queue Delay	0.3	
Total Delay	6.3	
LOS	A	
Approach Delay	6.3	
Approach LOS	A	
Queue Length 50th (ft)	28	
Queue Length 95th (ft)	43	
Internal Link Dist (ft)	268	
Turn Bay Length (ft)		
Base Capacity (vph)	1369	
Starvation Cap Reductn	356	
Spillback Cap Reductn	0	
Storage Cap Reductn	0	
Reduced v/c Ratio	0.51	
Intersection Summary		

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background - AM Peak Hour
2: Cedar Springs & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	355	0	0	0	71	0	561	30	0	0	0
Future Volume (vph)	38	355	0	0	0	71	0	561	30	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	0.88	1.00	0.81	0.81	1.00	1.00	1.00
Ped Bike Factor		1.00				0.96		1.00				
Frt						0.850		0.992				
Flt Protected		0.995										
Satd. Flow (prot)	0	3522	0	0	0	2787	0	7465	0	0	0	0
Flt Permitted		0.995										
Satd. Flow (perm)	0	3511	0	0	0	2671	0	7465	0	0	0	0
Right Turn on Red	Yes		Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25				340		18				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		269			424			493			445	
Travel Time (s)		6.1			9.6			11.2			10.1	
Confl. Peds. (#/hr)	16		21	21		16	16		18	18		16
Peak Hour Factor	0.93	0.93	0.93	0.77	0.77	0.77	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	41	382	0	0	0	92	0	610	33	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	423	0	0	0	92	0	643	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			-24			24	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA				Perm		NA				
Protected Phases		4						2				
Permitted Phases	4					4						
Minimum Split (s)	21.4	21.4				21.4		21.3				
Total Split (s)	47.0	47.0				47.0		53.0				
Total Split (%)	47.0%	47.0%				47.0%		53.0%				
Maximum Green (s)	41.6	41.6				41.6		47.7				
Yellow Time (s)	3.6	3.6				3.6		3.6				
All-Red Time (s)	1.8	1.8				1.8		1.7				
Lost Time Adjust (s)		-1.4				-1.4		-1.3				
Total Lost Time (s)		4.0				4.0		4.0				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0	4.0				4.0		4.0				
Flash Dont Walk (s)	12.0	12.0				12.0		10.0				
Pedestrian Calls (#/hr)	0	0				0		0				
Act Effct Green (s)		43.0				43.0		49.0				
Actuated g/C Ratio		0.43				0.43		0.49				
v/c Ratio		0.28				0.07		0.18				
Control Delay		13.9				0.3		8.4				

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background - AM Peak Hour

2: Cedar Springs & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0				0.0		0.0				
Total Delay		13.9				0.3		8.4				
LOS		B				A		A				
Approach Delay		13.9			0.3			8.4				
Approach LOS		B			A			A				
Queue Length 50th (ft)		55				0		31				
Queue Length 95th (ft)		87				0		41				
Internal Link Dist (ft)		189			344			413			365	
Turn Bay Length (ft)												
Base Capacity (vph)		1523				1342		3667				
Starvation Cap Reductn		0				0		0				
Spillback Cap Reductn		0				0		0				
Storage Cap Reductn		0				0		0				
Reduced v/c Ratio		0.28				0.07		0.18				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 40 (40%), Referenced to phase 2:NBT, Start of Yellow

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.28

Intersection Signal Delay: 9.8

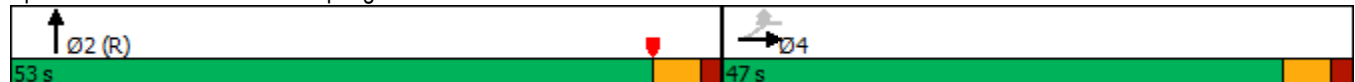
Intersection LOS: A

Intersection Capacity Utilization 42.9%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: Cedar Springs & Harwood



North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background - AM Peak Hour

3: McKinney & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	87	638	246	25	185	0	0	282	86
Future Volume (vph)	0	0	0	87	638	246	25	185	0	0	282	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor					0.98	0.94		0.99				0.96
Frt						0.850						0.965
Flt Protected					0.994			0.994				
Satd. Flow (prot)	0	0	0	0	3518	1583	0	3518	0	0	3276	0
Flt Permitted					0.994			0.872				
Satd. Flow (perm)	0	0	0	0	3461	1487	0	3057	0	0	3276	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						262						47
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		536			836			348			457	
Travel Time (s)		12.2			19.0			7.9			10.4	
Confl. Peds. (#/hr)				81		30	100					100
Peak Hour Factor	0.92	0.92	0.92	0.94	0.94	0.94	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	0	0	0	93	679	262	30	220	0	0	336	102
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	772	262	0	250	0	0	438	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		16			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type				Perm	NA	Perm	Perm	NA				NA
Protected Phases					4			2				2
Permitted Phases				4		4	2					
Minimum Split (s)				23.3	23.3	23.3	23.4	23.4				23.4
Total Split (s)				57.0	57.0	57.0	43.0	43.0				43.0
Total Split (%)				57.0%	57.0%	57.0%	43.0%	43.0%				43.0%
Maximum Green (s)				51.7	51.7	51.7	37.6	37.6				37.6
Yellow Time (s)				3.2	3.2	3.2	3.2	3.2				3.2
All-Red Time (s)				2.1	2.1	2.1	2.2	2.2				2.2
Lost Time Adjust (s)					-1.3	-1.3		-1.4				-1.4
Total Lost Time (s)					4.0	4.0		4.0				4.0
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)				4.0	4.0	4.0	4.0	4.0				4.0
Flash Dont Walk (s)				14.0	14.0	14.0	14.0	14.0				14.0
Pedestrian Calls (#/hr)				0	0	0	0	0				0
Act Effect Green (s)					53.0	53.0		39.0				39.0
Actuated g/C Ratio					0.53	0.53		0.39				0.39
v/c Ratio					0.42	0.29		0.21				0.34
Control Delay					9.4	0.9		27.2				7.9

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background - AM Peak Hour

3: McKinney & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay					0.0	0.0		0.0			0.0	
Total Delay					9.4	0.9		27.2			7.9	
LOS					A	A		C			A	
Approach Delay					7.2			27.2			7.9	
Approach LOS					A			C			A	
Queue Length 50th (ft)					105	2		63			26	
Queue Length 95th (ft)					122	6		86			40	
Internal Link Dist (ft)		456			756			268			377	
Turn Bay Length (ft)												
Base Capacity (vph)					1834	911		1192			1306	
Starvation Cap Reductn					0	0		0			0	
Spillback Cap Reductn					0	0		0			0	
Storage Cap Reductn					0	0		0			0	
Reduced v/c Ratio					0.42	0.29		0.21			0.34	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 19 (19%), Referenced to phase 2:NBSB and 6:, Start of Yellow

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.42

Intersection Signal Delay: 10.3

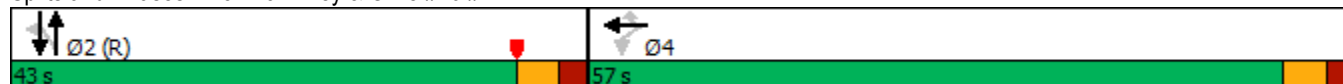
Intersection LOS: B

Intersection Capacity Utilization 51.5%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: McKinney & Olive #16 #21



North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background - AM Peak Hour
4: Cedar Springs & Akard & St Paul

										
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Lane Configurations										
Traffic Volume (vph)	5	643	1065	88	12	376	10	209	15	62
Future Volume (vph)	5	643	1065	88	12	376	10	209	15	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.97	0.91	0.91	1.00	1.00	0.88	0.97	1.00	1.00
Ped Bike Factor			1.00					0.98	0.97	
Frt			0.989				0.850		0.879	
Flt Protected		0.950			0.950			0.950		
Satd. Flow (prot)	0	3433	5013	0	1770	0	2787	3433	1582	0
Flt Permitted		0.108			0.950			0.950		
Satd. Flow (perm)	0	390	5013	0	1770	0	2787	3376	1582	0
Right Turn on Red				Yes						Yes
Satd. Flow (RTOR)			20						68	
Link Speed (mph)			30			30			30	
Link Distance (ft)			345			383			581	
Travel Time (s)			7.8			8.7			13.2	
Confl. Peds. (#/hr)		5		18				10		18
Peak Hour Factor	0.98	0.98	0.98	0.98	0.82	0.82	0.82	0.91	0.91	0.91
Adj. Flow (vph)	5	656	1087	90	15	459	12	230	16	68
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	661	1177	0	15	459	12	230	84	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)			0			0			24	
Link Offset(ft)			24			0			0	
Crosswalk Width(ft)			16			16			16	
Two way Left Turn Lane										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15		9	15		9	15		9
Turn Type	custom	Prot	NA		Prot	NA	Perm	Prot	NA	
Protected Phases		5			1	6		4		
Permitted Phases	5		2				6		4	
Minimum Split (s)	23.9	23.9	23.0		8.0	21.5	21.5	23.9	23.9	
Total Split (s)	41.0	41.0	57.0		15.0	31.0	31.0	28.0	28.0	
Total Split (%)	41.0%	41.0%	57.0%		15.0%	31.0%	31.0%	28.0%	28.0%	
Maximum Green (s)	35.1	35.1	52.0		11.0	25.5	25.5	22.1	22.1	
Yellow Time (s)	3.6	3.6	3.6		3.5	3.6	3.6	3.6	3.6	
All-Red Time (s)	2.3	2.3	1.4		0.5	1.9	1.9	2.3	2.3	
Lost Time Adjust (s)		-1.9	-1.0		0.0		-1.5	-1.9	-1.9	
Total Lost Time (s)		4.0	4.0		4.0		4.0	4.0	4.0	
Lead/Lag	Lead	Lead	Lag		Lead	Lag	Lag			
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes	Yes			
Walk Time (s)	4.0	4.0	4.0			4.0	4.0	4.0	4.0	
Flash Dont Walk (s)	14.0	14.0	14.0			8.0	8.0	14.0	14.0	
Pedestrian Calls (#/hr)	0	0	0			0	0	0	0	
Act Effect Green (s)		37.0	53.0		11.0	0.0	27.0	24.0	24.0	
Actuated g/C Ratio		0.37	0.53		0.11	0.00	0.27	0.24	0.24	
v/c Ratio		4.59	0.44		0.08	no cap	0.02	0.28	0.19	
Control Delay		1643.6	8.1		39.1		21.1	32.1	11.6	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background - AM Peak Hour
4: Cedar Springs & Akard & St Paul



Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Queue Delay		1.9	0.0		0.0		0.0	0.0	0.0	
Total Delay		1645.5	8.1		39.1	Error	21.1	32.1	11.6	
LOS		F	A		D	F	C	C	B	
Approach Delay			596.9			Err			26.6	
Approach LOS			F			F			C	
Queue Length 50th (ft)		~420	67		9	0	2	61	8	
Queue Length 95th (ft)		#533	87		26	0	m6	95	46	
Internal Link Dist (ft)			265			303			501	
Turn Bay Length (ft)										
Base Capacity (vph)		144	2666		194	1	752	823	431	
Starvation Cap Reductn		0	0		0	0	0	0	0	
Spillback Cap Reductn		13	0		0	0	0	0	7	
Storage Cap Reductn		0	0		0	0	0	0	0	
Reduced v/c Ratio		5.05	0.44		0.08	459.00	0.02	0.28	0.20	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow

Natural Cycle: 70

Control Type: Pretimed

Maximum v/c Ratio: Err

Intersection Signal Delay: Err

Intersection LOS: F

Intersection Capacity Utilization Err%

ICU Level of Service H

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

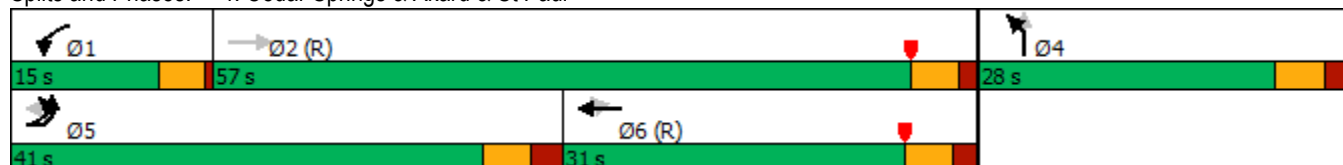
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Cedar Springs & Akard & St Paul



North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background - AM Peak Hour

5: McKinney & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	642	2	0	0	0	0	196	76	82	170	2
Future Volume (vph)	56	642	2	0	0	0	0	196	76	82	170	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor	0.98	1.00						0.98			0.99	
Frt								0.958			0.999	
Flt Protected	0.950										0.984	
Satd. Flow (prot)	1770	3539	0	0	0	0	0	3331	0	0	3477	0
Flt Permitted	0.950										0.762	
Satd. Flow (perm)	1734	3539	0	0	0	0	0	3331	0	0	2663	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)								64			1	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		323			197			264			526	
Travel Time (s)		7.3			4.5			6.0			12.0	
Confl. Peds. (#/hr)	10		10				33		33	33		33
Peak Hour Factor	0.89	0.89	0.89	0.92	0.92	0.92	0.96	0.96	0.96	0.89	0.89	0.89
Adj. Flow (vph)	63	721	2	0	0	0	0	204	79	92	191	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	63	723	0	0	0	0	0	283	0	0	285	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			24			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA						NA		Perm	NA	
Protected Phases	4							2			2	
Permitted Phases		4					2			2		
Minimum Split (s)	21.2	21.2					24.6	24.6		24.6	24.6	
Total Split (s)	38.0	38.0					41.0	41.0		41.0	41.0	
Total Split (%)	38.0%	38.0%					41.0%	41.0%		41.0%	41.0%	
Maximum Green (s)	33.1	33.1					35.6	35.6		35.6	35.6	
Yellow Time (s)	3.2	3.2					3.2	3.2		3.2	3.2	
All-Red Time (s)	1.7	1.7					2.2	2.2		2.2	2.2	
Lost Time Adjust (s)	-0.9	-0.9						-1.4			-1.4	
Total Lost Time (s)	4.0	4.0						4.0			4.0	
Lead/Lag	Lag	Lag										
Lead-Lag Optimize?	Yes	Yes										
Walk Time (s)	4.0	4.0					4.0	4.0		4.0	4.0	
Flash Dont Walk (s)	11.0	11.0					15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0					0	0		0	0	
Act Effct Green (s)	34.0	34.0						37.0			37.0	
Actuated g/C Ratio	0.34	0.34						0.37			0.37	
v/c Ratio	0.10	0.60						0.22			0.29	
Control Delay	16.6	24.0						16.0			15.5	

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Minimum Split (s)	9.5
Total Split (s)	21.0
Total Split (%)	21%
Maximum Green (s)	17.0
Yellow Time (s)	3.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background - AM Peak Hour

5: McKinney & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	45.6						0.0			0.0	
Total Delay	16.6	69.6						16.0			15.5	
LOS	B	E						B			B	
Approach Delay		65.4						16.0			15.5	
Approach LOS		E						B			B	
Queue Length 50th (ft)	31	257						61			68	
Queue Length 95th (ft)	m16	m82						98			87	
Internal Link Dist (ft)		243			117			184			446	
Turn Bay Length (ft)												
Base Capacity (vph)	601	1203						1272			985	
Starvation Cap Reductn	0	536						0			0	
Spillback Cap Reductn	0	0						0			0	
Storage Cap Reductn	0	0						0			0	
Reduced v/c Ratio	0.10	1.08						0.22			0.29	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 45 (45%), Referenced to phase 2:NBSB and 6:, Start of Yellow

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.60

Intersection Signal Delay: 44.6

Intersection LOS: D

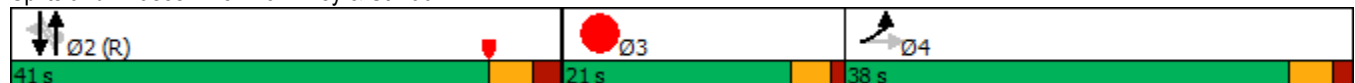
Intersection Capacity Utilization 59.5%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: McKinney & St Paul



Lane Group	Ø3
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background - AM Peak Hour

6: McKinney & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	982	29	8	427	253	5	10	10	87	52	31
Future Volume (vph)	11	982	29	8	427	253	5	10	10	87	52	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor		1.00			0.98			0.98			0.98	
Frt		0.996			0.945			0.940			0.973	
Flt Protected		0.999			0.999			0.990			0.975	
Satd. Flow (prot)	0	5048	0	0	4714	0	0	3251	0	0	3322	0
Flt Permitted		0.929			0.924			0.915			0.800	
Satd. Flow (perm)	0	4693	0	0	4360	0	0	2984	0	0	2698	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			224			12			31	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		383			222			432			264	
Travel Time (s)		8.7			5.0			9.8			6.0	
Confl. Peds. (#/hr)	19		37	37		19	30		13	13		30
Peak Hour Factor	0.92	0.92	0.92	0.89	0.89	0.89	0.82	0.82	0.82	0.83	0.83	0.83
Adj. Flow (vph)	12	1067	32	9	480	284	6	12	12	105	63	37
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1111	0	0	773	0	0	30	0	0	205	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			6			2	
Permitted Phases	4			4			6			2		
Minimum Split (s)	21.2	21.2		21.2	21.2		24.4	24.4		24.4	24.4	
Total Split (s)	57.0	57.0		57.0	57.0		43.0	43.0		43.0	43.0	
Total Split (%)	57.0%	57.0%		57.0%	57.0%		43.0%	43.0%		43.0%	43.0%	
Maximum Green (s)	51.8	51.8		51.8	51.8		37.6	37.6		37.6	37.6	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.6	1.6		1.6	1.6		2.4	2.4		2.4	2.4	
Lost Time Adjust (s)		-1.2			-1.2			-1.4			-1.4	
Total Lost Time (s)		4.0			4.0			4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)		53.0			53.0			39.0			39.0	
Actuated g/C Ratio		0.53			0.53			0.39			0.39	
v/c Ratio		0.45			0.32			0.03			0.19	
Control Delay		6.6			11.6			13.3			10.9	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background - AM Peak Hour

6: McKinney & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.4			2.0			0.0			0.0	
Total Delay		7.0			13.6			13.3			10.9	
LOS		A			B			B			B	
Approach Delay		7.0			13.6			13.3			10.9	
Approach LOS		A			B			B			B	
Queue Length 50th (ft)		97			78			3			59	
Queue Length 95th (ft)		113			104			11			82	
Internal Link Dist (ft)		303			142			352			184	
Turn Bay Length (ft)												
Base Capacity (vph)		2490			2416			1171			1071	
Starvation Cap Reductn		772			1444			0			0	
Spillback Cap Reductn		520			0			0			1	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.65			0.80			0.03			0.19	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 68 (68%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 9.9

Intersection LOS: A

Intersection Capacity Utilization 49.9%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: McKinney & Akard

 Ø2 (R)	
43 s	57 s
 Ø6 (R)	
43 s	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background - AM Peak Hour

7: Woodall WBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑									↑↑↑	
Traffic Volume (vph)	0	701	10	0	0	0	0	0	0	218	567	0
Future Volume (vph)	0	701	10	0	0	0	0	0	0	218	567	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00
Ped Bike Factor		1.00										
Frt		0.998										
Flt Protected											0.986	
Satd. Flow (prot)	0	5068	0	0	0	0	0	0	0	0	5014	0
Flt Permitted											0.986	
Satd. Flow (perm)	0	5068	0	0	0	0	0	0	0	0	5014	0
Right Turn on Red			Yes			Yes				Yes	No	No
Satd. Flow (RTOR)		2										
Link Speed (mph)		30			30			24			26	
Link Distance (ft)		183			58			216			216	
Travel Time (s)		4.2			1.3			6.1			5.7	
Confl. Peds. (#/hr)			34									
Peak Hour Factor	0.86	0.86	0.86	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	815	12	0	0	0	0	0	0	237	616	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	827	0	0	0	0	0	0	0	0	853	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		-24			24			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type		NA								Split	NA	
Protected Phases		2								4	4	
Permitted Phases												
Minimum Split (s)		21.6								21.3	21.3	
Total Split (s)		32.0								38.0	38.0	
Total Split (%)		32.0%								38.0%	38.0%	
Maximum Green (s)		26.4								32.7	32.7	
Yellow Time (s)		3.6								3.6	3.6	
All-Red Time (s)		2.0								1.7	1.7	
Lost Time Adjust (s)		-1.6									-1.3	
Total Lost Time (s)		4.0									4.0	
Lead/Lag		Lag										
Lead-Lag Optimize?		Yes										
Walk Time (s)		4.0								4.0	4.0	
Flash Dont Walk (s)		8.0								9.0	9.0	
Pedestrian Calls (#/hr)		0								0	0	
Act Effct Green (s)		28.0									34.0	
Actuated g/C Ratio		0.28									0.34	
v/c Ratio		0.58									0.50	
Control Delay		20.7									14.6	

Lane Group	Ø1
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	1
Permitted Phases	
Minimum Split (s)	21.3
Total Split (s)	30.0
Total Split (%)	30%
Maximum Green (s)	24.7
Yellow Time (s)	3.6
All-Red Time (s)	1.7
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background - AM Peak Hour

7: Woodall WBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.1									0.5	
Total Delay		20.7									15.1	
LOS		C									B	
Approach Delay		20.7									15.1	
Approach LOS		C									B	
Queue Length 50th (ft)		151									134	
Queue Length 95th (ft)		151									154	
Internal Link Dist (ft)		103			1			136			136	
Turn Bay Length (ft)												
Base Capacity (vph)		1420									1704	
Starvation Cap Reductn		0									0	
Spillback Cap Reductn		41									428	
Storage Cap Reductn		0									0	
Reduced v/c Ratio		0.60									0.67	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 14 (14%), Referenced to phase 2:EBT and 6:, Start of Yellow

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 17.9

Intersection LOS: B

Intersection Capacity Utilization 35.9%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 7: Woodall WBFR & St Paul



Lane Group	Ø1
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background - AM Peak Hour

8: Woodall EBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑						↑↑↑				
Traffic Volume (vph)	274	1033	1	0	0	0	0	601	162	0	0	0
Future Volume (vph)	274	1033	1	0	0	0	0	601	162	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	0.91	1.00	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00
Ped Bike Factor		0.96						0.96				
Frt								0.968				
Flt Protected		0.990										
Satd. Flow (prot)	0	5034	0	0	0	0	0	4735	0	0	0	0
Flt Permitted		0.990										
Satd. Flow (perm)	0	4829	0	0	0	0	0	4735	0	0	0	0
Right Turn on Red	Yes		Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		102						71				
Link Speed (mph)		30			30			26			30	
Link Distance (ft)		204			1246			248			416	
Travel Time (s)		4.6			28.3			6.5			9.5	
Confl. Peds. (#/hr)	78								91			
Peak Hour Factor	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95	0.92	0.92	0.92
Adj. Flow (vph)	288	1087	1	0	0	0	0	633	171	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1376	0	0	0	0	0	804	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		-24			24			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA						NA				
Protected Phases		2						4				
Permitted Phases	2											
Minimum Split (s)	21.0	21.0						21.8				
Total Split (s)	57.0	57.0						43.0				
Total Split (%)	57.0%	57.0%						43.0%				
Maximum Green (s)	52.0	52.0						37.2				
Yellow Time (s)	3.6	3.6						3.6				
All-Red Time (s)	1.4	1.4						2.2				
Lost Time Adjust (s)		-1.0						-1.8				
Total Lost Time (s)		4.0						4.0				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0	4.0						4.0				
Flash Dont Walk (s)	8.0	8.0						12.0				
Pedestrian Calls (#/hr)	0	0						0				
Act Effct Green (s)		53.0						39.0				
Actuated g/C Ratio		0.53						0.39				
v/c Ratio		0.53						0.43				
Control Delay		4.5						13.6				

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background - AM Peak Hour

8: Woodall EBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		1.1						0.7				
Total Delay		5.6						14.3				
LOS		A						B				
Approach Delay		5.6						14.3				
Approach LOS		A						B				
Queue Length 50th (ft)		35						91				
Queue Length 95th (ft)		42						74				
Internal Link Dist (ft)		124			1166			168			336	
Turn Bay Length (ft)												
Base Capacity (vph)		2607						1889				
Starvation Cap Reductn		910						696				
Spillback Cap Reductn		0						0				
Storage Cap Reductn		0						0				
Reduced v/c Ratio		0.81						0.67				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 40 (40%), Referenced to phase 2:EBTL and 6:, Start of Yellow

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.53

Intersection Signal Delay: 8.8

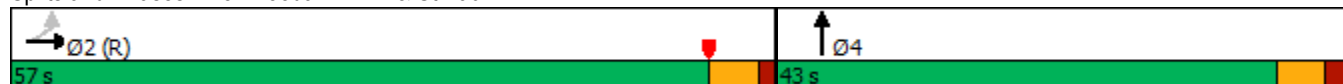
Intersection LOS: A

Intersection Capacity Utilization 48.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: Woodall EBFR & St Paul



North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background - AM Peak Hour
9: Woodall WBFR & Akard WB On-Ramp & Akard

	→	↗	↘	←	↖	↗	↘	↓	↙
Lane Group	EBT	EBR	WBL	WBT	WBR	SBU	SBL	SBT	SBR
Lane Configurations	↑↑↑			↑↑↑			↘	↑↑	
Traffic Volume (vph)	1000	66	35	24	604	153	129	222	87
Future Volume (vph)	1000	66	35	24	604	153	129	222	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.95	1.00	0.95	0.95
Ped Bike Factor	0.99			0.91			1.00		
Frt	0.991			0.863				0.958	
Flt Protected				0.997			0.950		
Satd. Flow (prot)	4999	0	0	3995	0	0	1770	3391	0
Flt Permitted				0.860			0.950		
Satd. Flow (perm)	4999	0	0	3446	0	0	1764	3391	0
Right Turn on Red					Yes				Yes
Satd. Flow (RTOR)				492				56	
Link Speed (mph)	30			30				30	
Link Distance (ft)	222			279				216	
Travel Time (s)	5.0			6.3				4.9	
Confl. Peds. (#/hr)		34	34		20		1		
Peak Hour Factor	0.93	0.93	0.86	0.86	0.86	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1075	71	41	28	702	161	136	234	92
Shared Lane Traffic (%)									
Lane Group Flow (vph)	1146	0	0	771	0	0	297	326	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Right	R NA	Left	Left	Right
Median Width(ft)	0			0				12	
Link Offset(ft)	0			0				0	
Crosswalk Width(ft)	16			16				16	
Two way Left Turn Lane									
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		9	9	15		9
Turn Type	NA		pm+pt	NA		Perm	Split	NA	
Protected Phases	2		1	6			4	4	
Permitted Phases			6			4			
Minimum Split (s)	21.3		8.0	21.3		22.5	22.5	22.5	
Total Split (s)	46.0		24.0	70.0		30.0	30.0	30.0	
Total Split (%)	46.0%		24.0%	70.0%		30.0%	30.0%	30.0%	
Maximum Green (s)	40.7		20.0	64.7		24.5	24.5	24.5	
Yellow Time (s)	3.6		3.5	3.6		3.6	3.6	3.6	
All-Red Time (s)	1.7		0.5	1.7		1.9	1.9	1.9	
Lost Time Adjust (s)	-1.3			-1.3			-1.5	-1.5	
Total Lost Time (s)	4.0			4.0			4.0	4.0	
Lead/Lag	Lag		Lead						
Lead-Lag Optimize?	Yes		Yes						
Walk Time (s)	4.0			4.0		4.0	4.0	4.0	
Flash Dont Walk (s)	11.0			9.0		13.0	13.0	13.0	
Pedestrian Calls (#/hr)	0			0		0	0	0	
Act Effect Green (s)	42.0			66.0			26.0	26.0	
Actuated g/C Ratio	0.42			0.66			0.26	0.26	
v/c Ratio	0.55			0.30			0.65	0.35	
Control Delay	14.2			2.4			14.8	5.7	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background - AM Peak Hour

9: Woodall WBFR & Akard WB On-Ramp & Akard

	→	↘	↙	←	↖	↗	↓	↘	
Lane Group	EBT	EBR	WBL	WBT	WBR	SBU	SBL	SBT	SBR
Queue Delay	0.3			0.2			0.8	0.5	
Total Delay	14.4			2.5			15.6	6.2	
LOS	B			A			B	A	
Approach Delay	14.4			2.5				10.7	
Approach LOS	B			A				B	
Queue Length 50th (ft)	256			16			155	55	
Queue Length 95th (ft)	304			24			257	70	
Internal Link Dist (ft)	142			199				136	
Turn Bay Length (ft)									
Base Capacity (vph)	2099			2551			458	923	
Starvation Cap Reductn	344			805			36	280	
Spillback Cap Reductn	0			0			0	0	
Storage Cap Reductn	0			0			0	0	
Reduced v/c Ratio	0.65			0.44			0.70	0.51	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 29 (29%), Referenced to phase 2:EBT and 6:WBTL, Start of Yellow

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 9.9

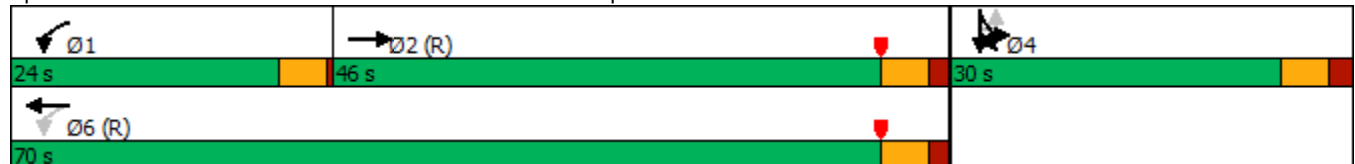
Intersection LOS: A

Intersection Capacity Utilization 63.2%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 9: Woodall WBFR & Akard WB On-Ramp & Akard



North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background - AM Peak Hour

10: Woodall EBFR & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↑↑↑			↑↑↑				↑↑↑			
Traffic Volume (vph)	221	957	0	0	470	76	6	177	465	47	0	0
Future Volume (vph)	221	957	0	0	470	76	6	177	465	47	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	1.00	1.00	0.91	0.91	0.91	0.91	0.91	0.91	1.00	1.00
Ped Bike Factor		1.00			0.99				0.98			
Frt					0.979				0.990			
Flt Protected		0.991							0.987			
Satd. Flow (prot)	0	5040	0	0	4936	0	0	0	4869	0	0	0
Flt Permitted		0.710							0.987			
Satd. Flow (perm)	0	3598	0	0	4936	0	0	0	4869	0	0	0
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)					37				11			
Link Speed (mph)		30			30				26			30
Link Distance (ft)		279			374				181			248
Travel Time (s)		6.3			8.5				4.7			5.6
Confl. Peds. (#/hr)	27		44	44		27				117		
Peak Hour Factor	0.91	0.91	0.91	0.88	0.88	0.88	0.95	0.95	0.95	0.95	0.92	0.92
Adj. Flow (vph)	243	1052	0	0	534	86	6	186	489	49	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1295	0	0	620	0	0	0	730	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	Left	Left
Median Width(ft)		0			0				0			0
Link Offset(ft)		0			0				-24			24
Crosswalk Width(ft)		16			16				16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	9	15		9	15	
Turn Type	pm+pt	NA			NA		Perm	Perm	NA			
Protected Phases	15	2			6				4			
Permitted Phases	2						4	4				
Minimum Split (s)	8.2	21.1			21.1		21.6	21.6	21.6			
Total Split (s)	23.0	67.0			44.0		33.0	33.0	33.0			
Total Split (%)	23.0%	67.0%			44.0%		33.0%	33.0%	33.0%			
Maximum Green (s)	17.8	61.9			38.9		27.4	27.4	27.4			
Yellow Time (s)	3.2	3.6			3.6		3.6	3.6	3.6			
All-Red Time (s)	2.0	1.5			1.5		2.0	2.0	2.0			
Lost Time Adjust (s)		-1.1			-1.1				-1.6			
Total Lost Time (s)		4.0			4.0				4.0			
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		4.0			4.0		4.0	4.0	4.0			
Flash Dont Walk (s)		8.0			12.0		8.0	8.0	8.0			
Pedestrian Calls (#/hr)		0			0		0	0	0			
Act Effct Green (s)		63.0			40.0				29.0			
Actuated g/C Ratio		0.63			0.40				0.29			
v/c Ratio		0.51			0.31				0.51			
Control Delay		4.9			16.2				30.7			

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	0
Future Volume (vph)	0
Ideal Flow (vphpl)	1900
Lane Util. Factor	1.00
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	0.92
Adj. Flow (vph)	0
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Enter Blocked Intersection	No
Lane Alignment	Right
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	1.00
Turning Speed (mph)	9
Turn Type	
Protected Phases	
Permitted Phases	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Maximum Green (s)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background - AM Peak Hour

10: Woodall EBFR & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Queue Delay		0.1			0.0				0.0			
Total Delay		4.9			16.2				30.7			
LOS		A			B				C			
Approach Delay		4.9			16.2				30.7			
Approach LOS		A			B				C			
Queue Length 50th (ft)		57			60				139			
Queue Length 95th (ft)		41			75				179			
Internal Link Dist (ft)		199			294				101			168
Turn Bay Length (ft)												
Base Capacity (vph)		2540			1996				1419			
Starvation Cap Reductn		176			0				0			
Spillback Cap Reductn		0			0				0			
Storage Cap Reductn		0			0				0			
Reduced v/c Ratio		0.55			0.31				0.51			

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 8 (8%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.51

Intersection Signal Delay: 14.7

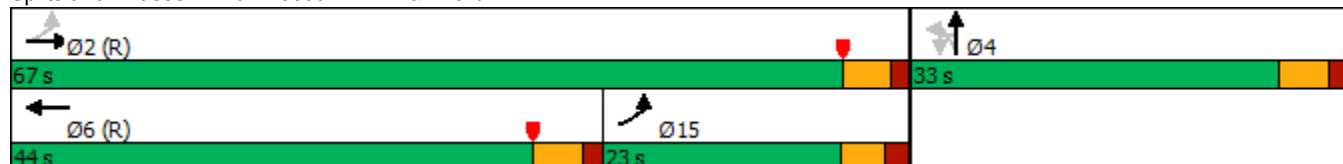
Intersection LOS: B

Intersection Capacity Utilization 60.5%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 10: Woodall EBFR & Akard





Lane Group	SBR
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background - AM Peak Hour

11: Field/Field #11 #12 & Woodall WBFR

												
Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↑↑↑	↗		↖	↗↑↑					↖	↗
Traffic Volume (vph)	0	724	171	2	108	763	0	0	0	0	211	412
Future Volume (vph)	0	724	171	2	108	763	0	0	0	0	211	412
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		200		0		0	0		0	0	
Storage Lanes	1		3		1		0	0		0	1	
Taper Length (ft)	25				25			25			25	
Lane Util. Factor	1.00	0.86	1.00	0.91	0.86	0.86	1.00	1.00	1.00	1.00	0.95	0.91
Ped Bike Factor			0.93		0.99	1.00						1.00
Frt			0.850									0.989
Flt Protected					0.950	0.999					0.950	0.998
Satd. Flow (prot)	0	6408	1583	0	1522	4801	0	0	0	0	1681	1670
Flt Permitted					0.199	0.940					0.950	0.998
Satd. Flow (perm)	0	6408	1477	0	315	4517	0	0	0	0	1681	1670
Right Turn on Red			Yes				Yes			Yes		
Satd. Flow (RTOR)			186									3
Link Speed (mph)		30				30			30			26
Link Distance (ft)		675				234			238			187
Travel Time (s)		15.3				5.3			5.4			4.9
Confl. Peds. (#/hr)			26		26							
Peak Hour Factor	0.92	0.92	0.92	0.91	0.91	0.91	0.91	0.92	0.92	0.92	0.96	0.96
Adj. Flow (vph)	0	787	186	2	119	838	0	0	0	0	220	429
Shared Lane Traffic (%)					10%						10%	
Lane Group Flow (vph)	0	787	186	0	109	850	0	0	0	0	198	485
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	R NA	Left	Left	Right	Left	Left	Right	Left	Left
Median Width(ft)		20				20			12			12
Link Offset(ft)		0				0			-20			24
Crosswalk Width(ft)		16				16			16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	9	15		9	15		9	15	
Turn Type		NA	Perm	custom	pm+pt	NA					Split	NA
Protected Phases		2			1	2 1					4 12	4 12
Permitted Phases			2	1	2 1							
Minimum Split (s)		23.2	23.2	8.0	8.0							
Total Split (s)		32.0	32.0	56.0	56.0							
Total Split (%)		24.6%	24.6%	43.1%	43.1%							
Maximum Green (s)		26.8	26.8	52.0	52.0							
Yellow Time (s)		5.2	5.2	3.5	3.5							
All-Red Time (s)		0.0	0.0	0.5	0.5							
Lost Time Adjust (s)		-1.2	-1.2		-1.0							
Total Lost Time (s)		4.0	4.0		3.0							
Lead/Lag		Lead	Lead	Lag	Lag							
Lead-Lag Optimize?		Yes	Yes	Yes	Yes							
Walk Time (s)		4.0	4.0									
Flash Dont Walk (s)		14.0	14.0									
Pedestrian Calls (#/hr)		0	0									
Act Effect Green (s)		28.0	28.0		82.0	79.6					38.0	38.0

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background - AM Peak Hour
11: Field/Field #11 #12 & Woodall WBFR

Lane Group	SBR	Ø4	Ø5	Ø6	Ø8	Ø12	Ø16
Lane Configurations							
Traffic Volume (vph)	327						
Future Volume (vph)	327						
Ideal Flow (vphpl)	1900						
Storage Length (ft)	0						
Storage Lanes	1						
Taper Length (ft)							
Lane Util. Factor	0.95						
Ped Bike Factor	0.97						
Frt	0.850						
Flt Protected							
Satd. Flow (prot)	1504						
Flt Permitted							
Satd. Flow (perm)	1460						
Right Turn on Red	Yes						
Satd. Flow (RTOR)	181						
Link Speed (mph)							
Link Distance (ft)							
Travel Time (s)							
Confl. Peds. (#/hr)	15						
Peak Hour Factor	0.96						
Adj. Flow (vph)	341						
Shared Lane Traffic (%)	10%						
Lane Group Flow (vph)	307						
Enter Blocked Intersection	No						
Lane Alignment	Right						
Median Width(ft)							
Link Offset(ft)							
Crosswalk Width(ft)							
Two way Left Turn Lane							
Headway Factor	1.00						
Turning Speed (mph)	9						
Turn Type	Perm						
Protected Phases		4	5	6	8	12	16
Permitted Phases	4 12						
Minimum Split (s)		40.1	8.0	21.9	31.0	6.0	6.0
Total Split (s)		36.0	62.0	34.0	28.0	6.0	6.0
Total Split (%)		28%	48%	26%	22%	5%	5%
Maximum Green (s)		29.9	57.0	28.6	22.0	1.0	1.0
Yellow Time (s)		6.1	5.0	5.4	6.0	5.0	5.0
All-Red Time (s)		0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)							
Total Lost Time (s)							
Lead/Lag		Lag	Lag	Lead	Lag	Lead	Lead
Lead-Lag Optimize?		Yes	Yes	Yes	Yes	Yes	Yes
Walk Time (s)		4.0		4.0	4.0		
Flash Dont Walk (s)		29.0		12.0	20.0		
Pedestrian Calls (#/hr)		0		0	0		
Act Effect Green (s)	38.0						

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background - AM Peak Hour
11: Field/Field #11 #12 & Woodall WBFR

												
Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Actuated g/C Ratio		0.22	0.22		0.63	0.61					0.29	0.29
v/c Ratio		0.57	0.40		0.16	0.30					0.40	0.99
Control Delay		24.3	10.4		1.9	2.9					39.9	83.9
Queue Delay		0.1	0.0		0.8	0.3					0.0	0.0
Total Delay		24.4	10.4		2.7	3.2					39.9	83.9
LOS		C	B		A	A					D	F
Approach Delay		21.7				3.1						55.1
Approach LOS		C				A						E
Queue Length 50th (ft)		178	84		6	17					141	446
Queue Length 95th (ft)		216	156		m9	20					218	#700
Internal Link Dist (ft)		595				154			158			107
Turn Bay Length (ft)			200									
Base Capacity (vph)		1380	464		690	2878					491	490
Starvation Cap Reductn		0	0		378	1304					0	0
Spillback Cap Reductn		68	0		0	0					0	0
Storage Cap Reductn		0	0		0	0					0	0
Reduced v/c Ratio		0.60	0.40		0.35	0.54					0.40	0.99

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 58 (45%), Referenced to phase 2:EBWB, Start of Yellow

Natural Cycle: 120

Control Type: Pretimed

Maximum v/c Ratio: 0.99

Intersection Signal Delay: 26.9

Intersection LOS: C

Intersection Capacity Utilization 67.4%

ICU Level of Service C

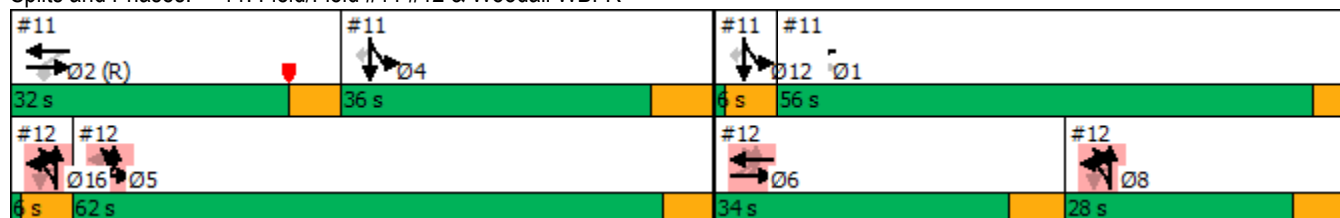
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: Field/Field #11 #12 & Woodall WBFR



Lane Group	SBR	Ø4	Ø5	Ø6	Ø8	Ø12	Ø16
Actuated g/C Ratio	0.29						
v/c Ratio	0.55						
Control Delay	19.5						
Queue Delay	0.0						
Total Delay	19.5						
LOS	B						
Approach Delay							
Approach LOS							
Queue Length 50th (ft)	90						
Queue Length 95th (ft)	192						
Internal Link Dist (ft)							
Turn Bay Length (ft)							
Base Capacity (vph)	554						
Starvation Cap Reductn	0						
Spillback Cap Reductn	0						
Storage Cap Reductn	0						
Reduced v/c Ratio	0.55						
Intersection Summary							

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background - AM Peak Hour
12: Woodall EBFR & Field #11 #12 & Field EB On-Ramp

												
Lane Group	EBU	EBL2	EBL	EBT	WBU	WBT	WBR	WBR2	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Volume (vph)	1	135	0	822	2	695	82	85	55	168	574	225
Future Volume (vph)	1	135	0	822	2	695	82	85	55	168	574	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)			0				0			0		0
Storage Lanes			1				1			1		0
Taper Length (ft)			25							25		
Lane Util. Factor	0.91	0.91	1.00	0.91	0.91	0.91	1.00	0.91	0.91	*0.80	0.86	0.91
Ped Bike Factor			1.00				0.97					
Frt							0.850				0.959	
Flt Protected			0.950							0.950	0.999	
Satd. Flow (prot)	0	0	1770	5085	0	5085	1583	0	0	1416	4604	0
Flt Permitted			0.170			0.938				0.950	0.999	
Satd. Flow (perm)	0	0	315	5085	0	4770	1530	0	0	1416	4604	0
Right Turn on Red								Yes				Yes
Satd. Flow (RTOR)							162				69	
Link Speed (mph)				30		30					30	
Link Distance (ft)				234		419					191	
Travel Time (s)				5.3		9.5					4.3	
Confl. Peds. (#/hr)		9					9					
Peak Hour Factor	0.92	0.92	0.92	0.92	0.89	0.89	0.89	0.89	0.87	0.87	0.87	0.87
Adj. Flow (vph)	1	147	0	893	2	781	92	96	63	193	660	259
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	0	0	148	893	0	783	188	0	0	237	938	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Left	R NA	Left	Right	Right	R NA	Left	Left	Right
Median Width(ft)				20		12					12	
Link Offset(ft)				0		12					-24	
Crosswalk Width(ft)				16		16					16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15	15		9		9	9	9	15		9
Turn Type	custom	pm+pt	pm+pt	NA	Perm	NA	Perm		Perm	Split	NA	
Protected Phases		5	5	5 6		6				8 16	8 16	
Permitted Phases	5	5 6	5 6		6		6		8 16			
Minimum Split (s)	8.0	8.0	8.0		21.9	21.9	21.9					
Total Split (s)	62.0	62.0	62.0		34.0	34.0	34.0					
Total Split (%)	47.7%	47.7%	47.7%		26.2%	26.2%	26.2%					
Maximum Green (s)	57.0	57.0	57.0		28.6	28.6	28.6					
Yellow Time (s)	5.0	5.0	5.0		5.4	5.4	5.4					
All-Red Time (s)	0.0	0.0	0.0		0.0	0.0	0.0					
Lost Time Adjust (s)			-1.0			-1.4	-1.4					
Total Lost Time (s)			4.0			4.0	4.0					
Lead/Lag	Lag	Lag	Lag		Lead	Lead	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes	Yes					
Walk Time (s)					4.0	4.0	4.0					
Flash Dont Walk (s)					12.0	12.0	12.0					
Pedestrian Calls (#/hr)					0	0	0					
Act Effect Green (s)			88.0	92.0		30.0	30.0			30.0	30.0	

Lane Group	Ø1	Ø2	Ø4	Ø8	Ø12	Ø16
Lane Configurations						
Traffic Volume (vph)						
Future Volume (vph)						
Ideal Flow (vphpl)						
Storage Length (ft)						
Storage Lanes						
Taper Length (ft)						
Lane Util. Factor						
Ped Bike Factor						
Frt						
Flt Protected						
Satd. Flow (prot)						
Flt Permitted						
Satd. Flow (perm)						
Right Turn on Red						
Satd. Flow (RTOR)						
Link Speed (mph)						
Link Distance (ft)						
Travel Time (s)						
Confl. Peds. (#/hr)						
Peak Hour Factor						
Adj. Flow (vph)						
Shared Lane Traffic (%)						
Lane Group Flow (vph)						
Enter Blocked Intersection						
Lane Alignment						
Median Width(ft)						
Link Offset(ft)						
Crosswalk Width(ft)						
Two way Left Turn Lane						
Headway Factor						
Turning Speed (mph)						
Turn Type						
Protected Phases	1	2	4	8	12	16
Permitted Phases						
Minimum Split (s)	8.0	23.2	40.1	31.0	6.0	6.0
Total Split (s)	56.0	32.0	36.0	28.0	6.0	6.0
Total Split (%)	43%	25%	28%	22%	5%	5%
Maximum Green (s)	52.0	26.8	29.9	22.0	1.0	1.0
Yellow Time (s)	3.5	5.2	6.1	6.0	5.0	5.0
All-Red Time (s)	0.5	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)						
Total Lost Time (s)						
Lead/Lag	Lag	Lead	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes
Walk Time (s)		4.0	4.0	4.0		
Flash Dont Walk (s)		14.0	29.0	20.0		
Pedestrian Calls (#/hr)		0	0	0		
Act Effect Green (s)						

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background - AM Peak Hour
12: Woodall EBFR & Field #11 #12 & Field EB On-Ramp

												
Lane Group	EBU	EBL2	EBL	EBT	WBU	WBT	WBR	WBR2	NBU	NBL	NBT	NBR
Actuated g/C Ratio			0.68	0.71		0.23	0.23			0.23	0.23	
v/c Ratio			0.17	0.25		0.71	0.39			0.73	0.84	
Control Delay			0.6	1.4		43.8	8.8			60.4	52.1	
Queue Delay			0.7	0.6		0.2	0.0			0.0	1.9	
Total Delay			1.3	2.0		43.9	8.8			60.4	54.0	
LOS			A	A		D	A			E	D	
Approach Delay				1.9		37.1					55.3	
Approach LOS				A		D					E	
Queue Length 50th (ft)			1	2		238	20			232	274	
Queue Length 95th (ft)			m2	m2		282	62			340	318	
Internal Link Dist (ft)				154		339					111	
Turn Bay Length (ft)												
Base Capacity (vph)			862	3598		1100	477			326	1115	
Starvation Cap Reductn			464	2175		0	0			0	0	
Spillback Cap Reductn			0	294		30	0			0	76	
Storage Cap Reductn			0	0		0	0			0	0	
Reduced v/c Ratio			0.37	0.63		0.73	0.39			0.73	0.90	

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 58 (45%), Referenced to phase 2:EBWB, Start of Yellow

Natural Cycle: 120

Control Type: Pretimed

Maximum v/c Ratio: 0.99

Intersection Signal Delay: 32.3

Intersection LOS: C

Intersection Capacity Utilization 54.8%

ICU Level of Service A

Analysis Period (min) 15

* User Entered Value

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: Woodall EBFR & Field #11 #12 & Field EB On-Ramp

 #11  #11  #11  #11  #11  #11  #11  #11  #11  #11  #11  #11  #11  #11  #11  #11  #11  #11  #11  #11  #11  #11  #11  #11  #11  #11  #11  #11  #11  #11  #11  #11  #11  #11  #11  #11  #11

Lane Group	Ø1	Ø2	Ø4	Ø8	Ø12	Ø16
Actuated g/C Ratio						
v/c Ratio						
Control Delay						
Queue Delay						
Total Delay						
LOS						
Approach Delay						
Approach LOS						
Queue Length 50th (ft)						
Queue Length 95th (ft)						
Internal Link Dist (ft)						
Turn Bay Length (ft)						
Base Capacity (vph)						
Starvation Cap Reductn						
Spillback Cap Reductn						
Storage Cap Reductn						
Reduced v/c Ratio						
Intersection Summary						

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background - AM Peak Hour

13: Woodall WBFR & Harwood

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↰↰			↱↱↱	
Traffic Volume (vph)	0	49	0	0	695	285
Future Volume (vph)	0	49	0	0	695	285
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.88	1.00	1.00	0.91	0.91
Ped Bike Factor		0.90			0.99	
Frt		0.850			0.956	
Flt Protected						
Satd. Flow (prot)	0	2787	0	0	4806	0
Flt Permitted						
Satd. Flow (perm)	0	2513	0	0	4806	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		269			176	
Link Speed (mph)	30			30	24	
Link Distance (ft)	242			217	260	
Travel Time (s)	5.5			4.9	7.4	
Confl. Peds. (#/hr)		47				15
Peak Hour Factor	0.77	0.77	0.92	0.92	0.83	0.83
Adj. Flow (vph)	0	64	0	0	837	343
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	64	0	0	1180	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			12	-12	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Turn Type		Perm			NA	
Protected Phases					4	
Permitted Phases		2				
Minimum Split (s)		20.0			20.0	
Total Split (s)		38.0			62.0	
Total Split (%)		38.0%			62.0%	
Maximum Green (s)		34.0			58.0	
Yellow Time (s)		3.5			3.5	
All-Red Time (s)		0.5			0.5	
Lost Time Adjust (s)		0.0			0.0	
Total Lost Time (s)		4.0			4.0	
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)		5.0			5.0	
Flash Dont Walk (s)		11.0			11.0	
Pedestrian Calls (#/hr)		0			0	
Act Effct Green (s)		34.0			58.0	
Actuated g/C Ratio		0.34			0.58	
v/c Ratio		0.06			0.41	
Control Delay		0.1			3.0	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background - AM Peak Hour

13: Woodall WBFR & Harwood

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Queue Delay		0.0			0.3	
Total Delay		0.1			3.3	
LOS		A			A	
Approach Delay	0.1				3.3	
Approach LOS	A				A	
Queue Length 50th (ft)		0			24	
Queue Length 95th (ft)		0			30	
Internal Link Dist (ft)	162			137	180	
Turn Bay Length (ft)						
Base Capacity (vph)		1031			2861	
Starvation Cap Reductn		0			915	
Spillback Cap Reductn		0			0	
Storage Cap Reductn		0			0	
Reduced v/c Ratio		0.06			0.61	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 91 (91%), Referenced to phase 2:EBR, Start of Yellow

Natural Cycle: 40

Control Type: Pretimed

Maximum v/c Ratio: 0.41

Intersection Signal Delay: 3.1

Intersection LOS: A

Intersection Capacity Utilization 40.2%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 13: Woodall WBFR & Harwood



North Harwood Tower
Lanes, Volumes, Timings

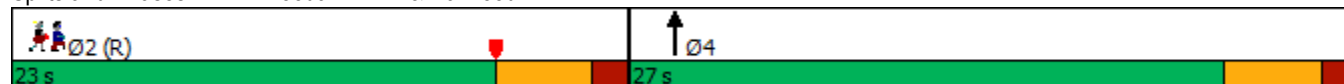
Phase 1 Background - AM Peak Hour

14: Woodall EBFR & Harwood

							
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø2
Lane Configurations			↑↑↑				
Traffic Volume (vph)	0	0	528	236	0	0	
Future Volume (vph)	0	0	528	236	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	0.91	0.91	1.00	1.00	
Ped Bike Factor			0.99				
Frt			0.954				
Flt Protected							
Satd. Flow (prot)	0	0	4802	0	0	0	
Flt Permitted							
Satd. Flow (perm)	0	0	4802	0	0	0	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)			265				
Link Speed (mph)	30		26			30	
Link Distance (ft)	974		416			261	
Travel Time (s)	22.1		10.9			5.9	
Confl. Peds. (#/hr)				17			
Peak Hour Factor	0.92	0.92	0.89	0.89	0.92	0.92	
Adj. Flow (vph)	0	0	593	265	0	0	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	0	858	0	0	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Right	Left	Left	
Median Width(ft)	0		0			0	
Link Offset(ft)	24		0			0	
Crosswalk Width(ft)	16		16			16	
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9		9	15		
Turn Type			NA				
Protected Phases			4			2	
Permitted Phases							
Minimum Split (s)			20.9			21.0	
Total Split (s)			27.0			23.0	
Total Split (%)			54.0%			46%	
Maximum Green (s)			22.1			18.0	
Yellow Time (s)			3.6			3.6	
All-Red Time (s)			1.3			1.4	
Lost Time Adjust (s)			-0.9				
Total Lost Time (s)			4.0				
Lead/Lag							
Lead-Lag Optimize?							
Walk Time (s)			4.0			4.0	
Flash Dont Walk (s)			8.0			8.0	
Pedestrian Calls (#/hr)			0			0	
Act Effect Green (s)			23.0				
Actuated g/C Ratio			0.46				
v/c Ratio			0.36				
Control Delay			12.1				

							
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø2
Queue Delay			0.0				
Total Delay			12.1				
LOS			B				
Approach Delay			12.1				
Approach LOS			B				
Queue Length 50th (ft)			80				
Queue Length 95th (ft)			109				
Internal Link Dist (ft)	894		336			181	
Turn Bay Length (ft)							
Base Capacity (vph)			2352				
Starvation Cap Reductn			0				
Spillback Cap Reductn			0				
Storage Cap Reductn			0				
Reduced v/c Ratio			0.36				
Intersection Summary							
Area Type:	Other						
Cycle Length: 50							
Actuated Cycle Length: 50							
Offset: 32 (64%), Referenced to phase 2:Ped, Start of Yellow							
Natural Cycle: 45							
Control Type: Pretimed							
Maximum v/c Ratio: 0.36							
Intersection Signal Delay: 12.1				Intersection LOS: B			
Intersection Capacity Utilization 19.3%				ICU Level of Service A			
Analysis Period (min) 15							

Splits and Phases: 14: Woodall EBFR & Harwood



North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background - AM Peak Hour

15: Woodall WBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑						↑↑↑	
Traffic Volume (vph)	0	0	0	185	755	0	0	0	0	0	802	335
Future Volume (vph)	0	0	0	185	755	0	0	0	0	0	802	335
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	0.91	0.91
Ped Bike Factor					0.97						0.97	
Frt											0.956	
Flt Protected					0.990							
Satd. Flow (prot)	0	0	0	0	5034	0	0	0	0	0	4708	0
Flt Permitted					0.990							
Satd. Flow (perm)	0	0	0	0	4896	0	0	0	0	0	4708	0
Right Turn on Red			Yes	Yes		Yes			Yes			Yes
Satd. Flow (RTOR)					54						122	
Link Speed (mph)		30			30			30			24	
Link Distance (ft)		836			267			260			433	
Travel Time (s)		19.0			6.1			5.9			12.3	
Confl. Peds. (#/hr)				56								39
Peak Hour Factor	0.92	0.92	0.92	0.91	0.91	0.91	0.92	0.92	0.92	0.85	0.85	0.85
Adj. Flow (vph)	0	0	0	203	830	0	0	0	0	0	944	394
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	1033	0	0	0	0	0	1338	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		20			-20			12			-12	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type				Perm	NA						NA	
Protected Phases					2						4	
Permitted Phases				2								
Minimum Split (s)				21.2	21.2						21.2	
Total Split (s)				54.0	54.0						46.0	
Total Split (%)				54.0%	54.0%						46.0%	
Maximum Green (s)				48.8	48.8						40.8	
Yellow Time (s)				3.6	3.6						3.6	
All-Red Time (s)				1.6	1.6						1.6	
Lost Time Adjust (s)					-1.2						-1.2	
Total Lost Time (s)					4.0						4.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)				4.0	4.0						4.0	
Flash Dont Walk (s)				8.0	8.0						8.0	
Pedestrian Calls (#/hr)				0	0						0	
Act Effect Green (s)					50.0						42.0	
Actuated g/C Ratio					0.50						0.42	
v/c Ratio					0.42						0.65	
Control Delay					6.2						22.9	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background - AM Peak Hour

15: Woodall WBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay					0.1						0.3	
Total Delay					6.3						23.2	
LOS					A						C	
Approach Delay					6.3						23.2	
Approach LOS					A						C	
Queue Length 50th (ft)					19						176	
Queue Length 95th (ft)					28						m179	
Internal Link Dist (ft)		756			187			180			353	
Turn Bay Length (ft)												
Base Capacity (vph)					2475						2048	
Starvation Cap Reductn					509						217	
Spillback Cap Reductn					0						0	
Storage Cap Reductn					0						0	
Reduced v/c Ratio					0.53						0.73	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 87 (87%), Referenced to phase 2:WBTL and 6:, Start of Yellow

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 15.8

Intersection LOS: B

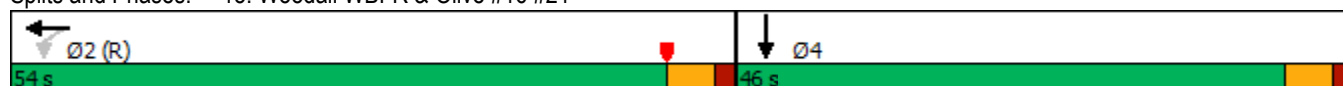
Intersection Capacity Utilization 49.0%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 15: Woodall WBFR & Olive #16 #21



North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background - AM Peak Hour

16: Woodall EBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑	↑		↑↑↑				
Traffic Volume (vph)	0	0	0	0	871	842	84	438	0	0	0	0
Future Volume (vph)	0	0	0	0	871	842	84	438	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00
Ped Bike Factor						0.95		0.99				
Frt						0.850						
Flt Protected								0.992				
Satd. Flow (prot)	0	0	0	0	5085	1583	0	5045	0	0	0	0
Flt Permitted								0.992				
Satd. Flow (perm)	0	0	0	0	5085	1510	0	5004	0	0	0	0
Right Turn on Red			Yes			Yes	Yes		Yes			Yes
Satd. Flow (RTOR)						168		46				
Link Speed (mph)		30			30			26			30	
Link Distance (ft)		267			231			261			427	
Travel Time (s)		6.1			5.3			6.8			9.7	
Confl. Peds. (#/hr)						14	20					
Peak Hour Factor	0.92	0.92	0.92	0.95	0.95	0.95	0.80	0.80	0.80	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	917	886	105	548	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	917	886	0	653	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		20			-20			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type					NA	Perm	Perm	NA				
Protected Phases					2			4				
Permitted Phases						2	4					
Minimum Split (s)					22.1	22.1	21.1	21.1				
Total Split (s)					57.5	57.5	42.5	42.5				
Total Split (%)					57.5%	57.5%	42.5%	42.5%				
Maximum Green (s)					51.4	51.4	37.4	37.4				
Yellow Time (s)					3.6	3.6	3.6	3.6				
All-Red Time (s)					2.5	2.5	1.5	1.5				
Lost Time Adjust (s)					-2.1	-2.1		-1.1				
Total Lost Time (s)					4.0	4.0		4.0				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)					4.0	4.0	4.0	4.0				
Flash Dont Walk (s)					8.0	8.0	8.0	8.0				
Pedestrian Calls (#/hr)					0	0	0	0				
Act Effct Green (s)					53.5	53.5		38.5				
Actuated g/C Ratio					0.54	0.54		0.38				
v/c Ratio					0.34	1.00		0.33				
Control Delay					13.6	50.9		14.6				

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background - AM Peak Hour
16: Woodall EBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay					0.0	2.7		0.6				
Total Delay					13.6	53.6		15.3				
LOS					B	D		B				
Approach Delay					33.3			15.3				
Approach LOS					C			B				
Queue Length 50th (ft)					115	~472		64				
Queue Length 95th (ft)					143	#776		67				
Internal Link Dist (ft)		187			151			181			347	
Turn Bay Length (ft)												
Base Capacity (vph)					2720	885		1954				
Starvation Cap Reductn					0	0		879				
Spillback Cap Reductn					0	9		273				
Storage Cap Reductn					0	0		0				
Reduced v/c Ratio					0.34	1.01		0.61				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 85 (85%), Referenced to phase 2:WBT and 6:, Start of Yellow

Natural Cycle: 70

Control Type: Pretimed

Maximum v/c Ratio: 1.00

Intersection Signal Delay: 28.5

Intersection LOS: C

Intersection Capacity Utilization 70.4%

ICU Level of Service C

Analysis Period (min) 15

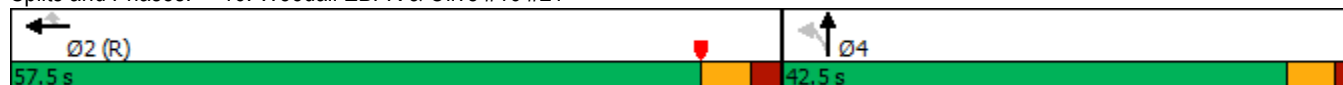
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 16: Woodall EBFR & Olive #16 #21



North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background - AM Peak Hour

17: Woodall WBFR & Pearl #17 #18

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations			↑↑↑	↑	↑	↑↑↑						↑↑↑
Traffic Volume (vph)	1	0	904	89	128	930	0	0	0	0	149	942
Future Volume (vph)	1	0	904	89	128	930	0	0	0	0	149	942
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		250		0	0		0	0		0	0	
Storage Lanes		1		1	1		0	0		0	0	
Taper Length (ft)		25			25			25			25	
Lane Util. Factor	0.91	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	0.91	0.91
Ped Bike Factor				0.98								0.93
Frt				0.850								0.943
Flt Protected					0.950							0.996
Satd. Flow (prot)	0	0	5085	1583	1770	5085	0	0	0	0	0	4453
Flt Permitted			0.939		0.159							0.996
Satd. Flow (perm)	0	0	4775	1546	296	5085	0	0	0	0	0	4453
Right Turn on Red				Yes			Yes			Yes		
Satd. Flow (RTOR)				102								78
Link Speed (mph)			30			30			30			30
Link Distance (ft)			1034			257			433			138
Travel Time (s)			23.5			5.8			9.8			3.1
Confl. Peds. (#/hr)				4	4							
Peak Hour Factor	0.87	0.87	0.87	0.87	0.94	0.94	0.94	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	0	1039	102	136	989	0	0	0	0	162	1024
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	1040	102	136	989	0	0	0	0	0	1921
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left
Median Width(ft)			12			12			0			0
Link Offset(ft)			0			0			0			0
Crosswalk Width(ft)			16			16			16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15		9	15		9	15		9	15	
Turn Type	Perm		NA	Perm	pm+pt	NA					Split	NA
Protected Phases			2		11	6 11					4	4
Permitted Phases	2			2	6 11							
Minimum Split (s)	21.1		21.1	21.1	8.0						22.0	22.0
Total Split (s)	36.0		36.0	36.0	18.0						46.0	46.0
Total Split (%)	36.0%		36.0%	36.0%	18.0%						46.0%	46.0%
Maximum Green (s)	30.9		30.9	30.9	14.0						40.0	40.0
Yellow Time (s)	3.6		3.6	3.6	3.5						3.9	3.9
All-Red Time (s)	1.5		1.5	1.5	0.5						2.1	2.1
Lost Time Adjust (s)			-1.1	-1.1	-1.0							-2.0
Total Lost Time (s)			4.0	4.0	3.0							4.0
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0		4.0	4.0							4.0	4.0
Flash Dont Walk (s)	6.0		6.0	6.0							6.0	6.0
Pedestrian Calls (#/hr)	0		0	0							0	0
Act Effect Green (s)			32.0	32.0	51.0	49.9						42.0

Lane Group	SBR	Ø6
Lane Configurations		
Traffic Volume (vph)	676	
Future Volume (vph)	676	
Ideal Flow (vphpl)	1900	
Storage Length (ft)	0	
Storage Lanes	0	
Taper Length (ft)		
Lane Util. Factor	0.91	
Ped Bike Factor		
Frt		
Flt Protected		
Satd. Flow (prot)	0	
Flt Permitted		
Satd. Flow (perm)	0	
Right Turn on Red	Yes	
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)	56	
Peak Hour Factor	0.92	
Adj. Flow (vph)	735	
Shared Lane Traffic (%)		
Lane Group Flow (vph)	0	
Enter Blocked Intersection	No	
Lane Alignment	Right	
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor	1.00	
Turning Speed (mph)	9	
Turn Type		
Protected Phases	6	
Permitted Phases		
Minimum Split (s)	21.1	
Total Split (s)	54.0	
Total Split (%)	54%	
Maximum Green (s)	48.9	
Yellow Time (s)	3.6	
All-Red Time (s)	1.5	
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Walk Time (s)	4.0	
Flash Dont Walk (s)	6.0	
Pedestrian Calls (#/hr)	0	
Act Effect Green (s)		

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background - AM Peak Hour

17: Woodall WBFR & Pearl #17 #18

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Actuated g/C Ratio			0.32	0.32	0.51	0.50						0.42
v/c Ratio			0.68	0.18	0.37	0.39						1.09dr
Control Delay			12.8	0.6	13.7	7.8						49.8
Queue Delay			0.0	0.0	0.0	0.1						0.0
Total Delay			12.8	0.6	13.7	7.9						49.8
LOS			B	A	B	A						D
Approach Delay			11.7			8.6						49.8
Approach LOS			B			A						D
Queue Length 50th (ft)			53	0	22	56						~429
Queue Length 95th (ft)			60	m0	m49	m66						#557
Internal Link Dist (ft)			954			177			353			58
Turn Bay Length (ft)												
Base Capacity (vph)			1528	564	372	2537						1915
Starvation Cap Reductn			0	0	0	430						0
Spillback Cap Reductn			0	0	0	0						0
Storage Cap Reductn			0	0	0	0						0
Reduced v/c Ratio			0.68	0.18	0.37	0.47						1.00

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 77 (77%), Referenced to phase 2:EBTU and 6:WBTL, Start of Yellow

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 1.00

Intersection Signal Delay: 28.4

Intersection LOS: C

Intersection Capacity Utilization 72.6%

ICU Level of Service C

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

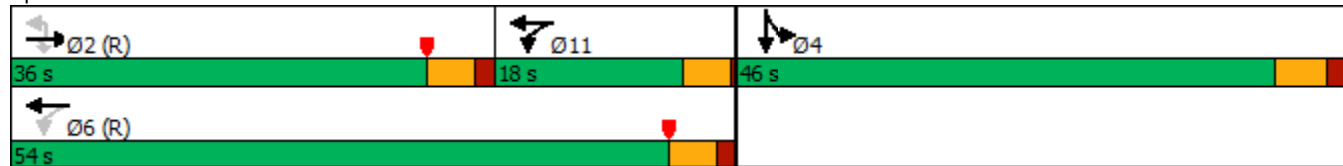
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 17: Woodall WBFR & Pearl #17 #18





Lane Group	SBR	Ø6
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background - AM Peak Hour

18: Woodall EBFR & Pearl #17 #18

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 			  			  				
Traffic Volume (vph)	298	765	0	0	883	54	186	715	368	0	0	0
Future Volume (vph)	298	765	0	0	883	54	186	715	368	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	250		0	0		0	0		0
Storage Lanes	2		0	1		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	1.00	0.91	1.00	0.91	0.91	0.91	1.00	1.00	1.00
Ped Bike Factor	0.98					0.87		0.98				
Frt						0.850		0.957				
Flt Protected	0.950							0.993				
Satd. Flow (prot)	3433	3539	0	0	5085	1583	0	4751	0	0	0	0
Flt Permitted	0.192							0.993				
Satd. Flow (perm)	678	3539	0	0	5085	1376	0	4751	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						87		105				
Link Speed (mph)		30			30			26			30	
Link Distance (ft)		257			1016			427			143	
Travel Time (s)		5.8			23.1			11.2			3.3	
Confl. Peds. (#/hr)	89					89			19			
Peak Hour Factor	0.89	0.89	0.89	0.96	0.96	0.96	0.91	0.91	0.91	0.92	0.92	0.92
Adj. Flow (vph)	335	860	0	0	920	56	204	786	404	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	335	860	0	0	920	56	0	1394	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			0			0	
Link Offset(ft)		0			0			-12			12	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA			NA	Perm	Perm	NA				
Protected Phases	5	2			6			4				
Permitted Phases	2					6	4					
Minimum Split (s)	8.0	21.4			27.0	27.0	23.1	23.1				
Total Split (s)	25.0	66.0			41.0	41.0	34.0	34.0				
Total Split (%)	25.0%	66.0%			41.0%	41.0%	34.0%	34.0%				
Maximum Green (s)	20.0	60.6			36.0	36.0	28.0	28.0				
Yellow Time (s)	3.0	3.6			3.6	3.6	3.6	3.6				
All-Red Time (s)	2.0	1.8			1.4	1.4	2.4	2.4				
Lost Time Adjust (s)	-1.0	-1.4			-1.0	-1.0		-2.0				
Total Lost Time (s)	4.0	4.0			4.0	4.0		4.0				
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Walk Time (s)		4.0			4.0	4.0	4.0	4.0				
Flash Dont Walk (s)		8.0			18.0	18.0	8.0	8.0				
Pedestrian Calls (#/hr)		0			0	0	0	0				
Act Effect Green (s)	62.0	62.0			37.0	37.0		30.0				

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background - AM Peak Hour

18: Woodall EBFR & Pearl #17 #18

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.62	0.62			0.37	0.37		0.30				
v/c Ratio	0.34	0.39			0.49	0.10		0.93				
Control Delay	11.2	1.8			25.3	2.3		35.9				
Queue Delay	0.3	0.2			0.0	0.0		0.3				
Total Delay	11.5	2.1			25.3	2.3		36.2				
LOS	B	A			C	A		D				
Approach Delay		4.7			24.0			36.2				
Approach LOS		A			C			D				
Queue Length 50th (ft)	31	24			163	0		320				
Queue Length 95th (ft)	m56	m28			202	12		m343				
Internal Link Dist (ft)		177			936			347			63	
Turn Bay Length (ft)												
Base Capacity (vph)	998	2194			1881	563		1498				
Starvation Cap Reductn	251	589			0	0		7				
Spillback Cap Reductn	0	0			0	0		0				
Storage Cap Reductn	0	0			0	0		0				
Reduced v/c Ratio	0.45	0.54			0.49	0.10		0.93				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 95 (95%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 22.3

Intersection LOS: C

Intersection Capacity Utilization 72.6%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Woodall EBFR & Pearl #17 #18



Intersection												
Int Delay, s/veh	0											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑							↑↑	↑		
Traffic Vol, veh/h	0	645	94	0	0	0	0	0	1	0	1	0
Future Vol, veh/h	0	645	94	0	0	0	0	0	1	0	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	0	-	-
Veh in Median Storage, #	-	0	-	-	16979	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	701	102	0	0	0	0	0	1	0	1	0

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	0	0	0	-	-	-	402	280	803
Stage 1	-	-	-	-	-	-	-	0	0
Stage 2	-	-	-	-	-	-	-	280	803
Critical Hdwy	5.34	-	-	-	-	-	7.14	6.44	6.54
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	6.74	5.54
Follow-up Hdwy	3.12	-	-	-	-	-	3.92	3.82	4.02
Pot Cap-1 Maneuver	-	-	-	0	0	0	511	660	315
Stage 1	-	-	-	0	0	-	-	-	0
Stage 2	-	-	-	0	0	-	645	394	0
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	-	-	511	659	315
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	659	315
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	644	394

Approach	EB	NB	SB
HCM Control Delay, s	0	12.1	0
HCM LOS		B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	511	-	-	-	-
HCM Lane V/C Ratio	0.002	-	-	-	-
HCM Control Delay (s)	12.1	0	-	-	0
HCM Lane LOS	B	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗			↑↑↑	
Traffic Vol, veh/h	0	2	0	0	741	4
Future Vol, veh/h	0	2	0	0	741	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	16974	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	2	0	0	805	4
Major/Minor	Minor2		Major2			
Conflicting Flow All	-	405	-	-	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.14	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.92	-	-	-	-
Pot Cap-1 Maneuver	0	509	-	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	509	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		SB			
HCM Control Delay, s	12.1		0			
HCM LOS	B					
Minor Lane/Major Mvmt	EBLn1	SBT	SBR			
Capacity (veh/h)	509	-	-			
HCM Lane V/C Ratio	0.004	-	-			
HCM Control Delay (s)	12.1	-	-			
HCM Lane LOS	B	-	-			
HCM 95th %tile Q(veh)	0	-	-			

Intersection												
Int Delay, s/veh	0.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔			↔↔			↕			↕		
Traffic Vol, veh/h	5	48	1	3	275	7	3	0	0	2	0	5
Future Vol, veh/h	5	48	1	3	275	7	3	0	0	2	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	52	1	3	299	8	3	0	0	2	0	5
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	307	0	0	53	0	0	219	376	27	345	372	154
Stage 1	-	-	-	-	-	-	63	63	-	309	309	-
Stage 2	-	-	-	-	-	-	156	313	-	36	63	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1250	-	-	1551	-	-	718	554	1042	585	557	864
Stage 1	-	-	-	-	-	-	941	842	-	676	658	-
Stage 2	-	-	-	-	-	-	831	656	-	975	842	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1250	-	-	1551	-	-	710	551	1042	582	554	864
Mov Cap-2 Maneuver	-	-	-	-	-	-	710	551	-	582	554	-
Stage 1	-	-	-	-	-	-	937	839	-	673	657	-
Stage 2	-	-	-	-	-	-	824	655	-	971	839	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.7			0.1			10.1			9.8		
HCM LOS							B			A		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	710	1250	-	-	1551	-	-	759				
HCM Lane V/C Ratio	0.005	0.004	-	-	0.002	-	-	0.01				
HCM Control Delay (s)	10.1	7.9	0	-	7.3	0	-	9.8				
HCM Lane LOS	B	A	A	-	A	A	-	A				
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0				

Intersection														
Int Delay, s/veh	2.7													
Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↕↕			↕↕				↕			↕	
Traffic Vol, veh/h	2	135	57	39	28	110	140	1	1	1	0	0	0	0
Future Vol, veh/h	2	135	57	39	28	110	140	1	1	1	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	-	None	-	-	None	-	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	-	0	-	-	0	-	-	-	0	-	-	0	-
Grade, %	-	-	0	-	-	0	-	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	147	62	42	30	120	152	1	1	1	0	0	0	0
Major/Minor	Major1			Major2			Minor1			Minor2				
Conflicting Flow All	272	272	0	0	104	0	0	0	501	713	52	586	658	136
Stage 1	-	-	-	-	-	-	-	0	381	381	-	256	256	-
Stage 2	-	-	-	-	-	-	-	0	120	332	-	330	402	-
Critical Hdwy	6.44	4.14	-	-	4.14	-	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.52	2.22	-	-	2.22	-	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	964	1288	-	-	1485	-	-	0	453	356	1005	394	383	888
Stage 1	-	-	-	-	-	-	-	0	613	612	-	726	694	-
Stage 2	-	-	-	-	-	-	-	0	872	643	-	657	599	-
Platoon blocked, %			-	-		-	-	-						
Mov Cap-1 Maneuver	1282	1282	-	-	1485	-	-	0	403	304	1005	349	327	888
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	0	403	304	-	349	327	-
Stage 1	-	-	-	-	-	-	-	0	537	536	-	636	677	-
Stage 2	-	-	-	-	-	-	-	0	851	628	-	574	525	-
Approach	EB			WB			NB			SB				
HCM Control Delay, s	4.9			0.8			15.4			0				
HCM LOS							C			A				
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1						
Capacity (veh/h)	347	1282	-	-	1485	-	-	-						
HCM Lane V/C Ratio	0.006	0.114	-	-	0.02	-	-	-						
HCM Control Delay (s)	15.4	8.2	0.2	-	7.5	0.1	-	0						
HCM Lane LOS	C	A	A	-	A	A	-	A						
HCM 95th %tile Q(veh)	0	0.4	-	-	0.1	-	-	-						

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour

1: McKinney & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	158	94	96	14	32	51	21	232	15	10	57	314
Future Volume (vph)	158	94	96	14	32	51	21	232	15	10	57	314
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor	0.93	0.94			0.94			0.99				0.97
Frt		0.924			0.921			0.992				0.978
Flt Protected	0.950				0.993			0.996				0.993
Satd. Flow (prot)	1770	1622	0	0	3081	0	0	3471	0	0	0	3374
Flt Permitted	0.950				0.899			0.916				0.835
Satd. Flow (perm)	1651	1622	0	0	2762	0	0	3182	0	0	0	2801
Right Turn on Red			Yes			Yes			Yes			
Satd. Flow (RTOR)		60			72			9				20
Link Speed (mph)		30			30			30				30
Link Distance (ft)		424			269			526				348
Travel Time (s)		9.6			6.1			12.0				7.9
Confl. Peds. (#/hr)	46		59	59		46	67		72		72	
Peak Hour Factor	0.80	0.80	0.80	0.71	0.71	0.71	0.92	0.92	0.92	0.84	0.84	0.84
Adj. Flow (vph)	198	118	120	20	45	72	23	252	16	12	68	374
Shared Lane Traffic (%)												
Lane Group Flow (vph)	198	238	0	0	137	0	0	291	0	0	0	530
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	R NA	Left	Left
Median Width(ft)		12			12			0				0
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	9	15	
Turn Type	Prot	NA		Perm	NA		pm+pt	NA		Perm	Perm	NA
Protected Phases	8!				4!		5	2				6
Permitted Phases		8		4			2			6	6	
Minimum Split (s)	23.4	23.4		23.4	23.4		8.0	23.4		23.4	23.4	23.4
Total Split (s)	44.0	44.0		44.0	44.0		19.0	56.0		37.0	37.0	37.0
Total Split (%)	44.0%	44.0%		44.0%	44.0%		19.0%	56.0%		37.0%	37.0%	37.0%
Maximum Green (s)	38.6	38.6		38.6	38.6		15.0	50.6		31.6	31.6	31.6
Yellow Time (s)	3.6	3.6		3.6	3.6		3.5	3.2		3.2	3.2	3.2
All-Red Time (s)	1.8	1.8		1.8	1.8		0.5	2.2		2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0			0.0			0.0				0.0
Total Lost Time (s)	5.4	5.4			5.4			5.4				5.4
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Walk Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	4.0
Flash Dont Walk (s)	13.0	13.0		13.0	13.0			13.0		13.0	13.0	13.0
Pedestrian Calls (#/hr)	0	0		0	0			0		0	0	0
Act Effect Green (s)	38.6	38.6			38.6			50.6				31.6
Actuated g/C Ratio	0.39	0.39			0.39			0.51				0.32
v/c Ratio	0.29	0.36			0.12			0.18				0.59
Control Delay	16.0	11.2			9.3			22.5				23.7

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	64
Future Volume (vph)	64
Ideal Flow (vphpl)	1900
Lane Util. Factor	0.95
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	67
Peak Hour Factor	0.84
Adj. Flow (vph)	76
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Enter Blocked Intersection	No
Lane Alignment	Right
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	1.00
Turning Speed (mph)	9
Turn Type	
Protected Phases	
Permitted Phases	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Maximum Green (s)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour

1: McKinney & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Queue Delay	0.0	0.0			0.0			0.0				0.3
Total Delay	16.0	11.2			9.3			22.5				24.0
LOS	B	B			A			C				C
Approach Delay		13.4			9.3			22.5				24.0
Approach LOS		B			A			C				C
Queue Length 50th (ft)	51	36			13			88				159
Queue Length 95th (ft)	72	58			22			129				197
Internal Link Dist (ft)		344			189			446				268
Turn Bay Length (ft)												
Base Capacity (vph)	683	662			1110			1653				898
Starvation Cap Reductn	0	0			0			0				69
Spillback Cap Reductn	0	0			0			0				0
Storage Cap Reductn	0	0			0			0				0
Reduced v/c Ratio	0.29	0.36			0.12			0.18				0.64

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 48 (48%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.59

Intersection Signal Delay: 18.9

Intersection LOS: B

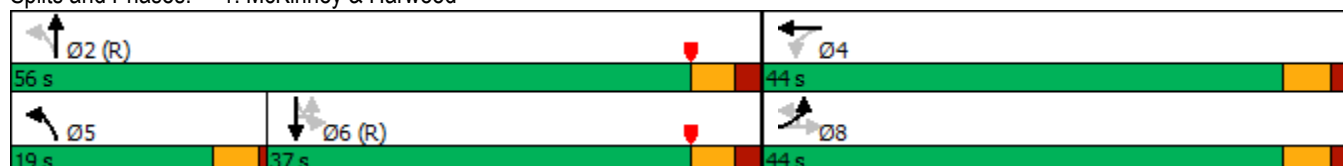
Intersection Capacity Utilization 59.5%

ICU Level of Service B

Analysis Period (min) 15

! Phase conflict between lane groups.

Splits and Phases: 1: McKinney & Harwood





Lane Group	SBR
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour

2: Cedar Springs & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	202	0	0	0	211	1	1069	23	0	0	0
Future Volume (vph)	68	202	0	0	0	211	1	1069	23	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	0.88	0.81	0.81	0.81	1.00	1.00	1.00
Ped Bike Factor		0.98				0.91		1.00				
Frt						0.850		0.997				
Flt Protected		0.988										
Satd. Flow (prot)	0	3497	0	0	0	2787	0	7505	0	0	0	0
Flt Permitted		0.988										
Satd. Flow (perm)	0	3429	0	0	0	2543	0	7504	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						62		6				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		269			424			493			445	
Travel Time (s)		6.1			9.6			11.2			10.1	
Confl. Peds. (#/hr)	41		44	44		41	34		44			
Peak Hour Factor	0.80	0.80	0.80	0.94	0.94	0.94	0.95	0.95	0.95	0.92	0.92	0.92
Adj. Flow (vph)	85	253	0	0	0	224	1	1125	24	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	338	0	0	0	224	0	1150	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			-24			24	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA				Perm	Perm	NA				
Protected Phases		4						2				
Permitted Phases	4					4	2					
Minimum Split (s)	21.4	21.4				21.4	21.3	21.3				
Total Split (s)	47.0	47.0				47.0	53.0	53.0				
Total Split (%)	47.0%	47.0%				47.0%	53.0%	53.0%				
Maximum Green (s)	41.6	41.6				41.6	47.7	47.7				
Yellow Time (s)	3.6	3.6				3.6	3.6	3.6				
All-Red Time (s)	1.8	1.8				1.8	1.7	1.7				
Lost Time Adjust (s)		0.0				0.0		0.0				
Total Lost Time (s)		5.4				5.4		5.3				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0	4.0				4.0	4.0	4.0				
Flash Dont Walk (s)	12.0	12.0				12.0	10.0	10.0				
Pedestrian Calls (#/hr)	0	0				0	0	0				
Act Effct Green (s)		41.6				41.6		47.7				
Actuated g/C Ratio		0.42				0.42		0.48				
v/c Ratio		0.24				0.20		0.32				
Control Delay		7.0				16.5		28.7				

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour

2: Cedar Springs & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0				0.0		0.0				
Total Delay		7.0				16.5		28.7				
LOS		A				B		C				
Approach Delay		7.0			16.5			28.7				
Approach LOS		A			B			C				
Queue Length 50th (ft)		13				47		190				
Queue Length 95th (ft)		25				77		m208				
Internal Link Dist (ft)		189			344			413			365	
Turn Bay Length (ft)												
Base Capacity (vph)		1426				1094		3582				
Starvation Cap Reductn		0				0		0				
Spillback Cap Reductn		0				0		0				
Storage Cap Reductn		0				0		0				
Reduced v/c Ratio		0.24				0.20		0.32				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 52 (52%), Referenced to phase 2:NBTL, Start of Yellow

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.32

Intersection Signal Delay: 22.8

Intersection LOS: C

Intersection Capacity Utilization 52.2%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Cedar Springs & Harwood



North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour

3: McKinney & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	0	0	0	72	684	329	1	36	370	0	0	259
Future Volume (vph)	0	0	0	72	684	329	1	36	370	0	0	259
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	0.95	1.00	1.00	0.95
Ped Bike Factor					0.99	0.95			0.99			0.96
Frt						0.850						0.959
Flt Protected					0.995				0.995			
Satd. Flow (prot)	0	0	0	0	3522	1583	0	0	3522	0	0	3252
Flt Permitted					0.995				0.881			
Satd. Flow (perm)	0	0	0	0	3472	1507	0	0	3096	0	0	3252
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)						165						63
Link Speed (mph)		30			30				30			30
Link Distance (ft)		536			836				348			457
Travel Time (s)		12.2			19.0				7.9			10.4
Confl. Peds. (#/hr)				88		22		86		69		
Peak Hour Factor	0.92	0.92	0.92	0.88	0.88	0.88	0.92	0.92	0.92	0.92	0.91	0.91
Adj. Flow (vph)	0	0	0	82	777	374	1	39	402	0	0	285
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	859	374	0	0	442	0	0	393
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	Left	Left
Median Width(ft)		0			0				0			0
Link Offset(ft)		16			0				0			0
Crosswalk Width(ft)		16			16				16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	9	15		9	15	
Turn Type				Perm	NA	Perm	Perm	Perm	NA			NA
Protected Phases					4				2			2
Permitted Phases				4		4	2	2				
Minimum Split (s)				23.3	23.3	23.3	23.4	23.4	23.4			23.4
Total Split (s)				57.0	57.0	57.0	43.0	43.0	43.0			43.0
Total Split (%)				57.0%	57.0%	57.0%	43.0%	43.0%	43.0%			43.0%
Maximum Green (s)				51.7	51.7	51.7	37.6	37.6	37.6			37.6
Yellow Time (s)				3.2	3.2	3.2	3.2	3.2	3.2			3.2
All-Red Time (s)				2.1	2.1	2.1	2.2	2.2	2.2			2.2
Lost Time Adjust (s)					0.0	0.0			0.0			0.0
Total Lost Time (s)					5.3	5.3			5.4			5.4
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)				4.0	4.0	4.0	4.0	4.0	4.0			4.0
Flash Dont Walk (s)				14.0	14.0	14.0	14.0	14.0	14.0			14.0
Pedestrian Calls (#/hr)				0	0	0	0	0	0			0
Act Effect Green (s)					51.7	51.7			37.6			37.6
Actuated g/C Ratio					0.52	0.52			0.38			0.38
v/c Ratio					0.48	0.44			0.38			0.31
Control Delay					12.5	5.9			25.1			17.8

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	98
Future Volume (vph)	98
Ideal Flow (vphpl)	1900
Lane Util. Factor	0.95
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	86
Peak Hour Factor	0.91
Adj. Flow (vph)	108
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Enter Blocked Intersection	No
Lane Alignment	Right
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	1.00
Turning Speed (mph)	9
Turn Type	
Protected Phases	
Permitted Phases	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Maximum Green (s)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour

3: McKinney & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Queue Delay					0.0	0.0			0.0			0.0
Total Delay					12.5	5.9			25.1			17.8
LOS					B	A			C			B
Approach Delay					10.5				25.1			17.8
Approach LOS					B				C			B
Queue Length 50th (ft)					116	35			146			96
Queue Length 95th (ft)					137	65			198			m132
Internal Link Dist (ft)		456			756				268			377
Turn Bay Length (ft)												
Base Capacity (vph)					1795	858			1164			1262
Starvation Cap Reductn					0	0			0			0
Spillback Cap Reductn					0	0			0			0
Storage Cap Reductn					0	0			0			0
Reduced v/c Ratio					0.48	0.44			0.38			0.31

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 47 (47%), Referenced to phase 2:NBSB and 6:, Start of Yellow

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.48

Intersection Signal Delay: 15.0

Intersection LOS: B

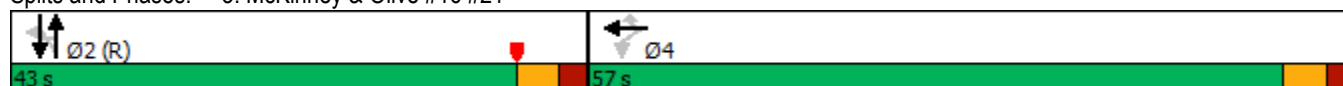
Intersection Capacity Utilization 64.4%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: McKinney & Olive #16 #21





Lane Group	SBR
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour

4: Cedar Springs & Akard /Akard & St Paul

										
Lane Group	EBU	EBL	EBT	EBR	WBL	WBR	WBR2	NBL	NBT	NBR
Lane Configurations										
Traffic Volume (vph)	16	713	828	122	24	756	7	312	33	87
Future Volume (vph)	16	713	828	122	24	756	7	312	33	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.97	0.91	0.91	1.00	0.88	1.00	0.97	1.00	1.00
Ped Bike Factor		0.99	0.98			0.89		0.95	0.97	
Frt			0.981			0.850			0.891	
Flt Protected		0.950			0.950			0.950		
Satd. Flow (prot)	0	3433	4913	0	1770	2787	0	3433	1602	0
Flt Permitted		0.950			0.950			0.950		
Satd. Flow (perm)	0	3385	4913	0	1770	2480	0	3250	1602	0
Right Turn on Red				Yes			Yes			Yes
Satd. Flow (RTOR)			49			96			95	
Link Speed (mph)			30						30	
Link Distance (ft)			385						581	
Travel Time (s)			8.8						13.2	
Confl. Peds. (#/hr)		14		58		14	26	32		22
Peak Hour Factor	0.97	0.97	0.97	0.97	0.93	0.93	0.93	0.92	0.92	0.92
Adj. Flow (vph)	16	735	854	126	26	813	8	339	36	95
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	751	980	0	26	821	0	339	131	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	Left	Right	Right	Left	Left	Right
Median Width(ft)			0						24	
Link Offset(ft)			24						0	
Crosswalk Width(ft)			16						16	
Two way Left Turn Lane										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15		9	15	9	9	15		9
Turn Type	custom	Prot	NA		Prot	Perm		Prot	NA	
Protected Phases		5			1			4		
Permitted Phases	5		2			6			4	
Minimum Split (s)	11.9	11.9	20.0		8.0	21.5		23.9	23.9	
Total Split (s)	36.0	36.0	64.0		10.0	38.0		26.0	26.0	
Total Split (%)	36.0%	36.0%	64.0%		10.0%	38.0%		26.0%	26.0%	
Maximum Green (s)	30.1	30.1	60.0		6.0	32.5		20.1	20.1	
Yellow Time (s)	3.6	3.6	3.5		3.5	3.6		3.6	3.6	
All-Red Time (s)	2.3	2.3	0.5		0.5	1.9		2.3	2.3	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.9	4.0		4.0	5.5		5.9	5.9	
Lead/Lag	Lag	Lag	Lag		Lead	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes				
Walk Time (s)			5.0			4.0		4.0	4.0	
Flash Dont Walk (s)			11.0			8.0		14.0	14.0	
Pedestrian Calls (#/hr)			0			0		0	0	
Act Effect Green (s)		30.1	60.0		6.0	32.5		20.1	20.1	
Actuated g/C Ratio		0.30	0.60		0.06	0.32		0.20	0.20	
v/c Ratio		0.74	0.33		0.25	0.94		0.49	0.33	
Control Delay		36.9	6.2		72.3	37.0		38.2	14.3	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour

4: Cedar Springs & Akard /Akard & St Paul



Lane Group	EBU	EBL	EBT	EBR	WBL	WBR	WBR2	NBL	NBT	NBR
Queue Delay		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay		36.9	6.2		72.3	37.0		38.2	14.3	
LOS		D	A		E	D		D	B	
Approach Delay			19.5						31.6	
Approach LOS			B						C	
Queue Length 50th (ft)		263	109		16	260		99	19	
Queue Length 95th (ft)		324	128		m40	#198		143	70	
Internal Link Dist (ft)			305						501	
Turn Bay Length (ft)										
Base Capacity (vph)		1018	2967		106	870		690	397	
Starvation Cap Reductn		0	0		0	0		0	0	
Spillback Cap Reductn		0	0		0	0		0	0	
Storage Cap Reductn		0	0		0	0		0	0	
Reduced v/c Ratio		0.74	0.33		0.25	0.94		0.49	0.33	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBR, Start of Yellow

Natural Cycle: 90

Control Type: Pretimed

Maximum v/c Ratio: 0.94

Intersection Signal Delay: 26.5

Intersection LOS: C

Intersection Capacity Utilization 76.7%

ICU Level of Service D

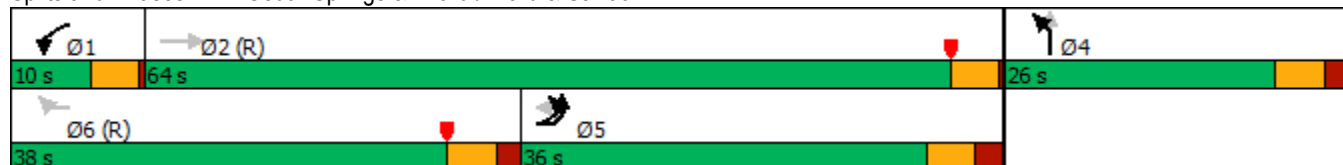
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Cedar Springs & Akard /Akard & St Paul



North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour

5: McKinney & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	48	728	5	0	0	0	0	215	17	153	239	0
Future Volume (vph)	48	728	5	0	0	0	0	215	17	153	239	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	1.00
Ped Bike Factor	0.98	1.00						0.99			0.98	
Frt		0.999						0.989				
Flt Protected	0.950										0.981	
Satd. Flow (prot)	1770	3534	0	0	0	0	0	3477	0	0	3472	0
Flt Permitted	0.950										0.696	
Satd. Flow (perm)	1727	3534	0	0	0	0	0	3477	0	0	2417	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1						9				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		323			182			264			526	
Travel Time (s)		7.3			4.1			6.0			12.0	
Confl. Peds. (#/hr)	12		22	22		12	44		49	49		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.72	0.72	0.72	0.77	0.77	0.77
Adj. Flow (vph)	52	791	5	0	0	0	0	299	24	199	310	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	52	796	0	0	0	0	0	323	0	0	509	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			24			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA						NA		Perm	NA	
Protected Phases	4							2			2	
Permitted Phases		4					2			2		
Minimum Split (s)	21.2	21.2					24.6	24.6		24.6	24.6	
Total Split (s)	40.0	40.0					40.0	40.0		40.0	40.0	
Total Split (%)	40.0%	40.0%					40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	35.1	35.1					34.6	34.6		34.6	34.6	
Yellow Time (s)	3.2	3.2					3.2	3.2		3.2	3.2	
All-Red Time (s)	1.7	1.7					2.2	2.2		2.2	2.2	
Lost Time Adjust (s)	0.0	0.0						0.0			0.0	
Total Lost Time (s)	4.9	4.9						5.4			5.4	
Lead/Lag	Lag	Lag										
Lead-Lag Optimize?	Yes	Yes										
Walk Time (s)	4.0	4.0					4.0	4.0		4.0	4.0	
Flash Dont Walk (s)	11.0	11.0					15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0					0	0		0	0	
Act Effct Green (s)	35.1	35.1						34.6			34.6	
Actuated g/C Ratio	0.35	0.35						0.35			0.35	
v/c Ratio	0.08	0.64						0.27			0.61	
Control Delay	3.7	5.3						21.0			26.1	

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Minimum Split (s)	9.5
Total Split (s)	20.0
Total Split (%)	20%
Maximum Green (s)	16.0
Yellow Time (s)	3.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour

5: McKinney & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.5						0.6			0.2	
Total Delay	3.7	5.7						21.6			26.4	
LOS	A	A						C			C	
Approach Delay		5.6						21.6			26.4	
Approach LOS		A						C			C	
Queue Length 50th (ft)	3	24						55			160	
Queue Length 95th (ft)	m5	32						64			175	
Internal Link Dist (ft)		243			102			184			446	
Turn Bay Length (ft)												
Base Capacity (vph)	621	1241						1208			836	
Starvation Cap Reductn	0	137						537			0	
Spillback Cap Reductn	0	0						69			48	
Storage Cap Reductn	0	0						0			0	
Reduced v/c Ratio	0.08	0.72						0.48			0.65	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 85 (85%), Referenced to phase 2:NBSB and 6:, Start of Yellow

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 15.0

Intersection LOS: B

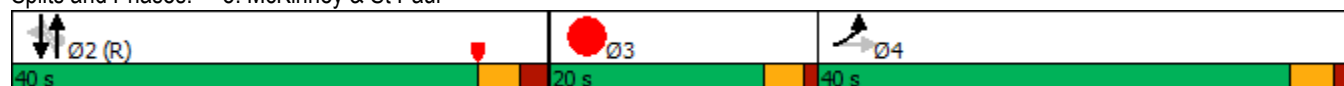
Intersection Capacity Utilization 60.3%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: McKinney & St Paul



Lane Group	Ø3
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour

6: McKinney & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	762	54	11	752	181	3	15	23	96	105	41
Future Volume (vph)	25	762	54	11	752	181	3	15	23	96	105	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor	0.99			0.98			0.97			0.97		
Frt	0.990			0.971			0.915			0.974		
Flt Protected	0.999			0.999			0.996			0.981		
Satd. Flow (prot)	0	4999	0	0	4858	0	0	3133	0	0	3333	0
Flt Permitted	0.885			0.926			0.936			0.809		
Satd. Flow (perm)	0	4427	0	0	4502	0	0	2934	0	0	2709	0
Right Turn on Red	Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)	16			82			31			28		
Link Speed (mph)	30			30			30			30		
Link Distance (ft)	383			222			432			264		
Travel Time (s)	8.7			5.0			9.8			6.0		
Confl. Peds. (#/hr)	34		42	42		34	47		25	25		47
Peak Hour Factor	0.93	0.93	0.93	0.98	0.98	0.98	0.75	0.75	0.75	0.78	0.78	0.78
Adj. Flow (vph)	27	819	58	11	767	185	4	20	31	123	135	53
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	904	0	0	963	0	0	55	0	0	311	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)	0			0			0			0		
Link Offset(ft)	0			0			0			0		
Crosswalk Width(ft)	16			16			16			16		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	4			4			6			2		
Permitted Phases	4			4			6			2		
Minimum Split (s)	21.2	21.2		21.2	21.2		24.4	24.4		24.4	24.4	
Total Split (s)	57.0	57.0		57.0	57.0		43.0	43.0		43.0	43.0	
Total Split (%)	57.0%	57.0%		57.0%	57.0%		43.0%	43.0%		43.0%	43.0%	
Maximum Green (s)	51.8	51.8		51.8	51.8		37.6	37.6		37.6	37.6	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.6	1.6		1.6	1.6		2.4	2.4		2.4	2.4	
Lost Time Adjust (s)	0.0			0.0			0.0			0.0		
Total Lost Time (s)	5.2			5.2			5.4			5.4		
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	51.8			51.8			37.6			37.6		
Actuated g/C Ratio	0.52			0.52			0.38			0.38		
v/c Ratio	0.39			0.41			0.05			0.30		
Control Delay	6.4			14.7			11.0			52.7		

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour

6: McKinney & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.2			7.9			0.0			1.3	
Total Delay		6.6			22.6			11.0			54.0	
LOS		A			C			B			D	
Approach Delay		6.6			22.6			11.0			54.0	
Approach LOS		A			C			B			D	
Queue Length 50th (ft)		39			121			4			105	
Queue Length 95th (ft)		51			153			13			129	
Internal Link Dist (ft)		303			142			352			184	
Turn Bay Length (ft)												
Base Capacity (vph)		2300			2371			1122			1036	
Starvation Cap Reductn		0			1362			0			510	
Spillback Cap Reductn		609			138			2			1	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.53			0.95			0.05			0.59	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 57 (57%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.41

Intersection Signal Delay: 20.2

Intersection LOS: C

Intersection Capacity Utilization 59.2%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 6: McKinney & Akard

 Ø2 (R)	 Ø4
43 s	57 s
 Ø6 (R)	
43 s	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour

7: Woodall WBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑									↑↑↑	
Traffic Volume (vph)	0	941	80	0	0	0	0	0	0	177	681	0
Future Volume (vph)	0	941	80	0	0	0	0	0	0	177	681	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00
Ped Bike Factor		1.00									1.00	
Frt		0.988										
Flt Protected											0.990	
Satd. Flow (prot)	0	5016	0	0	0	0	0	0	0	0	5034	0
Flt Permitted											0.990	
Satd. Flow (perm)	0	5016	0	0	0	0	0	0	0	0	5032	0
Right Turn on Red			Yes			Yes				Yes	No	No
Satd. Flow (RTOR)		13										
Link Speed (mph)		30			30			24			26	
Link Distance (ft)		196			58			216			231	
Travel Time (s)		4.5			1.3			6.1			6.1	
Confl. Peds. (#/hr)			4							1		
Peak Hour Factor	0.95	0.95	0.95	0.92	0.92	0.92	0.92	0.92	0.92	0.89	0.89	0.89
Adj. Flow (vph)	0	991	84	0	0	0	0	0	0	199	765	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1075	0	0	0	0	0	0	0	0	964	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		-24			24			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type		NA								Split	NA	
Protected Phases		2								4	4	
Permitted Phases												
Minimum Split (s)		21.6								21.3	21.3	
Total Split (s)		32.0								41.0	41.0	
Total Split (%)		32.0%								41.0%	41.0%	
Maximum Green (s)		26.4								35.7	35.7	
Yellow Time (s)		3.6								3.6	3.6	
All-Red Time (s)		2.0								1.7	1.7	
Lost Time Adjust (s)		0.0									0.0	
Total Lost Time (s)		5.6									5.3	
Lead/Lag		Lag										
Lead-Lag Optimize?		Yes										
Walk Time (s)		4.0								4.0	4.0	
Flash Dont Walk (s)		8.0								9.0	9.0	
Pedestrian Calls (#/hr)		0								0	0	
Act Effct Green (s)		26.4									35.7	
Actuated g/C Ratio		0.26									0.36	
v/c Ratio		0.81									0.54	
Control Delay		49.9									25.4	

Lane Group	Ø1
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	1
Permitted Phases	
Minimum Split (s)	21.3
Total Split (s)	27.0
Total Split (%)	27%
Maximum Green (s)	21.7
Yellow Time (s)	3.6
All-Red Time (s)	1.7
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour

7: Woodall WBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		1.8									0.3	
Total Delay		51.7									25.7	
LOS		D									C	
Approach Delay		51.7									25.7	
Approach LOS		D									C	
Queue Length 50th (ft)		263									134	
Queue Length 95th (ft)		311									180	
Internal Link Dist (ft)		116			1			136			151	
Turn Bay Length (ft)												
Base Capacity (vph)		1333									1797	
Starvation Cap Reductn		128									0	
Spillback Cap Reductn		45									276	
Storage Cap Reductn		0									0	
Reduced v/c Ratio		0.89									0.63	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 5 (5%), Referenced to phase 2:EBT and 6:, Start of Yellow

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 39.4

Intersection LOS: D

Intersection Capacity Utilization 45.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 7: Woodall WBFR & St Paul



Lane Group	Ø1
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour

8: Woodall EBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑						↑↑↑				
Traffic Volume (vph)	266	1064	0	0	0	0	0	424	171	0	0	0
Future Volume (vph)	266	1064	0	0	0	0	0	424	171	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00
Ped Bike Factor		0.97						0.97				
Frt								0.957				
Flt Protected		0.990										
Satd. Flow (prot)	0	5034	0	0	0	0	0	4708	0	0	0	0
Flt Permitted		0.990										
Satd. Flow (perm)	0	4873	0	0	0	0	0	4708	0	0	0	0
Right Turn on Red	Yes		Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		91						52				
Link Speed (mph)		30			30			26			30	
Link Distance (ft)		204			1246			248			416	
Travel Time (s)		4.6			28.3			6.5			9.5	
Confl. Peds. (#/hr)	64								55			
Peak Hour Factor	0.90	0.90	0.90	0.92	0.92	0.92	0.81	0.81	0.81	0.92	0.92	0.92
Adj. Flow (vph)	296	1182	0	0	0	0	0	523	211	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1478	0	0	0	0	0	734	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		-24			24			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA						NA				
Protected Phases		2						4				
Permitted Phases	2											
Minimum Split (s)	21.0	21.0						21.8				
Total Split (s)	57.0	57.0						43.0				
Total Split (%)	57.0%	57.0%						43.0%				
Maximum Green (s)	52.0	52.0						37.2				
Yellow Time (s)	3.6	3.6						3.6				
All-Red Time (s)	1.4	1.4						2.2				
Lost Time Adjust (s)		0.0						0.0				
Total Lost Time (s)		5.0						5.8				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0	4.0						4.0				
Flash Dont Walk (s)	8.0	8.0						12.0				
Pedestrian Calls (#/hr)	0	0						0				
Act Effct Green (s)		52.0						37.2				
Actuated g/C Ratio		0.52						0.37				
v/c Ratio		0.57						0.41				
Control Delay		7.8						17.7				

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour

8: Woodall EBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.6						0.8				
Total Delay		8.4						18.6				
LOS		A						B				
Approach Delay		8.4						18.6				
Approach LOS		A						B				
Queue Length 50th (ft)		93						87				
Queue Length 95th (ft)		109						99				
Internal Link Dist (ft)		124			1166			168			336	
Turn Bay Length (ft)												
Base Capacity (vph)		2577						1784				
Starvation Cap Reductn		649						706				
Spillback Cap Reductn		0						0				
Storage Cap Reductn		0						0				
Reduced v/c Ratio		0.77						0.68				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 23 (23%), Referenced to phase 2:EBTL and 6:, Start of Yellow

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 11.8

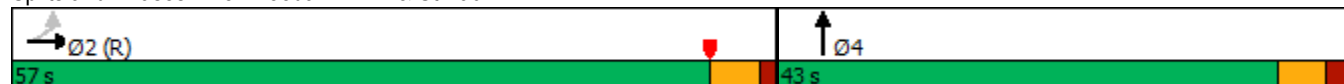
Intersection LOS: B

Intersection Capacity Utilization 48.3%

ICU Level of Service A

Analysis Period (min) 15

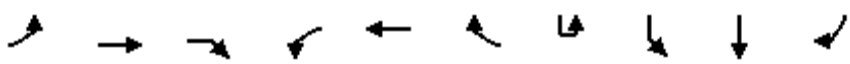
Splits and Phases: 8: Woodall EBFR & St Paul



North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour

9: Woodall WBFR & Akard WB On-Ramp & Akard

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBU	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑			↑	↑↑	
Traffic Volume (vph)	1	740	206	238	77	821	33	448	183	96
Future Volume (vph)	1	740	206	238	77	821	33	448	183	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.95	1.00	0.95	0.95
Ped Bike Factor		0.97			0.88				0.98	
Frt		0.967			0.892				0.948	
Flt Protected					0.990			0.950		
Satd. Flow (prot)	0	4746	0	0	3937	0	0	1770	3273	0
Flt Permitted		0.939			0.676			0.950		
Satd. Flow (perm)	0	4456	0	0	2688	0	0	1770	3273	0
Right Turn on Red						Yes				Yes
Satd. Flow (RTOR)					912				100	
Link Speed (mph)		30			30				30	
Link Distance (ft)		222			279				216	
Travel Time (s)		5.0			6.3				4.9	
Confl. Peds. (#/hr)			43	43		40				34
Peak Hour Factor	0.93	0.93	0.93	0.90	0.90	0.90	0.88	0.88	0.88	0.88
Adj. Flow (vph)	1	796	222	264	86	912	38	509	208	109
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	1019	0	0	1262	0	0	547	317	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right
Median Width(ft)		0			0				12	
Link Offset(ft)		0			0				0	
Crosswalk Width(ft)		16			16				16	
Two way Left Turn Lane										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	9	15		9
Turn Type	Perm	NA		pm+pt	NA		Perm	Split	NA	
Protected Phases		2		1	6			4	4	
Permitted Phases	2			6			4			
Minimum Split (s)	21.3	21.3		8.0	21.3		22.5	22.5	22.5	
Total Split (s)	30.0	30.0		32.0	62.0		38.0	38.0	38.0	
Total Split (%)	30.0%	30.0%		32.0%	62.0%		38.0%	38.0%	38.0%	
Maximum Green (s)	24.7	24.7		28.0	56.7		32.5	32.5	32.5	
Yellow Time (s)	3.6	3.6		3.5	3.6		3.6	3.6	3.6	
All-Red Time (s)	1.7	1.7		0.5	1.7		1.9	1.9	1.9	
Lost Time Adjust (s)		0.0			0.0			0.0	0.0	
Total Lost Time (s)		5.3			5.3			5.5	5.5	
Lead/Lag	Lag	Lag		Lead						
Lead-Lag Optimize?	Yes	Yes		Yes						
Walk Time (s)	4.0	4.0			4.0		4.0	4.0	4.0	
Flash Dont Walk (s)	11.0	11.0			9.0		13.0	13.0	13.0	
Pedestrian Calls (#/hr)	0	0			0		0	0	0	
Act Effct Green (s)		24.7			56.7			32.5	32.5	
Actuated g/C Ratio		0.25			0.57			0.32	0.32	
v/c Ratio		0.93			0.56			0.95	0.28	
Control Delay		38.5			1.9			45.8	5.7	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour
9: Woodall WBFR & Akard WB On-Ramp & Akard

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBU	SBL	SBT	SBR
Queue Delay		45.6			0.7			43.9	0.7	
Total Delay		84.1			2.6			89.7	6.5	
LOS		F			A			F	A	
Approach Delay		84.1			2.6				59.2	
Approach LOS		F			A				E	
Queue Length 50th (ft)		242			3			380	42	
Queue Length 95th (ft)		#325			4			m#551	m56	
Internal Link Dist (ft)		142			199				136	
Turn Bay Length (ft)										
Base Capacity (vph)		1100			2252			575	1131	
Starvation Cap Reductn		214			571			133	516	
Spillback Cap Reductn		0			182			0	34	
Storage Cap Reductn		0			0			0	0	
Reduced v/c Ratio		1.15			0.75			1.24	0.52	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 21 (21%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 44.5

Intersection LOS: D

Intersection Capacity Utilization 87.1%

ICU Level of Service E

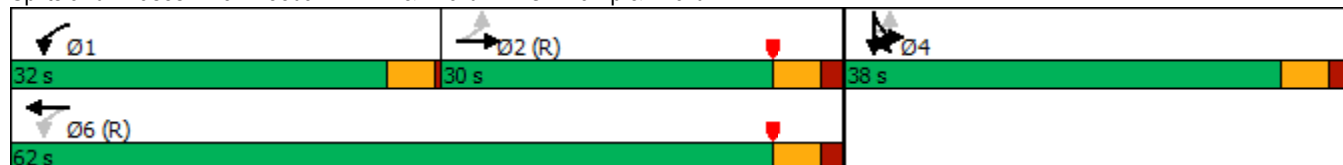
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Woodall WBFR & Akard WB On-Ramp & Akard



North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour

10: Woodall EBFR & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↑↑↑			↑↑↑				↑↑↑			
Traffic Volume (vph)	178	584	0	0	978	135	30	123	261	55	0	0
Future Volume (vph)	178	584	0	0	978	135	30	123	261	55	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	1.00	1.00	0.91	0.91	0.91	0.91	0.91	0.91	1.00	1.00
Ped Bike Factor		1.00			0.99				0.98			
Frt					0.982				0.982			0.850
Flt Protected		0.988							0.984			
Satd. Flow (prot)	0	5024	0	0	4948	0	0	0	4828	0	0	0
Flt Permitted		0.654							0.984			
Satd. Flow (perm)	0	3321	0	0	4948	0	0	0	4824	0	0	0
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)					31				23			141
Link Speed (mph)		30			30				26			30
Link Distance (ft)		279			374				181			248
Travel Time (s)		6.3			8.5				4.7			5.6
Confl. Peds. (#/hr)	35					35		1		56		
Peak Hour Factor	0.94	0.94	0.94	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.92
Adj. Flow (vph)	189	621	0	0	1087	150	33	137	290	61	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	810	0	0	1237	0	0	0	521	0	0	1
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	Left	Left
Median Width(ft)		0			0				0			0
Link Offset(ft)		0			0				-24			24
Crosswalk Width(ft)		16			16				16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	9	15		9	15	
Turn Type	pm+pt	NA			NA		Perm	Perm	NA			
Protected Phases	15	2			6				4			
Permitted Phases	2						4	4				
Minimum Split (s)	8.2	21.1			21.1		21.6	21.6	21.6			
Total Split (s)	22.0	69.0			47.0		31.0	31.0	31.0			
Total Split (%)	22.0%	69.0%			47.0%		31.0%	31.0%	31.0%			
Maximum Green (s)	16.8	63.9			41.9		25.4	25.4	25.4			
Yellow Time (s)	3.2	3.6			3.6		3.6	3.6	3.6			
All-Red Time (s)	2.0	1.5			1.5		2.0	2.0	2.0			
Lost Time Adjust (s)		0.0			0.0				0.0			
Total Lost Time (s)		5.1			5.1				5.6			
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		4.0			4.0		4.0	4.0	4.0			
Flash Dont Walk (s)		8.0			12.0		8.0	8.0	8.0			
Pedestrian Calls (#/hr)		0			0		0	0	0			
Act Effct Green (s)		63.9			41.9				25.4			0.0
Actuated g/C Ratio		0.64			0.42				0.25			0.00
v/c Ratio		0.34			0.59				0.42			0.01
Control Delay		8.3			18.6				30.9			0.0

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	1
Future Volume (vph)	1
Ideal Flow (vphpl)	1900
Lane Util. Factor	1.00
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	0.92
Adj. Flow (vph)	1
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Enter Blocked Intersection	No
Lane Alignment	Right
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	1.00
Turning Speed (mph)	9
Turn Type	
Protected Phases	
Permitted Phases	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Maximum Green (s)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour

10: Woodall EBFR & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Queue Delay		0.5			0.3				0.0			0.0
Total Delay		8.7			18.9				31.0			0.0
LOS		A			B				C			A
Approach Delay		8.7			18.9				31.0			
Approach LOS		A			B				C			
Queue Length 50th (ft)		49			136				97			0
Queue Length 95th (ft)		m65			158				130			0
Internal Link Dist (ft)		199			294				101			168
Turn Bay Length (ft)												
Base Capacity (vph)		2409			2091				1242			141
Starvation Cap Reductn		1037			273				0			0
Spillback Cap Reductn		0			9				53			0
Storage Cap Reductn		0			0				0			0
Reduced v/c Ratio		0.59			0.68				0.44			0.01

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 98 (98%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.59

Intersection Signal Delay: 18.1

Intersection LOS: B

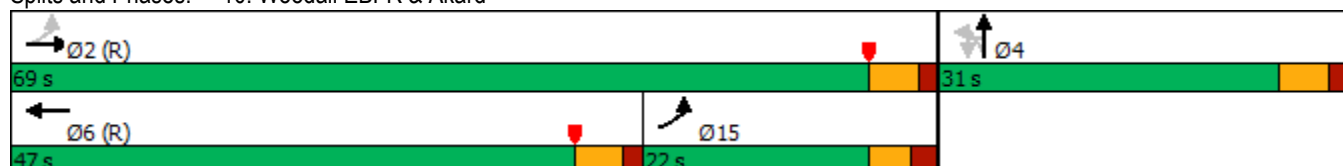
Intersection Capacity Utilization Err%

ICU Level of Service H

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Woodall EBFR & Akard





Lane Group	SBR
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour

11: Field /Field #11 #12 & Woodall WBFR

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations			↑↑↑↑	↑	↑	↑↑↑↑					↑	↑
Traffic Volume (vph)	2	0	1132	343	424	603	0	0	0	0	151	403
Future Volume (vph)	2	0	1132	343	424	603	0	0	0	0	151	403
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		150		200	0		0	0		0	0	
Storage Lanes		1		3	1		0	0		0	1	
Taper Length (ft)		25			25			25			25	
Lane Util. Factor	0.86	1.00	0.86	1.00	0.86	0.86	1.00	1.00	1.00	1.00	0.95	0.91
Ped Bike Factor				0.92								1.00
Frt				0.850								0.990
Flt Protected					0.950	0.987					0.950	0.998
Satd. Flow (prot)	0	0	6408	1583	1522	4743	0	0	0	0	1681	1668
Flt Permitted			0.931		0.103	0.675					0.950	0.998
Satd. Flow (perm)	0	0	5966	1453	165	3244	0	0	0	0	1681	1668
Right Turn on Red				Yes			Yes			Yes		
Satd. Flow (RTOR)				152								3
Link Speed (mph)			30			30			30			26
Link Distance (ft)			675			234			238			187
Travel Time (s)			15.3			5.3			5.4			4.9
Confl. Peds. (#/hr)				33	33							
Peak Hour Factor	0.86	0.86	0.86	0.86	0.84	0.84	0.84	0.92	0.92	0.92	0.95	0.95
Adj. Flow (vph)	2	0	1316	399	505	718	0	0	0	0	159	424
Shared Lane Traffic (%)					50%						10%	
Lane Group Flow (vph)	0	0	1318	399	252	971	0	0	0	0	143	472
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left
Median Width(ft)			20			20			12			12
Link Offset(ft)			0			0			-20			24
Crosswalk Width(ft)			16			16			16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15		9	15		9	15		9	15	
Turn Type	Perm		NA	Perm	pm+pt	NA					Split	NA
Protected Phases			2		3 11	2 3 11					4	4
Permitted Phases	2			2	11 2 3							
Minimum Split (s)	23.2		23.2	23.2							40.1	40.1
Total Split (s)	44.0		44.0	44.0							44.0	44.0
Total Split (%)	33.8%		33.8%	33.8%							33.8%	33.8%
Maximum Green (s)	38.8		38.8	38.8							37.9	37.9
Yellow Time (s)	5.2		5.2	5.2							6.1	6.1
All-Red Time (s)	0.0		0.0	0.0							0.0	0.0
Lost Time Adjust (s)			0.0	0.0							0.0	0.0
Total Lost Time (s)			5.2	5.2							6.1	6.1
Lead/Lag											Lag	Lag
Lead-Lag Optimize?											Yes	Yes
Walk Time (s)	4.0		4.0	4.0							4.0	4.0
Flash Dont Walk (s)	14.0		14.0	14.0							29.0	29.0
Pedestrian Calls (#/hr)	0		0	0							0	0
Act Effect Green (s)			38.8	38.8	78.0	75.6					37.9	37.9

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour

11: Field /Field #11 #12 & Woodall WBFR

Lane Group	SBR	Ø3	Ø5	Ø6	Ø8	Ø11
Lane Configurations						
Traffic Volume (vph)	305					
Future Volume (vph)	305					
Ideal Flow (vphpl)	1900					
Storage Length (ft)	0					
Storage Lanes	1					
Taper Length (ft)						
Lane Util. Factor	0.95					
Ped Bike Factor	0.94					
Frt	0.850					
Flt Protected						
Satd. Flow (prot)	1504					
Flt Permitted						
Satd. Flow (perm)	1416					
Right Turn on Red	Yes					
Satd. Flow (RTOR)	226					
Link Speed (mph)						
Link Distance (ft)						
Travel Time (s)						
Confl. Peds. (#/hr)	40					
Peak Hour Factor	0.95					
Adj. Flow (vph)	321					
Shared Lane Traffic (%)	10%					
Lane Group Flow (vph)	289					
Enter Blocked Intersection	No					
Lane Alignment	Right					
Median Width(ft)						
Link Offset(ft)						
Crosswalk Width(ft)						
Two way Left Turn Lane						
Headway Factor	1.00					
Turning Speed (mph)	9					
Turn Type	Perm					
Protected Phases		3	5	6	8	11
Permitted Phases	4					
Minimum Split (s)	40.1	8.0	8.0	21.9	31.0	8.0
Total Split (s)	44.0	9.0	35.0	42.0	53.0	33.0
Total Split (%)	33.8%	7%	27%	32%	41%	25%
Maximum Green (s)	37.9	5.0	30.0	36.6	47.0	29.0
Yellow Time (s)	6.1	3.5	5.0	5.4	6.0	3.5
All-Red Time (s)	0.0	0.5	0.0	0.0	0.0	0.5
Lost Time Adjust (s)	0.0					
Total Lost Time (s)	6.1					
Lead/Lag	Lag	Lead	Lead	Lag		
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		
Walk Time (s)	4.0			4.0	4.0	
Flash Dont Walk (s)	29.0			12.0	20.0	
Pedestrian Calls (#/hr)	0			0	0	
Act Effect Green (s)	37.9					

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour

11: Field /Field #11 #12 & Woodall WBFR

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Actuated g/C Ratio			0.30	0.30	0.60	0.58					0.29	0.29
v/c Ratio			0.74	0.74	0.51	0.42					0.29	0.97
Control Delay			31.1	21.8	5.8	3.4					37.7	78.8
Queue Delay			0.2	0.0	3.3	0.3					0.0	0.0
Total Delay			31.3	21.8	9.0	3.8					37.7	78.8
LOS			C	C	A	A					D	E
Approach Delay			29.1			4.9						51.1
Approach LOS			C			A						D
Queue Length 50th (ft)			313	219	15	20					98	429
Queue Length 95th (ft)			343	328	19	21					161	#673
Internal Link Dist (ft)			595			154			158			107
Turn Bay Length (ft)				200								
Base Capacity (vph)			1780	540	495	2310					490	488
Starvation Cap Reductn			0	0	155	697					0	0
Spillback Cap Reductn			66	0	0	0					0	0
Storage Cap Reductn			0	0	0	0					0	0
Reduced v/c Ratio			0.77	0.74	0.74	0.60					0.29	0.97

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 72 (55%), Referenced to phase 2:EBWB, Start of Yellow

Natural Cycle: 90

Control Type: Pretimed

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 26.5

Intersection LOS: C

Intersection Capacity Utilization 80.6%

ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 11: Field /Field #11 #12 & Woodall WBFR

#11  Ø2 (R)	#11  Ø11	#11  Ø3	#11  Ø4
44 s	33 s	9 s	44 s
#12  Ø5	#12  Ø6	#12  Ø8	
35 s	42 s	53 s	

Lane Group	SBR	Ø3	Ø5	Ø6	Ø8	Ø11
Actuated g/C Ratio	0.29					
v/c Ratio	0.51					
Control Delay	12.5					
Queue Delay	0.0					
Total Delay	12.5					
LOS	B					
Approach Delay						
Approach LOS						
Queue Length 50th (ft)	41					
Queue Length 95th (ft)	130					
Internal Link Dist (ft)						
Turn Bay Length (ft)						
Base Capacity (vph)	572					
Starvation Cap Reductn	0					
Spillback Cap Reductn	0					
Storage Cap Reductn	0					
Reduced v/c Ratio	0.51					
Intersection Summary						

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour
12: Woodall EBFR & Field #11 #12 & Field EB On-Ramp

												
Lane Group	EBU	EBL2	EBL	EBT	WBU	WBT	WBR	WBR2	NBU	NBL	NBT	NBR
Lane Configurations				  		  					  	
Traffic Volume (vph)	1	0	332	975	3	931	182	188	131	88	805	91
Future Volume (vph)	1	0	332	975	3	931	182	188	131	88	805	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)			0				0			0		0
Storage Lanes			1				1			1		0
Taper Length (ft)			25							25		
Lane Util. Factor	0.91	1.00	0.91	0.91	0.91	0.91	1.00	0.91	0.91	0.86	0.86	0.91
Frt							0.850				0.985	
Flt Protected		0.950		0.987						0.950	0.999	
Satd. Flow (prot)	0	1770	0	5019	0	5085	1583	0	0	1522	4729	0
Flt Permitted		0.067		0.669		0.935				0.950	0.999	
Satd. Flow (perm)	0	125	0	3402	0	4755	1583	0	0	1522	4729	0
Right Turn on Red								Yes				Yes
Satd. Flow (RTOR)							102				15	
Link Speed (mph)				30		30					30	
Link Distance (ft)				234		419					191	
Travel Time (s)				5.3		9.5					4.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	0	361	1060	3	1012	198	204	142	96	875	99
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	0	1	0	1421	0	1015	402	0	0	228	984	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Left	R NA	Left	Right	Right	R NA	Left	Left	Right
Median Width(ft)				20		12					12	
Link Offset(ft)				0		12					-24	
Crosswalk Width(ft)				16		16					16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15	15		9		9	9	9	15		9
Turn Type	custom	pm+pt	pm+pt	NA	Perm	NA	Perm		Perm	Split	NA	
Protected Phases		5	5	5 6		6				8	8	
Permitted Phases	5	5 6	5 6		6		6		8			
Minimum Split (s)	8.0	8.0	8.0		21.9	21.9	21.9		31.0	31.0	31.0	
Total Split (s)	35.0	35.0	35.0		42.0	42.0	42.0		53.0	53.0	53.0	
Total Split (%)	26.9%	26.9%	26.9%		32.3%	32.3%	32.3%		40.8%	40.8%	40.8%	
Maximum Green (s)	30.0	30.0	30.0		36.6	36.6	36.6		47.0	47.0	47.0	
Yellow Time (s)	5.0	5.0	5.0		5.4	5.4	5.4		6.0	6.0	6.0	
All-Red Time (s)	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	
Lost Time Adjust (s)		0.0				0.0	0.0			0.0	0.0	
Total Lost Time (s)		5.0				5.4	5.4			6.0	6.0	
Lead/Lag	Lead	Lead	Lead		Lag	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes	Yes					
Walk Time (s)					4.0	4.0	4.0		4.0	4.0	4.0	
Flash Dont Walk (s)					12.0	12.0	12.0		20.0	20.0	20.0	
Pedestrian Calls (#/hr)					0	0	0		0	0	0	
Act Effect Green (s)		72.0		67.0		36.6	36.6			47.0	47.0	
Actuated g/C Ratio		0.55		0.52		0.28	0.28			0.36	0.36	
v/c Ratio		0.01		0.67		0.76	0.78			0.41	0.57	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour
12: Woodall EBFR & Field #11 #12 & Field EB On-Ramp

Lane Group	Ø2	Ø3	Ø4	Ø11
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Ideal Flow (vphpl)				
Storage Length (ft)				
Storage Lanes				
Taper Length (ft)				
Lane Util. Factor				
Frt				
Flt Protected				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (mph)				
Link Distance (ft)				
Travel Time (s)				
Peak Hour Factor				
Adj. Flow (vph)				
Shared Lane Traffic (%)				
Lane Group Flow (vph)				
Enter Blocked Intersection				
Lane Alignment				
Median Width(ft)				
Link Offset(ft)				
Crosswalk Width(ft)				
Two way Left Turn Lane				
Headway Factor				
Turning Speed (mph)				
Turn Type				
Protected Phases	2	3	4	11
Permitted Phases				
Minimum Split (s)	23.2	8.0	40.1	8.0
Total Split (s)	44.0	9.0	44.0	33.0
Total Split (%)	34%	7%	34%	25%
Maximum Green (s)	38.8	5.0	37.9	29.0
Yellow Time (s)	5.2	3.5	6.1	3.5
All-Red Time (s)	0.0	0.5	0.0	0.5
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag		Lead	Lag	
Lead-Lag Optimize?		Yes	Yes	
Walk Time (s)	4.0		4.0	
Flash Dont Walk (s)	14.0		29.0	
Pedestrian Calls (#/hr)	0		0	
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour
12: Woodall EBFR & Field #11 #12 & Field EB On-Ramp

												
Lane Group	EBU	EBL2	EBL	EBT	WBU	WBT	WBR	WBR2	NBU	NBL	NBT	NBR
Control Delay		4.0		7.8		42.0	37.5			34.0	34.5	
Queue Delay		0.0		1.4		1.0	2.1			0.0	0.0	
Total Delay		4.0		9.2		42.9	39.6			34.0	34.5	
LOS		A		A		D	D			C	C	
Approach Delay				9.2		42.0					34.4	
Approach LOS				A		D					C	
Queue Length 50th (ft)		0		92		309	266			167	253	
Queue Length 95th (ft)		m0		m141		362	185			254	303	
Internal Link Dist (ft)				154		339					111	
Turn Bay Length (ft)												
Base Capacity (vph)		69		2126		1338	518			550	1719	
Starvation Cap Reductn		0		471		126	41			0	0	
Spillback Cap Reductn		0		129		28	0			0	0	
Storage Cap Reductn		0		0		0	0			0	0	
Reduced v/c Ratio		0.01		0.86		0.84	0.84			0.41	0.57	

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 72 (55%), Referenced to phase 2:EBWB, Start of Yellow

Natural Cycle: 90

Control Type: Pretimed

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 28.2

Intersection LOS: C

Intersection Capacity Utilization 78.7%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: Woodall EBFR & Field #11 #12 & Field EB On-Ramp

#11  Ø2 (R)	#11  Ø11	#11  Ø3	#11  Ø4
44 s	33 s	9 s	44 s
#12  Ø5	#12  Ø6	#12  Ø8	
35 s	42 s	53 s	

Lane Group	Ø2	Ø3	Ø4	Ø11
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				
Queue Length 50th (ft)				
Queue Length 95th (ft)				
Internal Link Dist (ft)				
Turn Bay Length (ft)				
Base Capacity (vph)				
Starvation Cap Reductn				
Spillback Cap Reductn				
Storage Cap Reductn				
Reduced v/c Ratio				
Intersection Summary				

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour

13: Woodall WBFR & Harwood

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗↗			↖↖↖	
Traffic Volume (vph)	0	225	0	0	682	57
Future Volume (vph)	0	225	0	0	682	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.88	1.00	1.00	0.91	0.91
Ped Bike Factor		0.91			1.00	
Frt		0.850			0.988	
Flt Protected						
Satd. Flow (prot)	0	2787	0	0	5005	0
Flt Permitted						
Satd. Flow (perm)	0	2543	0	0	5005	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		168			35	
Link Speed (mph)	30			30	24	
Link Distance (ft)	246			202	260	
Travel Time (s)	5.6			4.6	7.4	
Confl. Peds. (#/hr)		82				41
Peak Hour Factor	0.82	0.82	0.92	0.92	0.94	0.94
Adj. Flow (vph)	0	274	0	0	726	61
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	274	0	0	787	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			12	-12	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Turn Type		Perm			NA	
Protected Phases					8	
Permitted Phases		6				
Minimum Split (s)		20.0			20.0	
Total Split (s)		24.0			26.0	
Total Split (%)		48.0%			52.0%	
Maximum Green (s)		20.0			22.0	
Yellow Time (s)		3.5			3.5	
All-Red Time (s)		0.5			0.5	
Lost Time Adjust (s)		0.0			0.0	
Total Lost Time (s)		4.0			4.0	
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)		5.0			5.0	
Flash Dont Walk (s)		11.0			11.0	
Pedestrian Calls (#/hr)		0			0	
Act Effct Green (s)		20.0			22.0	
Actuated g/C Ratio		0.40			0.44	
v/c Ratio		0.25			0.35	
Control Delay		2.7			9.0	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour

13: Woodall WBFR & Harwood

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Queue Delay		0.0			0.0	
Total Delay		2.7			9.0	
LOS		A			A	
Approach Delay	2.7				9.0	
Approach LOS	A				A	
Queue Length 50th (ft)		0			63	
Queue Length 95th (ft)		19			75	
Internal Link Dist (ft)	166			122	180	
Turn Bay Length (ft)						
Base Capacity (vph)		1118			2221	
Starvation Cap Reductn		0			0	
Spillback Cap Reductn		0			0	
Storage Cap Reductn		0			0	
Reduced v/c Ratio		0.25			0.35	

Intersection Summary

Area Type: Other

Cycle Length: 50

Actuated Cycle Length: 50

Offset: 1 (2%), Referenced to phase 6:EBR, Start of Yellow

Natural Cycle: 40

Control Type: Pretimed

Maximum v/c Ratio: 0.35

Intersection Signal Delay: 7.4

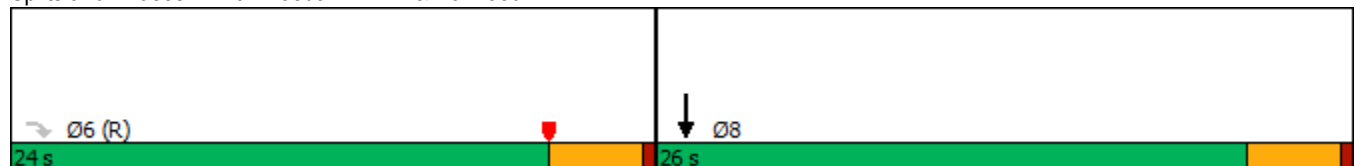
Intersection LOS: A

Intersection Capacity Utilization 34.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 13: Woodall WBFR & Harwood



North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour

14: Woodall EBFR & Harwood

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø2
Lane Configurations			↑↑↑				
Traffic Volume (vph)	0	0	792	137	0	0	
Future Volume (vph)	0	0	792	137	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	0.91	0.91	1.00	1.00	
Ped Bike Factor			0.99				
Frt			0.978				
Flt Protected							
Satd. Flow (prot)	0	0	4907	0	0	0	
Flt Permitted							
Satd. Flow (perm)	0	0	4907	0	0	0	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)			81				
Link Speed (mph)	30		26			30	
Link Distance (ft)	974		416			261	
Travel Time (s)	22.1		10.9			5.9	
Confl. Peds. (#/hr)				32			
Peak Hour Factor	0.92	0.92	0.96	0.96	0.92	0.92	
Adj. Flow (vph)	0	0	825	143	0	0	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	0	968	0	0	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Right	Left	Left	
Median Width(ft)	0		0			0	
Link Offset(ft)	24		0			0	
Crosswalk Width(ft)	16		16			16	
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9		9	15		
Turn Type			NA				
Protected Phases			4			2	
Permitted Phases							
Minimum Split (s)			20.9			21.0	
Total Split (s)			75.0			25.0	
Total Split (%)			75.0%			25%	
Maximum Green (s)			70.1			20.0	
Yellow Time (s)			3.6			3.6	
All-Red Time (s)			1.3			1.4	
Lost Time Adjust (s)			0.0				
Total Lost Time (s)			4.9				
Lead/Lag							
Lead-Lag Optimize?							
Walk Time (s)			4.0			4.0	
Flash Dont Walk (s)			8.0			8.0	
Pedestrian Calls (#/hr)			0			0	
Act Effect Green (s)			70.1				
Actuated g/C Ratio			0.70				
v/c Ratio			0.28				
Control Delay			3.1				

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour

14: Woodall EBFR & Harwood

							
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø2
Queue Delay			0.0				
Total Delay			3.1				
LOS			A				
Approach Delay			3.1				
Approach LOS			A				
Queue Length 50th (ft)			32				
Queue Length 95th (ft)			41				
Internal Link Dist (ft)	894		336			181	
Turn Bay Length (ft)							
Base Capacity (vph)			3464				
Starvation Cap Reductn			0				
Spillback Cap Reductn			398				
Storage Cap Reductn			0				
Reduced v/c Ratio			0.32				

Intersection Summary

Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 30 (30%), Referenced to phase 2:Ped, Start of Yellow	
Natural Cycle: 45	
Control Type: Pretimed	
Maximum v/c Ratio: 0.28	
Intersection Signal Delay: 3.1	Intersection LOS: A
Intersection Capacity Utilization 22.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 14: Woodall EBFR & Harwood



North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour

15: Woodall WBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑						↑↑↑	
Traffic Volume (vph)	0	0	0	290	578	0	0	0	0	0	480	118
Future Volume (vph)	0	0	0	290	578	0	0	0	0	0	480	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	0.91	0.91
Ped Bike Factor					0.92						0.96	
Frt											0.970	
Flt Protected					0.984							
Satd. Flow (prot)	0	0	0	0	5004	0	0	0	0	0	4711	0
Flt Permitted					0.984							
Satd. Flow (perm)	0	0	0	0	4611	0	0	0	0	0	4711	0
Right Turn on Red			Yes	Yes		Yes			Yes			Yes
Satd. Flow (RTOR)					166						71	
Link Speed (mph)		30			30			30			24	
Link Distance (ft)		836			267			260			433	
Travel Time (s)		19.0			6.1			5.9			12.3	
Confl. Peds. (#/hr)				94								88
Peak Hour Factor	0.92	0.92	0.92	0.97	0.97	0.97	0.92	0.92	0.92	0.82	0.82	0.82
Adj. Flow (vph)	0	0	0	299	596	0	0	0	0	0	585	144
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	895	0	0	0	0	0	729	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		20			-20			12			-12	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type				Perm	NA						NA	
Protected Phases					2						4	
Permitted Phases				2								
Minimum Split (s)				21.2	21.2						21.2	
Total Split (s)				54.0	54.0						46.0	
Total Split (%)				54.0%	54.0%						46.0%	
Maximum Green (s)				48.8	48.8						40.8	
Yellow Time (s)				3.6	3.6						3.6	
All-Red Time (s)				1.6	1.6						1.6	
Lost Time Adjust (s)					0.0						0.0	
Total Lost Time (s)					5.2						5.2	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)				4.0	4.0						4.0	
Flash Dont Walk (s)				8.0	8.0						8.0	
Pedestrian Calls (#/hr)				0	0						0	
Act Effct Green (s)					48.8						40.8	
Actuated g/C Ratio					0.49						0.41	
v/c Ratio					0.38						0.37	
Control Delay					2.3						18.6	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour

15: Woodall WBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay					0.1						0.0	
Total Delay					2.4						18.6	
LOS					A						B	
Approach Delay					2.4						18.6	
Approach LOS					A						B	
Queue Length 50th (ft)					7						99	
Queue Length 95th (ft)					11						m97	
Internal Link Dist (ft)		756			187			180			353	
Turn Bay Length (ft)												
Base Capacity (vph)					2335						1964	
Starvation Cap Reductn					468						0	
Spillback Cap Reductn					0						0	
Storage Cap Reductn					0						0	
Reduced v/c Ratio					0.48						0.37	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 87 (87%), Referenced to phase 2:WBTL and 6:, Start of Yellow

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.38

Intersection Signal Delay: 9.7

Intersection LOS: A

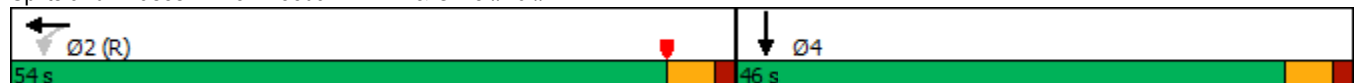
Intersection Capacity Utilization 38.7%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 15: Woodall WBFR & Olive #16 #21



North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour

16: Woodall EBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑	↑		↑↑↑				
Traffic Volume (vph)	0	0	0	0	826	368	56	711	0	0	0	0
Future Volume (vph)	0	0	0	0	826	368	56	711	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00
Ped Bike Factor						0.96		1.00				
Frt						0.850						
Flt Protected								0.996				
Satd. Flow (prot)	0	0	0	0	5085	1583	0	5065	0	0	0	0
Flt Permitted								0.996				
Satd. Flow (perm)	0	0	0	0	5085	1522	0	5043	0	0	0	0
Right Turn on Red			Yes			Yes	Yes		Yes			Yes
Satd. Flow (RTOR)						62		34				
Link Speed (mph)		30			30			26			30	
Link Distance (ft)		267			231			261			427	
Travel Time (s)		6.1			5.3			6.8			9.7	
Confl. Peds. (#/hr)						11	24					
Peak Hour Factor	0.92	0.92	0.92	0.96	0.96	0.96	0.90	0.90	0.90	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	860	383	62	790	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	860	383	0	852	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		20			-20			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type					NA	Perm	Perm	NA				
Protected Phases					2			4				
Permitted Phases						2	4					
Minimum Split (s)					22.1	22.1	21.1	21.1				
Total Split (s)					58.0	58.0	42.0	42.0				
Total Split (%)					58.0%	58.0%	42.0%	42.0%				
Maximum Green (s)					51.9	51.9	36.9	36.9				
Yellow Time (s)					3.6	3.6	3.6	3.6				
All-Red Time (s)					2.5	2.5	1.5	1.5				
Lost Time Adjust (s)					0.0	0.0		0.0				
Total Lost Time (s)					6.1	6.1		5.1				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)					4.0	4.0	4.0	4.0				
Flash Dont Walk (s)					8.0	8.0	8.0	8.0				
Pedestrian Calls (#/hr)					0	0	0	0				
Act Effct Green (s)					51.9	51.9		36.9				
Actuated g/C Ratio					0.52	0.52		0.37				
v/c Ratio					0.33	0.47		0.45				
Control Delay					14.3	14.8		33.8				

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour

16: Woodall EBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay					0.0	0.0		5.5				
Total Delay					14.3	14.8		39.2				
LOS					B	B		D				
Approach Delay					14.5			39.2				
Approach LOS					B			D				
Queue Length 50th (ft)					110	122		180				
Queue Length 95th (ft)					139	198		228				
Internal Link Dist (ft)		187			151			181			347	
Turn Bay Length (ft)												
Base Capacity (vph)					2639	819		1882				
Starvation Cap Reductn					0	0		955				
Spillback Cap Reductn					0	2		191				
Storage Cap Reductn					0	0		0				
Reduced v/c Ratio					0.33	0.47		0.92				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 85 (85%), Referenced to phase 2:WBT and 6:, Start of Yellow

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.47

Intersection Signal Delay: 24.6

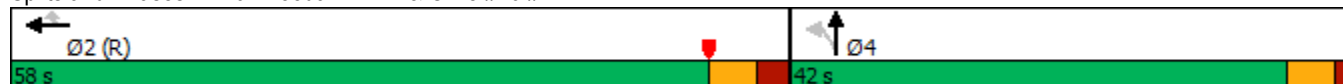
Intersection LOS: C

Intersection Capacity Utilization 48.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 16: Woodall EBFR & Olive #16 #21



North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour

17: Woodall WBFR & Pearl #17 #18

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations			↑↑↑	↑	↑	↑↑↑						↑↑↑
Traffic Volume (vph)	1	0	1564	178	160	890	0	0	0	0	89	277
Future Volume (vph)	1	0	1564	178	160	890	0	0	0	0	89	277
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		250		0	0		0	0		0	0	
Storage Lanes		1		1	1		0	0		0	0	
Taper Length (ft)		25			25			25			25	
Lane Util. Factor	0.91	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	0.91	0.91
Ped Bike Factor				0.95								0.90
Frt				0.850								0.935
Flt Protected					0.950							0.993
Satd. Flow (prot)	0	0	5085	1583	1770	5085	0	0	0	0	0	4237
Flt Permitted			0.940		0.089							0.993
Satd. Flow (perm)	0	0	4780	1504	166	5085	0	0	0	0	0	4237
Right Turn on Red				Yes			Yes			Yes		
Satd. Flow (RTOR)				182								163
Link Speed (mph)			30			30			30			30
Link Distance (ft)			1034			257			433			138
Travel Time (s)			23.5			5.8			9.8			3.1
Confl. Peds. (#/hr)				13	13							
Peak Hour Factor	0.98	0.98	0.98	0.98	0.92	0.92	0.92	0.92	0.92	0.92	0.78	0.78
Adj. Flow (vph)	1	0	1596	182	174	967	0	0	0	0	114	355
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	1597	182	174	967	0	0	0	0	0	823
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left
Median Width(ft)			12			12			0			0
Link Offset(ft)			0			0			0			0
Crosswalk Width(ft)			16			16			16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15		9	15		9	15		9	15	
Turn Type	Perm		NA	Perm	pm+pt	NA					Split	NA
Protected Phases			2		1 11	6					4	4
Permitted Phases	2			2	6							
Minimum Split (s)	21.1		21.1	21.1		28.1					22.0	22.0
Total Split (s)	40.0		40.0	40.0		78.0					22.0	22.0
Total Split (%)	40.0%		40.0%	40.0%		78.0%					22.0%	22.0%
Maximum Green (s)	34.9		34.9	34.9		72.9					16.0	16.0
Yellow Time (s)	3.6		3.6	3.6		3.6					3.9	3.9
All-Red Time (s)	1.5		1.5	1.5		1.5					2.1	2.1
Lost Time Adjust (s)			0.0	0.0		0.0						0.0
Total Lost Time (s)			5.1	5.1		5.1						6.0
Lead/Lag	Lag		Lag	Lag								
Lead-Lag Optimize?	Yes		Yes	Yes								
Walk Time (s)	4.0		4.0	4.0		4.0					4.0	4.0
Flash Dont Walk (s)	6.0		6.0	6.0		19.0					6.0	6.0
Pedestrian Calls (#/hr)	0		0	0		0					0	0
Act Effect Green (s)			34.9	34.9	73.0	72.9						16.0

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour

17: Woodall WBFR & Pearl #17 #18

Lane Group	SBR	Ø1	Ø11
Lane Configurations			
Traffic Volume (vph)	276		
Future Volume (vph)	276		
Ideal Flow (vphpl)	1900		
Storage Length (ft)	0		
Storage Lanes	0		
Taper Length (ft)			
Lane Util. Factor	0.91		
Ped Bike Factor			
Frt			
Flt Protected			
Satd. Flow (prot)	0		
Flt Permitted			
Satd. Flow (perm)	0		
Right Turn on Red	Yes		
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Peds. (#/hr)	77		
Peak Hour Factor	0.78		
Adj. Flow (vph)	354		
Shared Lane Traffic (%)			
Lane Group Flow (vph)	0		
Enter Blocked Intersection	No		
Lane Alignment	Right		
Median Width(ft)			
Link Offset(ft)			
Crosswalk Width(ft)			
Two way Left Turn Lane			
Headway Factor	1.00		
Turning Speed (mph)	9		
Turn Type			
Protected Phases	1	11	
Permitted Phases			
Minimum Split (s)	8.0	8.0	
Total Split (s)	20.0	18.0	
Total Split (%)	20%	18%	
Maximum Green (s)	15.0	14.0	
Yellow Time (s)	3.0	3.5	
All-Red Time (s)	2.0	0.5	
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead		
Lead-Lag Optimize?	Yes		
Walk Time (s)			
Flash Dont Walk (s)			
Pedestrian Calls (#/hr)			
Act Effect Green (s)			

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour

17: Woodall WBFR & Pearl #17 #18

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Actuated g/C Ratio			0.35	0.35	0.73	0.73						0.16
v/c Ratio			0.96	0.28	0.31	0.26						1.01
Control Delay			25.9	1.1	18.8	1.8						68.7
Queue Delay			0.8	0.0	2.1	0.3						0.0
Total Delay			26.7	1.1	20.9	2.1						68.7
LOS			C	A	C	A						E
Approach Delay			24.1			5.0						68.7
Approach LOS			C			A						E
Queue Length 50th (ft)			388	2	48	26						~162
Queue Length 95th (ft)			m#478	m2	m90	26						#188
Internal Link Dist (ft)			954			177			353			58
Turn Bay Length (ft)												
Base Capacity (vph)			1668	643	570	3706						814
Starvation Cap Reductn			0	0	274	1976						0
Spillback Cap Reductn			14	0	0	0						0
Storage Cap Reductn			0	0	0	0						0
Reduced v/c Ratio			0.97	0.28	0.59	0.56						1.01

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 88 (88%), Referenced to phase 2:EBTU and 6:WBTL, Start of Yellow

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 1.01

Intersection Signal Delay: 28.1

Intersection LOS: C

Intersection Capacity Utilization 71.5%

ICU Level of Service C

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

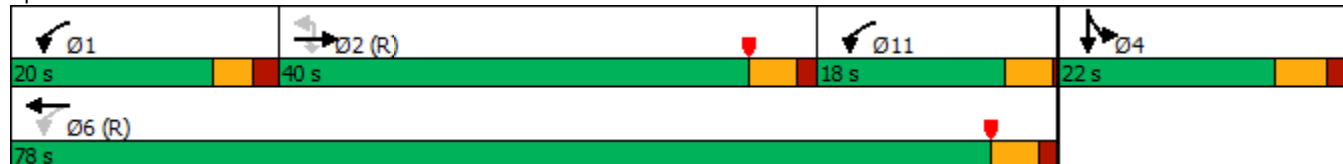
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 17: Woodall WBFR & Pearl #17 #18





Lane Group	SBR	Ø1	Ø11
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)			
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			
Intersection Summary			

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour

18: Woodall EBFR & Pearl #17 #18

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	663	1065	0	0	921	141	142	826	118	0	0	0
Future Volume (vph)	663	1065	0	0	921	141	142	826	118	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	250		0	0		0	0		0
Storage Lanes	2		0	1		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	1.00	0.91	1.00	0.91	0.91	0.91	1.00	1.00	1.00
Frt						0.850		0.984				
Flt Protected	0.950							0.994				
Satd. Flow (prot)	3433	3539	0	0	5085	1583	0	4974	0	0	0	0
Flt Permitted	0.157							0.994				
Satd. Flow (perm)	567	3539	0	0	5085	1583	0	4974	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						92		21				
Link Speed (mph)		30			30			26			30	
Link Distance (ft)		257			1016			427			143	
Travel Time (s)		5.8			23.1			11.2			3.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	721	1158	0	0	1001	153	154	898	128	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	721	1158	0	0	1001	153	0	1180	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			0			0	
Link Offset(ft)		0			0			-12			12	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA			NA	Perm	Perm	NA				
Protected Phases	15	2			6			4				
Permitted Phases	2					6	4					
Minimum Split (s)	8.0	21.4			27.0	27.0	23.1	23.1				
Total Split (s)	34.0	66.0			32.0	32.0	34.0	34.0				
Total Split (%)	34.0%	66.0%			32.0%	32.0%	34.0%	34.0%				
Maximum Green (s)	29.0	60.6			27.0	27.0	28.0	28.0				
Yellow Time (s)	3.0	3.6			3.6	3.6	3.6	3.6				
All-Red Time (s)	2.0	1.8			1.4	1.4	2.4	2.4				
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0				
Total Lost Time (s)	5.0	5.4			5.0	5.0		6.0				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		4.0			4.0	4.0	4.0	4.0				
Flash Dont Walk (s)		8.0			18.0	18.0	8.0	8.0				
Pedestrian Calls (#/hr)		0			0	0	0	0				
Act Effct Green (s)	61.0	60.6			27.0	27.0		28.0				
Actuated g/C Ratio	0.61	0.61			0.27	0.27		0.28				
v/c Ratio	0.61	0.54			0.73	0.31		0.84				

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background Conditions - PM Peak Hour

18: Woodall EBFR & Pearl #17 #18

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	5.6	2.1			36.9	14.4		26.4				
Queue Delay	0.0	0.6			0.0	0.0		0.0				
Total Delay	5.6	2.7			36.9	14.4		26.4				
LOS	A	A			D	B		C				
Approach Delay		3.8			33.9			26.4				
Approach LOS		A			C			C				
Queue Length 50th (ft)	40	36			212	30		286				
Queue Length 95th (ft)	m41	m37			262	82		341				
Internal Link Dist (ft)		177			936			347			63	
Turn Bay Length (ft)												
Base Capacity (vph)	1177	2144			1372	494		1407				
Starvation Cap Reductn	0	546			0	0		0				
Spillback Cap Reductn	0	0			0	0		0				
Storage Cap Reductn	0	0			0	0		0				
Reduced v/c Ratio	0.61	0.72			0.73	0.31		0.84				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 65 (65%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 18.4

Intersection LOS: B

Intersection Capacity Utilization 71.5%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Woodall EBFR & Pearl #17 #18



Intersection												
Int Delay, s/veh	1.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑↑								↑	↑		
Traffic Vol, veh/h	0	748	3	0	0	0	0	0	98	0	14	0
Future Vol, veh/h	0	748	3	0	0	0	0	0	98	0	14	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	0	-	-
Veh in Median Storage, #	-	0	-	-	16979	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	813	3	0	0	0	0	0	107	0	15	0

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	0	0	0	-	-	408	325	816	-
Stage 1	-	-	-	-	-	-	0	0	-
Stage 2	-	-	-	-	-	-	325	816	-
Critical Hdwy	5.34	-	-	-	-	7.14	6.44	6.54	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.74	5.54	-
Follow-up Hdwy	3.12	-	-	-	-	3.92	3.82	4.02	-
Pot Cap-1 Maneuver	-	-	-	0	0	506	623	310	0
Stage 1	-	-	-	0	0	-	-	-	0
Stage 2	-	-	-	0	0	-	606	389	0
Platoon blocked, %	-	-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	506	492	310	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	492	310	-
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	478	389	-

Approach	EB	NB	SB
HCM Control Delay, s	0	14	0
HCM LOS		B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	506	-	-	-	-
HCM Lane V/C Ratio	0.211	-	-	-	-
HCM Control Delay (s)	14	0	-	-	0
HCM Lane LOS	B	A	-	-	A
HCM 95th %tile Q(veh)	0.8	-	-	-	-

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗			↑↑↑	
Traffic Vol, veh/h	0	5	0	0	902	3
Future Vol, veh/h	0	5	0	0	902	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	16974	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	5	0	0	980	3
Major/Minor	Minor2		Major2			
Conflicting Flow All	-	492	-	-	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.14	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.92	-	-	-	-
Pot Cap-1 Maneuver	0	447	-	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	447	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		SB			
HCM Control Delay, s	13.2		0			
HCM LOS	B					
Minor Lane/Major Mvmt	EBLn1	SBT	SBR			
Capacity (veh/h)	447	-	-			
HCM Lane V/C Ratio	0.012	-	-			
HCM Control Delay (s)	13.2	-	-			
HCM Lane LOS	B	-	-			
HCM 95th %tile Q(veh)	0	-	-			

Intersection												
Int Delay, s/veh	1.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔			↔			↔	
Traffic Vol, veh/h	4	191	5	0	56	2	1	0	6	29	0	10
Future Vol, veh/h	4	191	5	0	56	2	1	0	6	29	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	208	5	0	61	2	1	0	7	32	0	11
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	63	0	0	213	0	0	250	282	107	174	283	32
Stage 1	-	-	-	-	-	-	219	219	-	62	62	-
Stage 2	-	-	-	-	-	-	31	63	-	112	221	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1538	-	-	1355	-	-	683	625	926	773	625	1035
Stage 1	-	-	-	-	-	-	763	721	-	942	843	-
Stage 2	-	-	-	-	-	-	981	842	-	881	719	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1538	-	-	1355	-	-	674	623	926	766	623	1035
Mov Cap-2 Maneuver	-	-	-	-	-	-	674	623	-	766	623	-
Stage 1	-	-	-	-	-	-	761	719	-	939	843	-
Stage 2	-	-	-	-	-	-	971	842	-	872	717	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0			9.1			9.6		
HCM LOS							A			A		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	879	1538	-	-	1355	-	-	821				
HCM Lane V/C Ratio	0.009	0.003	-	-	-	-	-	0.052				
HCM Control Delay (s)	9.1	7.3	0	-	0	-	-	9.6				
HCM Lane LOS	A	A	A	-	A	-	-	A				
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.2				

North Harwood Tower
HCM 6th TWSC

Phase 1 Background Conditions - PM Peak Hour
22: Adjacent North Drive/Adjacent South Drive & Harwood

Intersection													
Int Delay, s/veh	2.5												
Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↔↔			↔↔			↔↔			↔↔	
Traffic Vol, veh/h	2	15	185	1	1	53	13	48	0	18	0	0	0
Future Vol, veh/h	2	15	185	1	1	53	13	48	0	18	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	16	201	1	1	58	14	52	0	20	0	0	0
Major/Minor	Major1			Major2			Minor1			Minor2			
Conflicting Flow All	72	72	0	0	202	0	0	269	312	101	204	305	36
Stage 1	-	-	-	-	-	-	-	238	238	-	67	67	-
Stage 2	-	-	-	-	-	-	-	31	74	-	137	238	-
Critical Hdwy	6.44	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.52	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1288	1526	-	-	1367	-	-	662	602	935	736	607	1029
Stage 1	-	-	-	-	-	-	-	744	707	-	936	838	-
Stage 2	-	-	-	-	-	-	-	981	833	-	852	707	-
Platoon blocked, %			-	-		-	-						
Mov Cap-1 Maneuver	1494	1494	-	-	1367	-	-	655	593	935	712	598	1029
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	655	593	-	712	598	-
Stage 1	-	-	-	-	-	-	-	734	697	-	923	837	-
Stage 2	-	-	-	-	-	-	-	980	832	-	822	697	-
Approach	EB			WB			NB			SB			
HCM Control Delay, s	0.7			0.1			10.6			0			
HCM LOS							B			A			
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1					
Capacity (veh/h)	713	1494	-	-	1367	-	-	-					
HCM Lane V/C Ratio	0.101	0.011	-	-	0.001	-	-	-					
HCM Control Delay (s)	10.6	7.4	0.1	-	7.6	0	-	0					
HCM Lane LOS	B	A	A	-	A	A	-	A					
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	-					



Synchro™ Output - 2022 Background Plus Site Traffic

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour

1: McKinney & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	83	226	34	11	113	10	1	31	160	72	6	114
Future Volume (vph)	83	226	34	11	113	10	1	31	160	72	6	114
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor	0.92	0.99			0.99				0.95			
Frt		0.981			0.989				0.959			
Flt Protected	0.950				0.996				0.994			
Satd. Flow (prot)	1770	1809	0	0	3459	0	0	0	3225	0	0	0
Flt Permitted	0.950				0.927				0.849			
Satd. Flow (perm)	1632	1809	0	0	3209	0	0	0	2741	0	0	0
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)		9			10				78			
Link Speed (mph)		30			30				30			
Link Distance (ft)		424			278				526			
Travel Time (s)		9.6			6.3				12.0			
Confl. Peds. (#/hr)	54		37	37		54		60		86		86
Peak Hour Factor	0.96	0.96	0.96	0.92	0.92	0.92	0.86	0.86	0.86	0.86	0.93	0.93
Adj. Flow (vph)	86	235	35	12	123	11	1	36	186	84	6	123
Shared Lane Traffic (%)												
Lane Group Flow (vph)	86	270	0	0	146	0	0	0	307	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	R NA	Left
Median Width(ft)		12			12				0			
Link Offset(ft)		0			0				0			
Crosswalk Width(ft)		16			16				16			
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	9	15		9	9	15
Turn Type	Prot	NA		Perm	NA		Perm	Perm	NA		Perm	Perm
Protected Phases	8!				4!				2			
Permitted Phases		8		4			2	2			6	6
Minimum Split (s)	23.4	23.4		23.4	23.4		23.4	23.4	23.4		23.4	23.4
Total Split (s)	46.0	46.0		46.0	46.0		54.0	54.0	54.0		54.0	54.0
Total Split (%)	46.0%	46.0%		46.0%	46.0%		54.0%	54.0%	54.0%		54.0%	54.0%
Maximum Green (s)	40.6	40.6		40.6	40.6		48.6	48.6	48.6		48.6	48.6
Yellow Time (s)	3.6	3.6		3.6	3.6		3.2	3.2	3.2		3.2	3.2
All-Red Time (s)	1.8	1.8		1.8	1.8		2.2	2.2	2.2		2.2	2.2
Lost Time Adjust (s)	-1.4	0.0			-1.4				-1.4			
Total Lost Time (s)	4.0	5.4			4.0				4.0			
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0		4.0	4.0
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		13.0	13.0	13.0		13.0	13.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0		0	0
Act Effect Green (s)	42.0	40.6			42.0				50.0			
Actuated g/C Ratio	0.42	0.41			0.42				0.50			
v/c Ratio	0.12	0.37			0.11				0.22			
Control Delay	12.0	14.3			15.4				3.0			

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour

1: McKinney & Harwood

	↓	↙
Lane Group	SBT	SBR
Lane Configurations	4T	
Traffic Volume (vph)	254	143
Future Volume (vph)	254	143
Ideal Flow (vphpl)	1900	1900
Lane Util. Factor	0.95	0.95
Ped Bike Factor	0.95	
Frt	0.958	
Flt Protected	0.989	
Satd. Flow (prot)	3246	0
Flt Permitted	0.780	
Satd. Flow (perm)	2503	0
Right Turn on Red		Yes
Satd. Flow (RTOR)	80	
Link Speed (mph)	30	
Link Distance (ft)	348	
Travel Time (s)	7.9	
Confl. Peds. (#/hr)		60
Peak Hour Factor	0.93	0.93
Adj. Flow (vph)	273	154
Shared Lane Traffic (%)		
Lane Group Flow (vph)	556	0
Enter Blocked Intersection	No	No
Lane Alignment	Left	Right
Median Width(ft)	0	
Link Offset(ft)	0	
Crosswalk Width(ft)	16	
Two way Left Turn Lane		
Headway Factor	1.00	1.00
Turning Speed (mph)		9
Turn Type	NA	
Protected Phases	6	
Permitted Phases		
Minimum Split (s)	23.4	
Total Split (s)	54.0	
Total Split (%)	54.0%	
Maximum Green (s)	48.6	
Yellow Time (s)	3.2	
All-Red Time (s)	2.2	
Lost Time Adjust (s)	-1.4	
Total Lost Time (s)	4.0	
Lead/Lag		
Lead-Lag Optimize?		
Walk Time (s)	4.0	
Flash Dont Walk (s)	13.0	
Pedestrian Calls (#/hr)	0	
Act Effct Green (s)	50.0	
Actuated g/C Ratio	0.50	
v/c Ratio	0.43	
Control Delay	6.3	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour

1: McKinney & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Queue Delay	0.0	0.0			0.0				0.0			
Total Delay	12.0	14.3			15.4				3.0			
LOS	B	B			B				A			
Approach Delay		13.7			15.4				3.0			
Approach LOS		B			B				A			
Queue Length 50th (ft)	15	49			33				3			
Queue Length 95th (ft)	30	77			59				6			
Internal Link Dist (ft)		344			198				446			
Turn Bay Length (ft)												
Base Capacity (vph)	743	739			1353				1409			
Starvation Cap Reductn	0	0			0				0			
Spillback Cap Reductn	0	0			0				0			
Storage Cap Reductn	0	0			0				0			
Reduced v/c Ratio	0.12	0.37			0.11				0.22			

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 38 (38%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.43

Intersection Signal Delay: 8.6

Intersection LOS: A

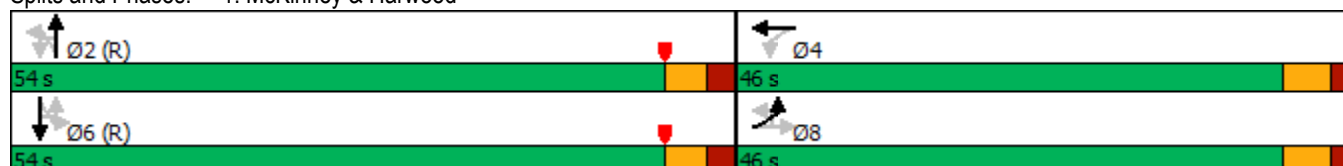
Intersection Capacity Utilization 74.4%

ICU Level of Service D

Analysis Period (min) 15

! Phase conflict between lane groups.

Splits and Phases: 1: McKinney & Harwood





Lane Group	SBT	SBR
Queue Delay	0.4	
Total Delay	6.7	
LOS	A	
Approach Delay	6.7	
Approach LOS	A	
Queue Length 50th (ft)	30	
Queue Length 95th (ft)	43	
Internal Link Dist (ft)	268	
Turn Bay Length (ft)		
Base Capacity (vph)	1291	
Starvation Cap Reductn	292	
Spillback Cap Reductn	0	
Storage Cap Reductn	0	
Reduced v/c Ratio	0.56	
Intersection Summary		

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour

2: Cedar Springs & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	421	0	0	0	82	0	561	30	0	0	0
Future Volume (vph)	38	421	0	0	0	82	0	561	30	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	0.88	1.00	0.81	0.81	1.00	1.00	1.00
Ped Bike Factor		1.00				0.96		1.00				
Frt						0.850		0.992				
Flt Protected		0.996										
Satd. Flow (prot)	0	3525	0	0	0	2787	0	7465	0	0	0	0
Flt Permitted		0.996										
Satd. Flow (perm)	0	3516	0	0	0	2671	0	7465	0	0	0	0
Right Turn on Red	Yes		Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25				340		18				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		269			424			493			445	
Travel Time (s)		6.1			9.6			11.2			10.1	
Confl. Peds. (#/hr)	16		21	21		16	16		18	18		16
Peak Hour Factor	0.93	0.93	0.93	0.77	0.77	0.77	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	41	453	0	0	0	106	0	610	33	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	494	0	0	0	106	0	643	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			-24			24	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA				Perm		NA				
Protected Phases		4						2				
Permitted Phases	4					4						
Minimum Split (s)	21.4	21.4				21.4		21.3				
Total Split (s)	47.0	47.0				47.0		53.0				
Total Split (%)	47.0%	47.0%				47.0%		53.0%				
Maximum Green (s)	41.6	41.6				41.6		47.7				
Yellow Time (s)	3.6	3.6				3.6		3.6				
All-Red Time (s)	1.8	1.8				1.8		1.7				
Lost Time Adjust (s)		-1.4				-1.4		-1.3				
Total Lost Time (s)		4.0				4.0		4.0				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0	4.0				4.0		4.0				
Flash Dont Walk (s)	12.0	12.0				12.0		10.0				
Pedestrian Calls (#/hr)	0	0				0		0				
Act Effct Green (s)		43.0				43.0		49.0				
Actuated g/C Ratio		0.43				0.43		0.49				
v/c Ratio		0.32				0.08		0.18				
Control Delay		14.9				0.2		3.3				

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour

2: Cedar Springs & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0				0.0		0.0				
Total Delay		14.9				0.2		3.3				
LOS		B				A		A				
Approach Delay		14.9			0.2			3.3				
Approach LOS		B			A			A				
Queue Length 50th (ft)		71				0		16				
Queue Length 95th (ft)		107				0		14				
Internal Link Dist (ft)		189			344			413			365	
Turn Bay Length (ft)												
Base Capacity (vph)		1526				1342		3667				
Starvation Cap Reductn		0				0		0				
Spillback Cap Reductn		0				0		0				
Storage Cap Reductn		0				0		0				
Reduced v/c Ratio		0.32				0.08		0.18				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 40 (40%), Referenced to phase 2:NBT, Start of Yellow

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.32

Intersection Signal Delay: 7.7

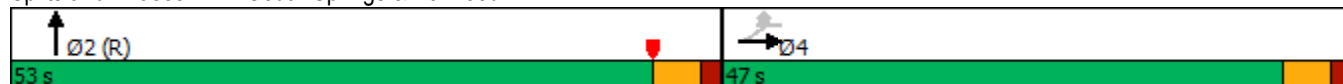
Intersection LOS: A

Intersection Capacity Utilization 43.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: Cedar Springs & Harwood



North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour

3: McKinney & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	87	638	246	25	191	0	0	315	86
Future Volume (vph)	0	0	0	87	638	246	25	191	0	0	315	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor					0.98	0.94		0.99			0.96	
Frt						0.850					0.968	
Flt Protected					0.994			0.994				
Satd. Flow (prot)	0	0	0	0	3518	1583	0	3518	0	0	3298	0
Flt Permitted					0.994			0.868				
Satd. Flow (perm)	0	0	0	0	3461	1487	0	3046	0	0	3298	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						262					40	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		536			836			348			457	
Travel Time (s)		12.2			19.0			7.9			10.4	
Confl. Peds. (#/hr)				81		30	100					100
Peak Hour Factor	0.92	0.92	0.92	0.94	0.94	0.94	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	0	0	0	93	679	262	30	227	0	0	375	102
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	772	262	0	257	0	0	477	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		16			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					4			2			2	
Permitted Phases				4		4	2					
Minimum Split (s)				23.3	23.3	23.3	23.4	23.4			23.4	
Total Split (s)				57.0	57.0	57.0	43.0	43.0			43.0	
Total Split (%)				57.0%	57.0%	57.0%	43.0%	43.0%			43.0%	
Maximum Green (s)				51.7	51.7	51.7	37.6	37.6			37.6	
Yellow Time (s)				3.2	3.2	3.2	3.2	3.2			3.2	
All-Red Time (s)				2.1	2.1	2.1	2.2	2.2			2.2	
Lost Time Adjust (s)					-1.3	-1.3		-1.4			-1.4	
Total Lost Time (s)					4.0	4.0		4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	
Flash Dont Walk (s)				14.0	14.0	14.0	14.0	14.0			14.0	
Pedestrian Calls (#/hr)				0	0	0	0	0			0	
Act Effect Green (s)					53.0	53.0		39.0			39.0	
Actuated g/C Ratio					0.53	0.53		0.39			0.39	
v/c Ratio					0.42	0.29		0.22			0.36	
Control Delay					9.3	0.8		28.2			8.7	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour

3: McKinney & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay					0.0	0.0		0.0			0.0	
Total Delay					9.3	0.8		28.2			8.7	
LOS					A	A		C			A	
Approach Delay					7.2			28.2			8.7	
Approach LOS					A			C			A	
Queue Length 50th (ft)					98	1		68			31	
Queue Length 95th (ft)					121	m4		94			45	
Internal Link Dist (ft)		456			756			268			377	
Turn Bay Length (ft)												
Base Capacity (vph)					1834	911		1187			1310	
Starvation Cap Reductn					0	0		0			0	
Spillback Cap Reductn					0	0		0			0	
Storage Cap Reductn					0	0		0			0	
Reduced v/c Ratio					0.42	0.29		0.22			0.36	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 19 (19%), Referenced to phase 2:NBSB and 6:, Start of Yellow

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.42

Intersection Signal Delay: 10.7

Intersection LOS: B

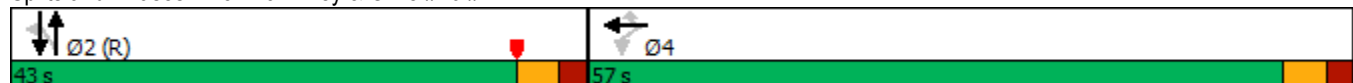
Intersection Capacity Utilization 51.7%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: McKinney & Olive #16 #21



North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour

4: Cedar Springs & Akard & St Paul

										
Lane Group	EBU	EBL	EBT	EBR	WBL	WBR	WBR2	NBL	NBT	NBR
Lane Configurations										
Traffic Volume (vph)	5	643	1065	88	12	376	10	209	15	62
Future Volume (vph)	5	643	1065	88	12	376	10	209	15	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.97	0.91	0.91	1.00	0.88	1.00	0.97	1.00	1.00
Ped Bike Factor		0.99	1.00			0.95		0.98	0.97	
Frt			0.989			0.850			0.879	
Flt Protected		0.950			0.950			0.950		
Satd. Flow (prot)	0	3433	5013	0	1770	2787	0	3433	1582	0
Flt Permitted		0.950			0.950			0.950		
Satd. Flow (perm)	0	3404	5013	0	1770	2637	0	3376	1582	0
Right Turn on Red				Yes			Yes			Yes
Satd. Flow (RTOR)			20			140			68	
Link Speed (mph)			30						30	
Link Distance (ft)			345						581	
Travel Time (s)			7.8						13.2	
Confl. Peds. (#/hr)		5		18			17	10		18
Peak Hour Factor	0.98	0.98	0.98	0.98	0.82	0.82	0.82	0.91	0.91	0.91
Adj. Flow (vph)	5	656	1087	90	15	459	12	230	16	68
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	661	1177	0	15	471	0	230	84	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	Left	Right	Right	Left	Left	Right
Median Width(ft)			0						24	
Link Offset(ft)			24						0	
Crosswalk Width(ft)			16						16	
Two way Left Turn Lane										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15		9	15	9	9	15		9
Turn Type	custom	Prot	NA		Prot	Perm		Prot	NA	
Protected Phases		5			1			4		
Permitted Phases	5		2			6			4	
Minimum Split (s)	23.9	23.9	23.0		8.0	21.5		23.9	23.9	
Total Split (s)	41.0	41.0	57.0		15.0	31.0		28.0	28.0	
Total Split (%)	41.0%	41.0%	57.0%		15.0%	31.0%		28.0%	28.0%	
Maximum Green (s)	35.1	35.1	52.0		11.0	25.5		22.1	22.1	
Yellow Time (s)	3.6	3.6	3.6		3.5	3.6		3.6	3.6	
All-Red Time (s)	2.3	2.3	1.4		0.5	1.9		2.3	2.3	
Lost Time Adjust (s)		-1.9	-1.0		0.0	-1.5		-1.9	-1.9	
Total Lost Time (s)		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lead	Lag		Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes				
Walk Time (s)	4.0	4.0	4.0			4.0		4.0	4.0	
Flash Dont Walk (s)	14.0	14.0	14.0			8.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0	0			0		0	0	
Act Effect Green (s)		37.0	53.0		11.0	27.0		24.0	24.0	
Actuated g/C Ratio		0.37	0.53		0.11	0.27		0.24	0.24	
v/c Ratio		0.53	0.44		0.08	0.58		0.28	0.19	
Control Delay		45.9	8.1		39.3	16.1		32.1	11.6	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour

4: Cedar Springs & Akard & St Paul



Lane Group	EBU	EBL	EBT	EBR	WBL	WBR	WBR2	NBL	NBT	NBR
Queue Delay		0.7	0.0		0.0	0.7		0.0	0.0	
Total Delay		46.5	8.1		39.3	16.8		32.1	11.6	
LOS		D	A		D	B		C	B	
Approach Delay			21.9						26.6	
Approach LOS			C						C	
Queue Length 50th (ft)		206	67		9	47		61	8	
Queue Length 95th (ft)		266	87		26	59		95	46	
Internal Link Dist (ft)			265						501	
Turn Bay Length (ft)										
Base Capacity (vph)		1259	2666		194	814		823	431	
Starvation Cap Reductn		0	0		0	0		0	0	
Spillback Cap Reductn		283	0		0	115		0	10	
Storage Cap Reductn		0	0		0	0		0	0	
Reduced v/c Ratio		0.68	0.44		0.08	0.67		0.28	0.20	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBR, Start of Yellow

Natural Cycle: 70

Control Type: Pretimed

Maximum v/c Ratio: 0.58

Intersection Signal Delay: 21.6

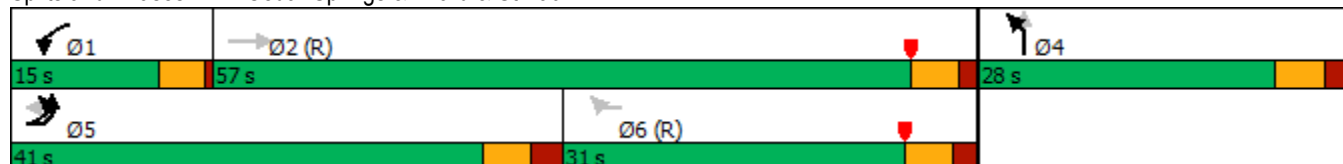
Intersection LOS: C

Intersection Capacity Utilization 57.0%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 4: Cedar Springs & Akard & St Paul



North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour

5: McKinney & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	642	2	0	0	0	0	212	76	82	170	2
Future Volume (vph)	56	642	2	0	0	0	0	212	76	82	170	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor	0.98	1.00						0.98			0.99	
Frt								0.960			0.999	
Flt Protected	0.950										0.984	
Satd. Flow (prot)	1770	3539	0	0	0	0	0	3341	0	0	3477	0
Flt Permitted	0.950										0.756	
Satd. Flow (perm)	1734	3539	0	0	0	0	0	3341	0	0	2643	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)								57			1	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		323			197			264			526	
Travel Time (s)		7.3			4.5			6.0			12.0	
Confl. Peds. (#/hr)	10		10				33		33	33		33
Peak Hour Factor	0.89	0.89	0.89	0.92	0.92	0.92	0.96	0.96	0.96	0.89	0.89	0.89
Adj. Flow (vph)	63	721	2	0	0	0	0	221	79	92	191	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	63	723	0	0	0	0	0	300	0	0	285	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			24			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA						NA		Perm	NA	
Protected Phases	4							2			2	
Permitted Phases		4					2			2		
Minimum Split (s)	21.2	21.2					24.6	24.6		24.6	24.6	
Total Split (s)	38.0	38.0					41.0	41.0		41.0	41.0	
Total Split (%)	38.0%	38.0%					41.0%	41.0%		41.0%	41.0%	
Maximum Green (s)	33.1	33.1					35.6	35.6		35.6	35.6	
Yellow Time (s)	3.2	3.2					3.2	3.2		3.2	3.2	
All-Red Time (s)	1.7	1.7					2.2	2.2		2.2	2.2	
Lost Time Adjust (s)	-0.9	-0.9						-1.4			-1.4	
Total Lost Time (s)	4.0	4.0						4.0			4.0	
Lead/Lag	Lag	Lag										
Lead-Lag Optimize?	Yes	Yes										
Walk Time (s)	4.0	4.0					4.0	4.0		4.0	4.0	
Flash Dont Walk (s)	11.0	11.0					15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0					0	0		0	0	
Act Efect Green (s)	34.0	34.0						37.0			37.0	
Actuated g/C Ratio	0.34	0.34						0.37			0.37	
v/c Ratio	0.10	0.60						0.24			0.29	
Control Delay	22.3	31.9						17.0			14.5	

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Minimum Split (s)	9.5
Total Split (s)	21.0
Total Split (%)	21%
Maximum Green (s)	17.0
Yellow Time (s)	3.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour

5: McKinney & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	41.3						0.6			0.0	
Total Delay	22.3	73.1						17.6			14.5	
LOS	C	E						B			B	
Approach Delay		69.1						17.6			14.5	
Approach LOS		E						B			B	
Queue Length 50th (ft)	39	254						68			57	
Queue Length 95th (ft)	m78	312						106			74	
Internal Link Dist (ft)		243			117			184			446	
Turn Bay Length (ft)												
Base Capacity (vph)	601	1203						1272			978	
Starvation Cap Reductn	0	529						632			0	
Spillback Cap Reductn	0	0						0			0	
Storage Cap Reductn	0	0						0			0	
Reduced v/c Ratio	0.10	1.07						0.47			0.29	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 45 (45%), Referenced to phase 2:NBSB and 6:, Start of Yellow

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.60

Intersection Signal Delay: 46.5

Intersection LOS: D

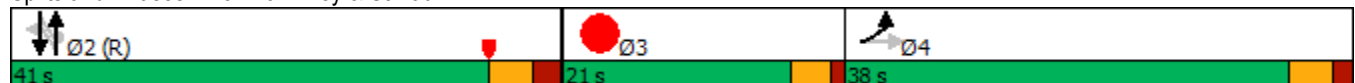
Intersection Capacity Utilization 59.5%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: McKinney & St Paul



Lane Group	Ø3
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour

6: McKinney & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	982	29	8	427	269	5	10	10	87	52	31
Future Volume (vph)	11	982	29	8	427	269	5	10	10	87	52	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor		1.00			0.98			0.98			0.98	
Frt		0.996			0.943			0.940			0.973	
Flt Protected		0.999			0.999			0.990			0.975	
Satd. Flow (prot)	0	5048	0	0	4701	0	0	3251	0	0	3322	0
Flt Permitted		0.929			0.924			0.915			0.800	
Satd. Flow (perm)	0	4693	0	0	4347	0	0	2984	0	0	2698	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			238			12			31	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		383			222			432			264	
Travel Time (s)		8.7			5.0			9.8			6.0	
Confl. Peds. (#/hr)	19		37	37		19	30		13	13		30
Peak Hour Factor	0.92	0.92	0.92	0.89	0.89	0.89	0.82	0.82	0.82	0.83	0.83	0.83
Adj. Flow (vph)	12	1067	32	9	480	302	6	12	12	105	63	37
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1111	0	0	791	0	0	30	0	0	205	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			6			2	
Permitted Phases	4			4			6			2		
Minimum Split (s)	21.2	21.2		21.2	21.2		24.4	24.4		24.4	24.4	
Total Split (s)	57.0	57.0		57.0	57.0		43.0	43.0		43.0	43.0	
Total Split (%)	57.0%	57.0%		57.0%	57.0%		43.0%	43.0%		43.0%	43.0%	
Maximum Green (s)	51.8	51.8		51.8	51.8		37.6	37.6		37.6	37.6	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.6	1.6		1.6	1.6		2.4	2.4		2.4	2.4	
Lost Time Adjust (s)		-1.2			-1.2			-1.4			-1.4	
Total Lost Time (s)		4.0			4.0			4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)		53.0			53.0			39.0			39.0	
Actuated g/C Ratio		0.53			0.53			0.39			0.39	
v/c Ratio		0.45			0.33			0.03			0.19	
Control Delay		6.6			11.2			13.3			10.9	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour

6: McKinney & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.4			1.9			0.0			0.0	
Total Delay		7.0			13.2			13.3			10.9	
LOS		A			B			B			B	
Approach Delay		7.0			13.2			13.3			10.9	
Approach LOS		A			B			B			B	
Queue Length 50th (ft)		97			77			3			60	
Queue Length 95th (ft)		113			104			11			82	
Internal Link Dist (ft)		303			142			352			184	
Turn Bay Length (ft)												
Base Capacity (vph)		2490			2415			1171			1071	
Starvation Cap Reductn		772			1420			0			0	
Spillback Cap Reductn		520			0			0			1	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.65			0.79			0.03			0.19	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 68 (68%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 9.8

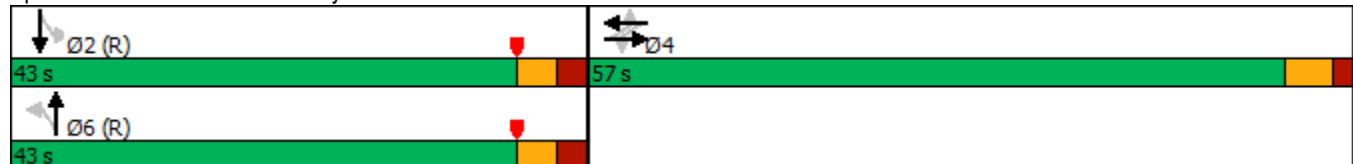
Intersection LOS: A

Intersection Capacity Utilization 49.9%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: McKinney & Akard



North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour

7: Woodall WBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑									↑↑↑	
Traffic Volume (vph)	0	701	10	0	0	0	0	0	0	238	584	0
Future Volume (vph)	0	701	10	0	0	0	0	0	0	238	584	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00
Ped Bike Factor		1.00										
Frt		0.998										
Flt Protected											0.986	
Satd. Flow (prot)	0	5068	0	0	0	0	0	0	0	0	5014	0
Flt Permitted											0.986	
Satd. Flow (perm)	0	5068	0	0	0	0	0	0	0	0	5014	0
Right Turn on Red			Yes			Yes				Yes	No	No
Satd. Flow (RTOR)		2										
Link Speed (mph)		30			30			24			26	
Link Distance (ft)		183			58			216			216	
Travel Time (s)		4.2			1.3			6.1			5.7	
Confl. Peds. (#/hr)			34									
Peak Hour Factor	0.86	0.86	0.86	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	815	12	0	0	0	0	0	0	259	635	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	827	0	0	0	0	0	0	0	0	894	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		-24			24			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type		NA								Split	NA	
Protected Phases		2								4	4	
Permitted Phases												
Minimum Split (s)		21.6								21.3	21.3	
Total Split (s)		32.0								38.0	38.0	
Total Split (%)		32.0%								38.0%	38.0%	
Maximum Green (s)		26.4								32.7	32.7	
Yellow Time (s)		3.6								3.6	3.6	
All-Red Time (s)		2.0								1.7	1.7	
Lost Time Adjust (s)		-1.6									-1.3	
Total Lost Time (s)		4.0									4.0	
Lead/Lag		Lag										
Lead-Lag Optimize?		Yes										
Walk Time (s)		4.0								4.0	4.0	
Flash Dont Walk (s)		8.0								9.0	9.0	
Pedestrian Calls (#/hr)		0								0	0	
Act Effct Green (s)		28.0									34.0	
Actuated g/C Ratio		0.28									0.34	
v/c Ratio		0.58									0.52	
Control Delay		20.8									15.4	

Lane Group	Ø1
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	1
Permitted Phases	
Minimum Split (s)	21.3
Total Split (s)	30.0
Total Split (%)	30%
Maximum Green (s)	24.7
Yellow Time (s)	3.6
All-Red Time (s)	1.7
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour

7: Woodall WBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.1									0.6	
Total Delay		20.9									16.0	
LOS		C									B	
Approach Delay		20.9									16.0	
Approach LOS		C									B	
Queue Length 50th (ft)		152									141	
Queue Length 95th (ft)		151									164	
Internal Link Dist (ft)		103			1			136			136	
Turn Bay Length (ft)												
Base Capacity (vph)		1420									1704	
Starvation Cap Reductn		0									0	
Spillback Cap Reductn		41									431	
Storage Cap Reductn		0									0	
Reduced v/c Ratio		0.60									0.70	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 14 (14%), Referenced to phase 2:EBT and 6:, Start of Yellow

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 18.4

Intersection LOS: B

Intersection Capacity Utilization 36.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 7: Woodall WBFR & St Paul



Lane Group	Ø1
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour

8: Woodall EBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑						↑↑↑				
Traffic Volume (vph)	294	1033	1	0	0	0	0	617	162	0	0	0
Future Volume (vph)	294	1033	1	0	0	0	0	617	162	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	0.91	1.00	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00
Ped Bike Factor		0.96						0.96				
Frt								0.969				
Flt Protected		0.989										
Satd. Flow (prot)	0	5029	0	0	0	0	0	4743	0	0	0	0
Flt Permitted		0.989										
Satd. Flow (perm)	0	4812	0	0	0	0	0	4743	0	0	0	0
Right Turn on Red	Yes		Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		109						71				
Link Speed (mph)		30			30			26			30	
Link Distance (ft)		204			1246			248			416	
Travel Time (s)		4.6			28.3			6.5			9.5	
Confl. Peds. (#/hr)	78								91			
Peak Hour Factor	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95	0.92	0.92	0.92
Adj. Flow (vph)	309	1087	1	0	0	0	0	649	171	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1397	0	0	0	0	0	820	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		-24			24			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA						NA				
Protected Phases		2						4				
Permitted Phases	2											
Minimum Split (s)	21.0	21.0						21.8				
Total Split (s)	57.0	57.0						43.0				
Total Split (%)	57.0%	57.0%						43.0%				
Maximum Green (s)	52.0	52.0						37.2				
Yellow Time (s)	3.6	3.6						3.6				
All-Red Time (s)	1.4	1.4						2.2				
Lost Time Adjust (s)		-1.0						-1.8				
Total Lost Time (s)		4.0						4.0				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0	4.0						4.0				
Flash Dont Walk (s)	8.0	8.0						12.0				
Pedestrian Calls (#/hr)	0	0						0				
Act Effct Green (s)		53.0						39.0				
Actuated g/C Ratio		0.53						0.39				
v/c Ratio		0.54						0.43				
Control Delay		4.7						13.3				

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour

8: Woodall EBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		1.2						0.8				
Total Delay		5.9						14.1				
LOS		A						B				
Approach Delay		5.9						14.1				
Approach LOS		A						B				
Queue Length 50th (ft)		36						90				
Queue Length 95th (ft)		44						73				
Internal Link Dist (ft)		124			1166			168			336	
Turn Bay Length (ft)												
Base Capacity (vph)		2601						1893				
Starvation Cap Reductn		902						702				
Spillback Cap Reductn		0						0				
Storage Cap Reductn		0						0				
Reduced v/c Ratio		0.82						0.69				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 40 (40%), Referenced to phase 2:EBTL and 6:, Start of Yellow

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.54

Intersection Signal Delay: 8.9

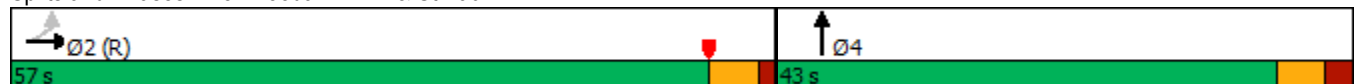
Intersection LOS: A

Intersection Capacity Utilization 49.3%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: Woodall EBFR & St Paul



North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour

9: Woodall WBFR & Akard WB On-Ramp & Akard

									
Lane Group	EBT	EBR	WBL	WBT	WBR	SBU	SBL	SBT	SBR
Lane Configurations	↑↑↑			↑↑↑			↑	↑↑	
Traffic Volume (vph)	1000	66	35	40	604	153	129	239	87
Future Volume (vph)	1000	66	35	40	604	153	129	239	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.95	1.00	0.95	0.95
Ped Bike Factor	0.99			0.92			1.00		
Frt	0.991			0.867				0.960	
Flt Protected				0.997			0.950		
Satd. Flow (prot)	4999	0	0	4023	0	0	1770	3398	0
Flt Permitted				0.861			0.950		
Satd. Flow (perm)	4999	0	0	3474	0	0	1764	3398	0
Right Turn on Red					Yes				Yes
Satd. Flow (RTOR)				492				50	
Link Speed (mph)	30			30				30	
Link Distance (ft)	222			279				216	
Travel Time (s)	5.0			6.3				4.9	
Confl. Peds. (#/hr)		34	34		20		1		
Peak Hour Factor	0.93	0.93	0.86	0.86	0.86	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1075	71	41	47	702	161	136	252	92
Shared Lane Traffic (%)									
Lane Group Flow (vph)	1146	0	0	790	0	0	297	344	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Right	R NA	Left	Left	Right
Median Width(ft)	0			0				12	
Link Offset(ft)	0			0				0	
Crosswalk Width(ft)	16			16				16	
Two way Left Turn Lane									
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		9	9	15		9
Turn Type	NA		pm+pt	NA		Perm	Split	NA	
Protected Phases	2		1	6			4	4	
Permitted Phases			6			4			
Minimum Split (s)	21.3		8.0	21.3		22.5	22.5	22.5	
Total Split (s)	46.0		24.0	70.0		30.0	30.0	30.0	
Total Split (%)	46.0%		24.0%	70.0%		30.0%	30.0%	30.0%	
Maximum Green (s)	40.7		20.0	64.7		24.5	24.5	24.5	
Yellow Time (s)	3.6		3.5	3.6		3.6	3.6	3.6	
All-Red Time (s)	1.7		0.5	1.7		1.9	1.9	1.9	
Lost Time Adjust (s)	-1.3			-1.3			-1.5	-1.5	
Total Lost Time (s)	4.0			4.0			4.0	4.0	
Lead/Lag	Lag		Lead						
Lead-Lag Optimize?	Yes		Yes						
Walk Time (s)	4.0			4.0		4.0	4.0	4.0	
Flash Dont Walk (s)	11.0			9.0		13.0	13.0	13.0	
Pedestrian Calls (#/hr)	0			0		0	0	0	
Act Effect Green (s)	42.0			66.0			26.0	26.0	
Actuated g/C Ratio	0.42			0.66			0.26	0.26	
v/c Ratio	0.55			0.31			0.65	0.37	
Control Delay	14.2			2.6			14.6	5.8	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour
9: Woodall WBFR & Akard WB On-Ramp & Akard

	→	↘	↙	←	↖	↗	↓	↘	
Lane Group	EBT	EBR	WBL	WBT	WBR	SBU	SBL	SBT	SBR
Queue Delay	0.3			0.2			1.1	0.6	
Total Delay	14.4			2.8			15.7	6.4	
LOS	B			A			B	A	
Approach Delay	14.4			2.8				10.7	
Approach LOS	B			A				B	
Queue Length 50th (ft)	256			20			159	56	
Queue Length 95th (ft)	304			28			258	71	
Internal Link Dist (ft)	142			199				136	
Turn Bay Length (ft)									
Base Capacity (vph)	2099			2569			458	920	
Starvation Cap Reductn	344			819			44	275	
Spillback Cap Reductn	0			0			0	0	
Storage Cap Reductn	0			0			0	0	
Reduced v/c Ratio	0.65			0.45			0.72	0.53	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 29 (29%), Referenced to phase 2:EBT and 6:WBTL, Start of Yellow

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 9.9

Intersection LOS: A

Intersection Capacity Utilization 63.5%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 9: Woodall WBFR & Akard WB On-Ramp & Akard

↙ Ø1	→ Ø2 (R)	↘ Ø4
24 s	46 s	30 s
↙ Ø6 (R)		
70 s		

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour

10: Woodall EBFR & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↑↑↑			↑↑↑				↑↑↑			
Traffic Volume (vph)	221	960	0	0	470	76	6	193	481	47	0	0
Future Volume (vph)	221	960	0	0	470	76	6	193	481	47	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	1.00	1.00	0.91	0.91	0.91	0.91	0.91	0.91	1.00	1.00
Ped Bike Factor		1.00			0.99				0.98			
Frt					0.979				0.990			
Flt Protected		0.991							0.987			
Satd. Flow (prot)	0	5040	0	0	4936	0	0	0	4874	0	0	0
Flt Permitted		0.710							0.987			
Satd. Flow (perm)	0	3598	0	0	4936	0	0	0	4874	0	0	0
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)					37				11			
Link Speed (mph)		30			30				26			30
Link Distance (ft)		279			374				181			248
Travel Time (s)		6.3			8.5				4.7			5.6
Confl. Peds. (#/hr)	27		44	44		27				117		
Peak Hour Factor	0.91	0.91	0.91	0.88	0.88	0.88	0.95	0.95	0.95	0.95	0.92	0.92
Adj. Flow (vph)	243	1055	0	0	534	86	6	203	506	49	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1298	0	0	620	0	0	0	764	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	Left	Left
Median Width(ft)		0			0				0			0
Link Offset(ft)		0			0				-24			24
Crosswalk Width(ft)		16			16				16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	9	15		9	15	
Turn Type	pm+pt	NA			NA		Perm	Perm	NA			
Protected Phases	15	2			6				4			
Permitted Phases	2						4	4				
Minimum Split (s)	8.2	21.1			21.1		21.6	21.6	21.6			
Total Split (s)	23.0	67.0			44.0		33.0	33.0	33.0			
Total Split (%)	23.0%	67.0%			44.0%		33.0%	33.0%	33.0%			
Maximum Green (s)	17.8	61.9			38.9		27.4	27.4	27.4			
Yellow Time (s)	3.2	3.6			3.6		3.6	3.6	3.6			
All-Red Time (s)	2.0	1.5			1.5		2.0	2.0	2.0			
Lost Time Adjust (s)		-1.1			-1.1				-1.6			
Total Lost Time (s)		4.0			4.0				4.0			
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		4.0			4.0		4.0	4.0	4.0			
Flash Dont Walk (s)		8.0			12.0		8.0	8.0	8.0			
Pedestrian Calls (#/hr)		0			0		0	0	0			
Act Effct Green (s)		63.0			40.0				29.0			
Actuated g/C Ratio		0.63			0.40				0.29			
v/c Ratio		0.51			0.31				0.54			
Control Delay		4.9			16.2				31.1			

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	0
Future Volume (vph)	0
Ideal Flow (vphpl)	1900
Lane Util. Factor	1.00
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	0.92
Adj. Flow (vph)	0
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Enter Blocked Intersection	No
Lane Alignment	Right
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	1.00
Turning Speed (mph)	9
Turn Type	
Protected Phases	
Permitted Phases	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Maximum Green (s)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour

10: Woodall EBFR & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Queue Delay		0.1			0.0				0.0			
Total Delay		4.9			16.2				31.1			
LOS		A			B				C			
Approach Delay		4.9			16.2				31.1			
Approach LOS		A			B				C			
Queue Length 50th (ft)		57			60				147			
Queue Length 95th (ft)		42			75				188			
Internal Link Dist (ft)		199			294				101			168
Turn Bay Length (ft)												
Base Capacity (vph)		2540			1996				1421			
Starvation Cap Reductn		176			0				0			
Spillback Cap Reductn		0			0				19			
Storage Cap Reductn		0			0				0			
Reduced v/c Ratio		0.55			0.31				0.54			

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 8 (8%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.54

Intersection Signal Delay: 15.0

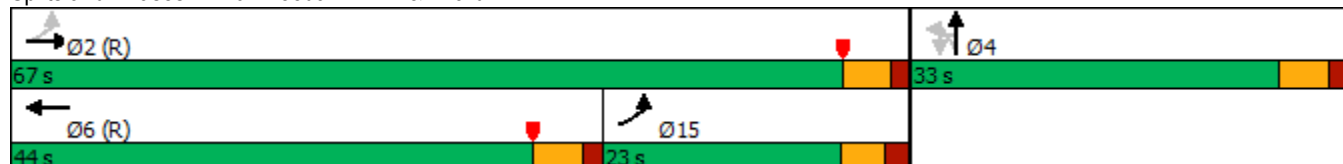
Intersection LOS: B

Intersection Capacity Utilization 61.2%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 10: Woodall EBFR & Akard





Lane Group	SBR
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour

11: Field/Field #11 #12 & Woodall WBFR

												
Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↑↑↑	↗		↖	↗↑↑					↖	↗
Traffic Volume (vph)	0	724	171	2	108	763	0	0	0	0	214	412
Future Volume (vph)	0	724	171	2	108	763	0	0	0	0	214	412
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		200		0		0	0		0	0	
Storage Lanes	1		3		1		0	0		0	1	
Taper Length (ft)	25				25			25			25	
Lane Util. Factor	1.00	0.86	1.00	0.91	0.86	0.86	1.00	1.00	1.00	1.00	0.95	0.91
Ped Bike Factor			0.93		0.99	1.00						1.00
Frt			0.850									0.989
Flt Protected					0.950	0.999					0.950	0.998
Satd. Flow (prot)	0	6408	1583	0	1522	4801	0	0	0	0	1681	1670
Flt Permitted					0.199	0.940					0.950	0.998
Satd. Flow (perm)	0	6408	1477	0	315	4517	0	0	0	0	1681	1670
Right Turn on Red			Yes				Yes			Yes		
Satd. Flow (RTOR)			186									3
Link Speed (mph)		30				30			30			26
Link Distance (ft)		675				234			238			187
Travel Time (s)		15.3				5.3			5.4			4.9
Confl. Peds. (#/hr)			26		26							
Peak Hour Factor	0.92	0.92	0.92	0.91	0.91	0.91	0.91	0.92	0.92	0.92	0.96	0.96
Adj. Flow (vph)	0	787	186	2	119	838	0	0	0	0	223	429
Shared Lane Traffic (%)					10%						10%	
Lane Group Flow (vph)	0	787	186	0	109	850	0	0	0	0	201	485
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	R NA	Left	Left	Right	Left	Left	Right	Left	Left
Median Width(ft)		20				20			12			12
Link Offset(ft)		0				0			-20			24
Crosswalk Width(ft)		16				16			16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	9	15		9	15		9	15	
Turn Type		NA	Perm	custom	pm+pt	NA					Split	NA
Protected Phases		2			1	2 1					4 12	4 12
Permitted Phases			2	1	2 1							
Minimum Split (s)		23.2	23.2	8.0	8.0							
Total Split (s)		32.0	32.0	56.0	56.0							
Total Split (%)		24.6%	24.6%	43.1%	43.1%							
Maximum Green (s)		26.8	26.8	52.0	52.0							
Yellow Time (s)		5.2	5.2	3.5	3.5							
All-Red Time (s)		0.0	0.0	0.5	0.5							
Lost Time Adjust (s)		-1.2	-1.2		-1.0							
Total Lost Time (s)		4.0	4.0		3.0							
Lead/Lag		Lead	Lead	Lag	Lag							
Lead-Lag Optimize?		Yes	Yes	Yes	Yes							
Walk Time (s)		4.0	4.0									
Flash Dont Walk (s)		14.0	14.0									
Pedestrian Calls (#/hr)		0	0									
Act Effect Green (s)		28.0	28.0		82.0	79.6					38.0	38.0

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour

11: Field/Field #11 #12 & Woodall WBFR

Lane Group	SBR	Ø4	Ø5	Ø6	Ø8	Ø12	Ø16
Lane Configurations							
Traffic Volume (vph)	327						
Future Volume (vph)	327						
Ideal Flow (vphpl)	1900						
Storage Length (ft)	0						
Storage Lanes	1						
Taper Length (ft)							
Lane Util. Factor	0.95						
Ped Bike Factor	0.97						
Frt	0.850						
Flt Protected							
Satd. Flow (prot)	1504						
Flt Permitted							
Satd. Flow (perm)	1460						
Right Turn on Red	Yes						
Satd. Flow (RTOR)	181						
Link Speed (mph)							
Link Distance (ft)							
Travel Time (s)							
Confl. Peds. (#/hr)	15						
Peak Hour Factor	0.96						
Adj. Flow (vph)	341						
Shared Lane Traffic (%)	10%						
Lane Group Flow (vph)	307						
Enter Blocked Intersection	No						
Lane Alignment	Right						
Median Width(ft)							
Link Offset(ft)							
Crosswalk Width(ft)							
Two way Left Turn Lane							
Headway Factor	1.00						
Turning Speed (mph)	9						
Turn Type	Perm						
Protected Phases		4	5	6	8	12	16
Permitted Phases	4 12						
Minimum Split (s)		40.1	8.0	21.9	31.0	6.0	6.0
Total Split (s)		36.0	62.0	34.0	28.0	6.0	6.0
Total Split (%)		28%	48%	26%	22%	5%	5%
Maximum Green (s)		29.9	57.0	28.6	22.0	1.0	1.0
Yellow Time (s)		6.1	5.0	5.4	6.0	5.0	5.0
All-Red Time (s)		0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)							
Total Lost Time (s)							
Lead/Lag		Lag	Lag	Lead	Lag	Lead	Lead
Lead-Lag Optimize?		Yes	Yes	Yes	Yes	Yes	Yes
Walk Time (s)		4.0		4.0	4.0		5.0
Flash Dont Walk (s)		29.0		12.0	20.0		11.0
Pedestrian Calls (#/hr)		0		0	0		0
Act Effect Green (s)	38.0						

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour

11: Field/Field #11 #12 & Woodall WBFR

												
Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Actuated g/C Ratio		0.22	0.22		0.63	0.61					0.29	0.29
v/c Ratio		0.57	0.40		0.16	0.30					0.41	0.99
Control Delay		24.3	10.4		1.9	2.9					40.1	83.9
Queue Delay		0.1	0.0		0.8	0.3					0.0	0.0
Total Delay		24.4	10.4		2.7	3.2					40.1	83.9
LOS		C	B		A	A					D	F
Approach Delay		21.7				3.1						55.1
Approach LOS		C				A						E
Queue Length 50th (ft)		178	84		6	17					143	446
Queue Length 95th (ft)		216	156		m9	20					222	#700
Internal Link Dist (ft)		595				154			158			107
Turn Bay Length (ft)			200									
Base Capacity (vph)		1380	464		690	2878					491	490
Starvation Cap Reductn		0	0		378	1304					0	0
Spillback Cap Reductn		68	0		0	0					0	0
Storage Cap Reductn		0	0		0	0					0	0
Reduced v/c Ratio		0.60	0.40		0.35	0.54					0.41	0.99

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 58 (45%), Referenced to phase 2:EBWB, Start of Yellow

Natural Cycle: 120

Control Type: Pretimed

Maximum v/c Ratio: 0.99

Intersection Signal Delay: 27.0

Intersection LOS: C

Intersection Capacity Utilization 67.4%

ICU Level of Service C

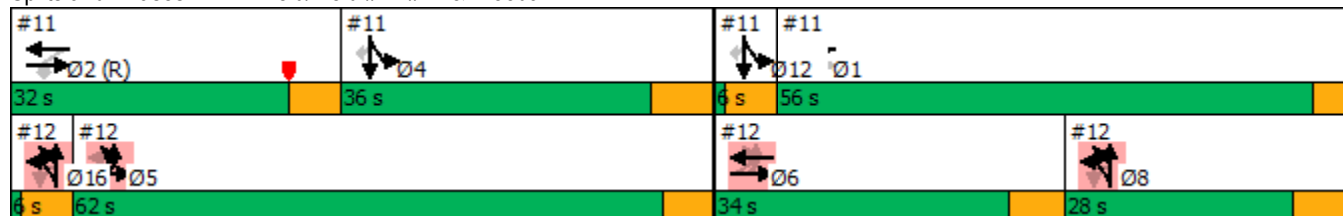
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: Field/Field #11 #12 & Woodall WBFR



Lane Group	SBR	Ø4	Ø5	Ø6	Ø8	Ø12	Ø16
Actuated g/C Ratio	0.29						
v/c Ratio	0.55						
Control Delay	19.5						
Queue Delay	0.0						
Total Delay	19.5						
LOS	B						
Approach Delay							
Approach LOS							
Queue Length 50th (ft)	90						
Queue Length 95th (ft)	192						
Internal Link Dist (ft)							
Turn Bay Length (ft)							
Base Capacity (vph)	554						
Starvation Cap Reductn	0						
Spillback Cap Reductn	0						
Storage Cap Reductn	0						
Reduced v/c Ratio	0.55						
Intersection Summary							

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour
12: Woodall EBFR & Field #11 #12 & Field EB On-Ramp

												
Lane Group	EBU	EBL2	EBL	EBT	WBU	WBT	WBR	WBR2	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Volume (vph)	1	135	0	825	2	695	82	101	55	168	590	225
Future Volume (vph)	1	135	0	825	2	695	82	101	55	168	590	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)			0				0			0		0
Storage Lanes			1				1			1		0
Taper Length (ft)			25							25		
Lane Util. Factor	0.91	0.91	1.00	0.91	0.91	0.91	1.00	0.91	0.91	0.86	0.86	0.91
Ped Bike Factor			1.00				0.97					
Frt							0.850				0.959	
Flt Protected			0.950							0.950	0.999	
Satd. Flow (prot)	0	0	1770	5085	0	5085	1583	0	0	1522	4604	0
Flt Permitted			0.170			0.938				0.950	0.999	
Satd. Flow (perm)	0	0	315	5085	0	4770	1530	0	0	1522	4604	0
Right Turn on Red								Yes				Yes
Satd. Flow (RTOR)							162				67	
Link Speed (mph)				30		30					30	
Link Distance (ft)				234		419					191	
Travel Time (s)				5.3		9.5					4.3	
Confl. Peds. (#/hr)		9					9					
Peak Hour Factor	0.92	0.92	0.92	0.92	0.89	0.89	0.89	0.89	0.87	0.87	0.87	0.87
Adj. Flow (vph)	1	147	0	897	2	781	92	113	63	193	678	259
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	0	0	148	897	0	783	205	0	0	237	956	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Left	R NA	Left	Right	Right	R NA	Left	Left	Right
Median Width(ft)				20		12					12	
Link Offset(ft)				0		12					-24	
Crosswalk Width(ft)				16		16					16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15	15		9		9	9	9	15		9
Turn Type	custom	pm+pt	pm+pt	NA	Perm	NA	Perm		Perm	Split	NA	
Protected Phases		5	5	5 6		6				8 16	8 16	
Permitted Phases	5	5 6	5 6		6		6		8 16			
Minimum Split (s)	8.0	8.0	8.0		21.9	21.9	21.9					
Total Split (s)	62.0	62.0	62.0		34.0	34.0	34.0					
Total Split (%)	47.7%	47.7%	47.7%		26.2%	26.2%	26.2%					
Maximum Green (s)	57.0	57.0	57.0		28.6	28.6	28.6					
Yellow Time (s)	5.0	5.0	5.0		5.4	5.4	5.4					
All-Red Time (s)	0.0	0.0	0.0		0.0	0.0	0.0					
Lost Time Adjust (s)			-1.0			-1.4	-1.4					
Total Lost Time (s)			4.0			4.0	4.0					
Lead/Lag	Lag	Lag	Lag		Lead	Lead	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes	Yes					
Walk Time (s)					4.0	4.0	4.0					
Flash Dont Walk (s)					12.0	12.0	12.0					
Pedestrian Calls (#/hr)					0	0	0					
Act Effect Green (s)			88.0	92.0		30.0	30.0			30.0	30.0	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour
12: Woodall EBFR & Field #11 #12 & Field EB On-Ramp

Lane Group	Ø1	Ø2	Ø4	Ø8	Ø12	Ø16
Lane Configurations						
Traffic Volume (vph)						
Future Volume (vph)						
Ideal Flow (vphpl)						
Storage Length (ft)						
Storage Lanes						
Taper Length (ft)						
Lane Util. Factor						
Ped Bike Factor						
Frt						
Flt Protected						
Satd. Flow (prot)						
Flt Permitted						
Satd. Flow (perm)						
Right Turn on Red						
Satd. Flow (RTOR)						
Link Speed (mph)						
Link Distance (ft)						
Travel Time (s)						
Confl. Peds. (#/hr)						
Peak Hour Factor						
Adj. Flow (vph)						
Shared Lane Traffic (%)						
Lane Group Flow (vph)						
Enter Blocked Intersection						
Lane Alignment						
Median Width(ft)						
Link Offset(ft)						
Crosswalk Width(ft)						
Two way Left Turn Lane						
Headway Factor						
Turning Speed (mph)						
Turn Type						
Protected Phases	1	2	4	8	12	16
Permitted Phases						
Minimum Split (s)	8.0	23.2	40.1	31.0	6.0	6.0
Total Split (s)	56.0	32.0	36.0	28.0	6.0	6.0
Total Split (%)	43%	25%	28%	22%	5%	5%
Maximum Green (s)	52.0	26.8	29.9	22.0	1.0	1.0
Yellow Time (s)	3.5	5.2	6.1	6.0	5.0	5.0
All-Red Time (s)	0.5	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)						
Total Lost Time (s)						
Lead/Lag	Lag	Lead	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes
Walk Time (s)		4.0	4.0	4.0		5.0
Flash Dont Walk (s)		14.0	29.0	20.0		11.0
Pedestrian Calls (#/hr)		0	0	0		0
Act Effect Green (s)						

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour
12: Woodall EBFR & Field #11 #12 & Field EB On-Ramp

												
Lane Group	EBU	EBL2	EBL	EBT	WBU	WBT	WBR	WBR2	NBU	NBL	NBT	NBR
Actuated g/C Ratio			0.68	0.71		0.23	0.23			0.23	0.23	
v/c Ratio			0.17	0.25		0.71	0.43			0.68	0.86	
Control Delay			0.6	1.4		43.8	10.5			56.4	53.4	
Queue Delay			0.7	0.6		0.2	0.0			0.0	2.3	
Total Delay			1.3	2.0		43.9	10.5			56.4	55.7	
LOS			A	A		D	B			E	E	
Approach Delay				1.9		37.0					55.8	
Approach LOS				A		D					E	
Queue Length 50th (ft)			1	2		238	25			212	282	
Queue Length 95th (ft)			m2	m2		282	81			310	327	
Internal Link Dist (ft)				154		339					111	
Turn Bay Length (ft)												
Base Capacity (vph)			862	3598		1100	477			351	1114	
Starvation Cap Reductn			464	2170		0	0			0	0	
Spillback Cap Reductn			0	292		30	0			0	73	
Storage Cap Reductn			0	0		0	0			0	0	
Reduced v/c Ratio			0.37	0.63		0.73	0.43			0.68	0.92	

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 58 (45%), Referenced to phase 2:EBWB, Start of Yellow

Natural Cycle: 120

Control Type: Pretimed

Maximum v/c Ratio: 0.99

Intersection Signal Delay: 32.6

Intersection LOS: C

Intersection Capacity Utilization 55.1%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: Woodall EBFR & Field #11 #12 & Field EB On-Ramp

#11  Ø2 (R)		#11  Ø4		#11  Ø12		#11  Ø1	
32 s		36 s		6 s		56 s	
#12  Ø16	#12  Ø5	#12  Ø6		#12  Ø8			
6 s	62 s	34 s		28 s			

Lane Group	Ø1	Ø2	Ø4	Ø8	Ø12	Ø16
Actuated g/C Ratio						
v/c Ratio						
Control Delay						
Queue Delay						
Total Delay						
LOS						
Approach Delay						
Approach LOS						
Queue Length 50th (ft)						
Queue Length 95th (ft)						
Internal Link Dist (ft)						
Turn Bay Length (ft)						
Base Capacity (vph)						
Starvation Cap Reductn						
Spillback Cap Reductn						
Storage Cap Reductn						
Reduced v/c Ratio						
Intersection Summary						

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour

13: Woodall WBFR & Harwood

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↰↰			↱↱↱	
Traffic Volume (vph)	0	57	0	0	875	318
Future Volume (vph)	0	57	0	0	875	318
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.88	1.00	1.00	0.91	0.91
Ped Bike Factor		0.90			0.99	
Frt		0.850			0.960	
Flt Protected						
Satd. Flow (prot)	0	2787	0	0	4830	0
Flt Permitted						
Satd. Flow (perm)	0	2513	0	0	4830	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		160			156	
Link Speed (mph)	30			30	24	
Link Distance (ft)	242			217	260	
Travel Time (s)	5.5			4.9	7.4	
Confl. Peds. (#/hr)		47				15
Peak Hour Factor	0.77	0.77	0.92	0.92	0.83	0.83
Adj. Flow (vph)	0	74	0	0	1054	383
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	74	0	0	1437	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			12	-12	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Turn Type		Perm			NA	
Protected Phases					4	
Permitted Phases		2				
Minimum Split (s)		20.0			20.0	
Total Split (s)		38.0			62.0	
Total Split (%)		38.0%			62.0%	
Maximum Green (s)		34.0			58.0	
Yellow Time (s)		3.5			3.5	
All-Red Time (s)		0.5			0.5	
Lost Time Adjust (s)		0.0			0.0	
Total Lost Time (s)		4.0			4.0	
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)		5.0			5.0	
Flash Dont Walk (s)		11.0			11.0	
Pedestrian Calls (#/hr)		0			0	
Act Effct Green (s)		34.0			58.0	
Actuated g/C Ratio		0.34			0.58	
v/c Ratio		0.08			0.50	
Control Delay		0.3			4.7	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour

13: Woodall WBFR & Harwood

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Queue Delay		0.0			0.5	
Total Delay		0.3			5.1	
LOS		A			A	
Approach Delay	0.3				5.1	
Approach LOS	A				A	
Queue Length 50th (ft)		0			48	
Queue Length 95th (ft)		1			55	
Internal Link Dist (ft)	162			137	180	
Turn Bay Length (ft)						
Base Capacity (vph)		960			2866	
Starvation Cap Reductn		0			844	
Spillback Cap Reductn		0			0	
Storage Cap Reductn		0			0	
Reduced v/c Ratio		0.08			0.71	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 91 (91%), Referenced to phase 2:EBR, Start of Yellow

Natural Cycle: 40

Control Type: Pretimed

Maximum v/c Ratio: 0.50

Intersection Signal Delay: 4.9

Intersection LOS: A

Intersection Capacity Utilization 44.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 13: Woodall WBFR & Harwood



North Harwood Tower
Lanes, Volumes, Timings

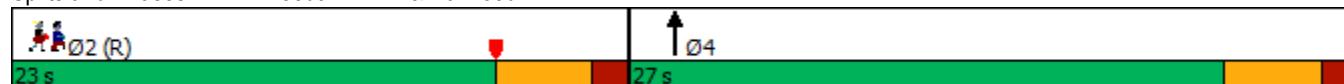
Phase 1 Background + Site - AM Peak Hour

14: Woodall EBFR & Harwood

							
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø2
Lane Configurations			↑↑↑				
Traffic Volume (vph)	0	0	564	236	0	0	
Future Volume (vph)	0	0	564	236	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	0.91	0.91	1.00	1.00	
Ped Bike Factor			0.99				
Frt			0.956				
Flt Protected							
Satd. Flow (prot)	0	0	4815	0	0	0	
Flt Permitted							
Satd. Flow (perm)	0	0	4815	0	0	0	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)			265				
Link Speed (mph)	30		26			30	
Link Distance (ft)	974		416			261	
Travel Time (s)	22.1		10.9			5.9	
Confl. Peds. (#/hr)				17			
Peak Hour Factor	0.92	0.92	0.89	0.89	0.92	0.92	
Adj. Flow (vph)	0	0	634	265	0	0	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	0	899	0	0	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Right	Left	Left	
Median Width(ft)	0		0			0	
Link Offset(ft)	24		0			0	
Crosswalk Width(ft)	16		16			16	
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9		9	15		
Turn Type			NA				
Protected Phases			4			2	
Permitted Phases							
Minimum Split (s)			20.9			21.0	
Total Split (s)			27.0			23.0	
Total Split (%)			54.0%			46%	
Maximum Green (s)			22.1			18.0	
Yellow Time (s)			3.6			3.6	
All-Red Time (s)			1.3			1.4	
Lost Time Adjust (s)			-0.9				
Total Lost Time (s)			4.0				
Lead/Lag							
Lead-Lag Optimize?							
Walk Time (s)			4.0			4.0	
Flash Dont Walk (s)			8.0			8.0	
Pedestrian Calls (#/hr)			0			0	
Act Effct Green (s)			23.0				
Actuated g/C Ratio			0.46				
v/c Ratio			0.38				
Control Delay			12.4				

							
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø2
Queue Delay			0.0				
Total Delay			12.4				
LOS			B				
Approach Delay			12.4				
Approach LOS			B				
Queue Length 50th (ft)			84				
Queue Length 95th (ft)			113				
Internal Link Dist (ft)	894		336			181	
Turn Bay Length (ft)							
Base Capacity (vph)			2358				
Starvation Cap Reductn			0				
Spillback Cap Reductn			0				
Storage Cap Reductn			0				
Reduced v/c Ratio			0.38				
Intersection Summary							
Area Type:	Other						
Cycle Length: 50							
Actuated Cycle Length: 50							
Offset: 32 (64%), Referenced to phase 2:Ped, Start of Yellow							
Natural Cycle: 45							
Control Type: Pretimed							
Maximum v/c Ratio: 0.38							
Intersection Signal Delay: 12.4				Intersection LOS: B			
Intersection Capacity Utilization 20.0%				ICU Level of Service A			
Analysis Period (min) 15							

Splits and Phases: 14: Woodall EBFR & Harwood



North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour

15: Woodall WBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑						↑↑↑	
Traffic Volume (vph)	0	0	0	283	755	0	0	0	0	0	917	335
Future Volume (vph)	0	0	0	283	755	0	0	0	0	0	917	335
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	0.91	0.91
Ped Bike Factor					0.96						0.97	
Frt											0.960	
Flt Protected					0.987							
Satd. Flow (prot)	0	0	0	0	5019	0	0	0	0	0	4741	0
Flt Permitted					0.987							
Satd. Flow (perm)	0	0	0	0	4828	0	0	0	0	0	4741	0
Right Turn on Red			Yes	Yes		Yes			Yes			Yes
Satd. Flow (RTOR)					34						114	
Link Speed (mph)		30			30			30			24	
Link Distance (ft)		836			267			260			433	
Travel Time (s)		19.0			6.1			5.9			12.3	
Confl. Peds. (#/hr)				56								39
Peak Hour Factor	0.92	0.92	0.92	0.91	0.91	0.91	0.92	0.92	0.92	0.85	0.85	0.85
Adj. Flow (vph)	0	0	0	311	830	0	0	0	0	0	1079	394
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	1141	0	0	0	0	0	1473	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		20			-20			12			-12	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type				Perm	NA						NA	
Protected Phases					2						4	
Permitted Phases				2								
Minimum Split (s)				21.2	21.2						21.2	
Total Split (s)				54.0	54.0						46.0	
Total Split (%)				54.0%	54.0%						46.0%	
Maximum Green (s)				48.8	48.8						40.8	
Yellow Time (s)				3.6	3.6						3.6	
All-Red Time (s)				1.6	1.6						1.6	
Lost Time Adjust (s)					-1.2						-1.2	
Total Lost Time (s)					4.0						4.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)				4.0	4.0						4.0	
Flash Dont Walk (s)				8.0	8.0						8.0	
Pedestrian Calls (#/hr)				0	0						0	
Act Effect Green (s)					50.0						42.0	
Actuated g/C Ratio					0.50						0.42	
v/c Ratio					0.47						0.72	
Control Delay					7.3						24.1	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour

15: Woodall WBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay					0.1						0.5	
Total Delay					7.4						24.6	
LOS					A						C	
Approach Delay					7.4						24.6	
Approach LOS					A						C	
Queue Length 50th (ft)					40						200	
Queue Length 95th (ft)					48						m196	
Internal Link Dist (ft)		756			187			180			353	
Turn Bay Length (ft)												
Base Capacity (vph)					2431						2057	
Starvation Cap Reductn					369						212	
Spillback Cap Reductn					0						0	
Storage Cap Reductn					0						0	
Reduced v/c Ratio					0.55						0.80	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 87 (87%), Referenced to phase 2:WBTL and 6:, Start of Yellow

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 17.1

Intersection LOS: B

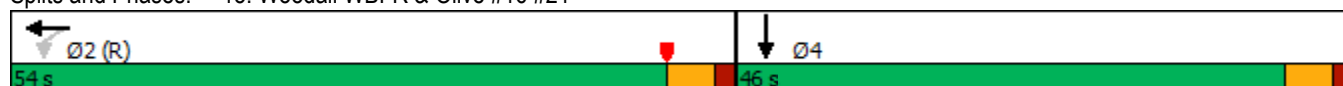
Intersection Capacity Utilization 53.1%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 15: Woodall WBFR & Olive #16 #21



North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour

16: Woodall EBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑	↑		↑↑↑				
Traffic Volume (vph)	0	0	0	0	953	842	100	458	0	0	0	0
Future Volume (vph)	0	0	0	0	953	842	100	458	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00
Ped Bike Factor						0.95		0.99				
Frt						0.850						
Flt Protected								0.991				
Satd. Flow (prot)	0	0	0	0	5085	1583	0	5040	0	0	0	0
Flt Permitted								0.991				
Satd. Flow (perm)	0	0	0	0	5085	1510	0	4994	0	0	0	0
Right Turn on Red			Yes			Yes	Yes		Yes			Yes
Satd. Flow (RTOR)						154		56				
Link Speed (mph)		30			30			26			30	
Link Distance (ft)		267			231			261			427	
Travel Time (s)		6.1			5.3			6.8			9.7	
Confl. Peds. (#/hr)						14	20					
Peak Hour Factor	0.92	0.92	0.92	0.95	0.95	0.95	0.80	0.80	0.80	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	1003	886	125	573	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	1003	886	0	698	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		20			-20			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type					NA	Perm	Perm	NA				
Protected Phases					2			4				
Permitted Phases						2	4					
Minimum Split (s)					22.1	22.1	21.1	21.1				
Total Split (s)					57.5	57.5	42.5	42.5				
Total Split (%)					57.5%	57.5%	42.5%	42.5%				
Maximum Green (s)					51.4	51.4	37.4	37.4				
Yellow Time (s)					3.6	3.6	3.6	3.6				
All-Red Time (s)					2.5	2.5	1.5	1.5				
Lost Time Adjust (s)					-2.1	-2.1		-1.1				
Total Lost Time (s)					4.0	4.0		4.0				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)					4.0	4.0	4.0	4.0				
Flash Dont Walk (s)					8.0	8.0	8.0	8.0				
Pedestrian Calls (#/hr)					0	0	0	0				
Act Effct Green (s)					53.5	53.5		38.5				
Actuated g/C Ratio					0.54	0.54		0.38				
v/c Ratio					0.37	1.01		0.36				
Control Delay					14.0	53.1		14.8				

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour

16: Woodall EBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay					0.0	2.6		0.7				
Total Delay					14.0	55.7		15.5				
LOS					B	E		B				
Approach Delay					33.5			15.5				
Approach LOS					C			B				
Queue Length 50th (ft)					128	~494		67				
Queue Length 95th (ft)					159	#785		69				
Internal Link Dist (ft)		187			151			181			347	
Turn Bay Length (ft)												
Base Capacity (vph)					2720	879		1957				
Starvation Cap Reductn					0	0		857				
Spillback Cap Reductn					10	8		271				
Storage Cap Reductn					0	0		0				
Reduced v/c Ratio					0.37	1.02		0.63				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 85 (85%), Referenced to phase 2:WBT and 6:, Start of Yellow

Natural Cycle: 70

Control Type: Pretimed

Maximum v/c Ratio: 1.01

Intersection Signal Delay: 28.7

Intersection LOS: C

Intersection Capacity Utilization 71.1%

ICU Level of Service C

Analysis Period (min) 15

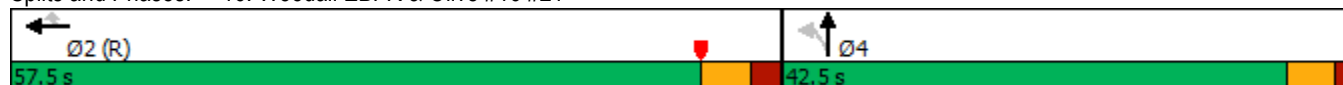
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 16: Woodall EBFR & Olive #16 #21



North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour

17: Woodall WBFR & Pearl #17 #18

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations			↑↑↑	↑	↑	↑↑↑						↑↑↑
Traffic Volume (vph)	1	0	904	105	144	930	0	0	0	0	149	1024
Future Volume (vph)	1	0	904	105	144	930	0	0	0	0	149	1024
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		250		0	0		0	0		0	0	
Storage Lanes		1		1	1		0	0		0	0	
Taper Length (ft)		25			25			25			25	
Lane Util. Factor	0.91	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	0.91	0.91
Ped Bike Factor				0.98								0.94
Frt				0.850								0.945
Flt Protected					0.950							0.996
Satd. Flow (prot)	0	0	5085	1583	1770	5085	0	0	0	0	0	4477
Flt Permitted			0.939		0.159							0.996
Satd. Flow (perm)	0	0	4775	1546	296	5085	0	0	0	0	0	4477
Right Turn on Red				Yes			Yes			Yes		
Satd. Flow (RTOR)				119								78
Link Speed (mph)			30			30			30			30
Link Distance (ft)			1034			257			433			138
Travel Time (s)			23.5			5.8			9.8			3.1
Confl. Peds. (#/hr)				4	4							
Peak Hour Factor	0.87	0.87	0.87	0.87	0.94	0.94	0.94	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	0	1039	121	153	989	0	0	0	0	162	1113
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	1040	121	153	989	0	0	0	0	0	2010
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left
Median Width(ft)			12			12			0			0
Link Offset(ft)			0			0			0			0
Crosswalk Width(ft)			16			16			16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15		9	15		9	15		9	15	
Turn Type	Perm		NA	Perm	pm+pt	NA					Split	NA
Protected Phases			2		11	6 11					4	4
Permitted Phases	2			2	6 11							
Minimum Split (s)	21.1		21.1	21.1	8.0						22.0	22.0
Total Split (s)	36.0		36.0	36.0	18.0						46.0	46.0
Total Split (%)	36.0%		36.0%	36.0%	18.0%						46.0%	46.0%
Maximum Green (s)	30.9		30.9	30.9	14.0						40.0	40.0
Yellow Time (s)	3.6		3.6	3.6	3.5						3.9	3.9
All-Red Time (s)	1.5		1.5	1.5	0.5						2.1	2.1
Lost Time Adjust (s)			-1.1	-1.1	-1.0							-2.0
Total Lost Time (s)			4.0	4.0	3.0							4.0
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0		4.0	4.0							4.0	4.0
Flash Dont Walk (s)	6.0		6.0	6.0							6.0	6.0
Pedestrian Calls (#/hr)	0		0	0							0	0
Act Effect Green (s)			32.0	32.0	51.0	49.9						42.0

Lane Group	SBR	Ø6
Lane Configurations		
Traffic Volume (vph)	676	
Future Volume (vph)	676	
Ideal Flow (vphpl)	1900	
Storage Length (ft)	0	
Storage Lanes	0	
Taper Length (ft)		
Lane Util. Factor	0.91	
Ped Bike Factor		
Frt		
Flt Protected		
Satd. Flow (prot)	0	
Flt Permitted		
Satd. Flow (perm)	0	
Right Turn on Red	Yes	
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)	56	
Peak Hour Factor	0.92	
Adj. Flow (vph)	735	
Shared Lane Traffic (%)		
Lane Group Flow (vph)	0	
Enter Blocked Intersection	No	
Lane Alignment	Right	
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor	1.00	
Turning Speed (mph)	9	
Turn Type		
Protected Phases	6	
Permitted Phases		
Minimum Split (s)	21.1	
Total Split (s)	54.0	
Total Split (%)	54%	
Maximum Green (s)	48.9	
Yellow Time (s)	3.6	
All-Red Time (s)	1.5	
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Walk Time (s)	4.0	
Flash Dont Walk (s)	6.0	
Pedestrian Calls (#/hr)	0	
Act Effect Green (s)		

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour

17: Woodall WBFR & Pearl #17 #18

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Actuated g/C Ratio			0.32	0.32	0.51	0.50						0.42
v/c Ratio			0.68	0.21	0.41	0.39						1.08dr
Control Delay			12.7	0.7	14.6	7.8						61.5
Queue Delay			0.0	0.0	0.0	0.1						0.0
Total Delay			12.7	0.7	14.6	7.8						61.5
LOS			B	A	B	A						E
Approach Delay			11.5			8.8						61.5
Approach LOS			B			A						E
Queue Length 50th (ft)			53	0	28	56						~501
Queue Length 95th (ft)			60	m0	m58	m65						#599
Internal Link Dist (ft)			954			177			353			58
Turn Bay Length (ft)												
Base Capacity (vph)			1528	575	372	2537						1925
Starvation Cap Reductn			0	0	0	426						0
Spillback Cap Reductn			0	0	0	0						0
Storage Cap Reductn			0	0	0	0						0
Reduced v/c Ratio			0.68	0.21	0.41	0.47						1.04

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 77 (77%), Referenced to phase 2:EBTU and 6:WBTL, Start of Yellow

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 1.04

Intersection Signal Delay: 34.1

Intersection LOS: C

Intersection Capacity Utilization 75.0%

ICU Level of Service D

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

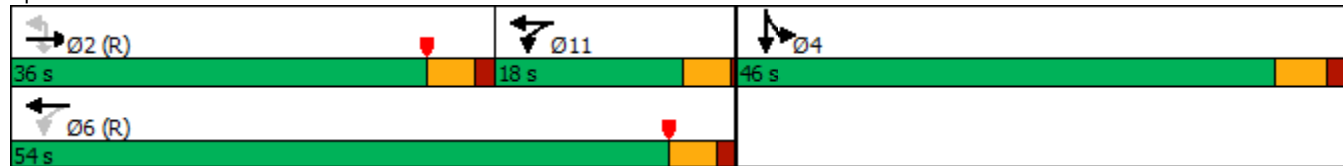
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 17: Woodall WBFR & Pearl #17 #18





Lane Group	SBR	Ø6
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour

18: Woodall EBFR & Pearl #17 #18

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	298	765	0	0	899	54	186	732	371	0	0	0
Future Volume (vph)	298	765	0	0	899	54	186	732	371	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	250		0	0		0	0		0
Storage Lanes	2		0	1		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	1.00	0.91	1.00	0.91	0.91	0.91	1.00	1.00	1.00
Ped Bike Factor	0.98					0.87		0.98				
Frt						0.850		0.957				
Flt Protected	0.950							0.993				
Satd. Flow (prot)	3433	3539	0	0	5085	1583	0	4751	0	0	0	0
Flt Permitted	0.186							0.993				
Satd. Flow (perm)	657	3539	0	0	5085	1376	0	4751	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						87		104				
Link Speed (mph)		30			30			26			30	
Link Distance (ft)		257			1016			427			143	
Travel Time (s)		5.8			23.1			11.2			3.3	
Confl. Peds. (#/hr)	89					89			19			
Peak Hour Factor	0.89	0.89	0.89	0.96	0.96	0.96	0.91	0.91	0.91	0.92	0.92	0.92
Adj. Flow (vph)	335	860	0	0	936	56	204	804	408	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	335	860	0	0	936	56	0	1416	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			0			0	
Link Offset(ft)		0			0			-12			12	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA			NA	Perm	Perm	NA				
Protected Phases	5	2			6			4				
Permitted Phases	2					6	4					
Minimum Split (s)	8.0	21.4			27.0	27.0	23.1	23.1				
Total Split (s)	25.0	66.0			41.0	41.0	34.0	34.0				
Total Split (%)	25.0%	66.0%			41.0%	41.0%	34.0%	34.0%				
Maximum Green (s)	20.0	60.6			36.0	36.0	28.0	28.0				
Yellow Time (s)	3.0	3.6			3.6	3.6	3.6	3.6				
All-Red Time (s)	2.0	1.8			1.4	1.4	2.4	2.4				
Lost Time Adjust (s)	-1.0	-1.4			-1.0	-1.0		-2.0				
Total Lost Time (s)	4.0	4.0			4.0	4.0		4.0				
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Walk Time (s)		4.0			4.0	4.0	4.0	4.0				
Flash Dont Walk (s)		8.0			18.0	18.0	8.0	8.0				
Pedestrian Calls (#/hr)		0			0	0	0	0				
Act Effect Green (s)	62.0	62.0			37.0	37.0		30.0				

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site - AM Peak Hour

18: Woodall EBFR & Pearl #17 #18

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.62	0.62			0.37	0.37		0.30				
v/c Ratio	0.34	0.39			0.50	0.10		0.95				
Control Delay	12.0	1.8			25.4	2.3		37.3				
Queue Delay	0.3	0.2			0.0	0.0		0.4				
Total Delay	12.3	2.0			25.4	2.3		37.6				
LOS	B	A			C	A		D				
Approach Delay		4.9			24.1			37.6				
Approach LOS		A			C			D				
Queue Length 50th (ft)	32	24			166	0		326				
Queue Length 95th (ft)	m57	m28			206	12		m349				
Internal Link Dist (ft)		177			936			347				63
Turn Bay Length (ft)												
Base Capacity (vph)	990	2194			1881	563		1498				
Starvation Cap Reductn	248	589			0	0		7				
Spillback Cap Reductn	0	0			0	0		0				
Storage Cap Reductn	0	0			0	0		0				
Reduced v/c Ratio	0.45	0.54			0.50	0.10		0.95				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 95 (95%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 23.1

Intersection LOS: C

Intersection Capacity Utilization 75.0%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Woodall EBFR & Pearl #17 #18



Intersection												
Int Delay, s/veh	0											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑↑								↑↑	↑		
Traffic Vol, veh/h	0	645	94	0	0	0	0	0	1	0	1	0
Future Vol, veh/h	0	645	94	0	0	0	0	0	1	0	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	0	-	-
Veh in Median Storage, #	-	0	-	-	16979	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	701	102	0	0	0	0	0	1	0	1	0

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	0	0	0	-	-	-	402	280	803
Stage 1	-	-	-	-	-	-	-	0	0
Stage 2	-	-	-	-	-	-	-	280	803
Critical Hdwy	5.34	-	-	-	-	-	7.14	6.44	6.54
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	6.74	5.54
Follow-up Hdwy	3.12	-	-	-	-	-	3.92	3.82	4.02
Pot Cap-1 Maneuver	-	-	-	0	0	0	511	660	315
Stage 1	-	-	-	0	0	-	-	-	0
Stage 2	-	-	-	0	0	-	645	394	0
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	-	-	511	659	315
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	659	315
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	644	394	-

Approach	EB	NB	SB
HCM Control Delay, s	0	12.1	0
HCM LOS		B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	511	-	-	-	-
HCM Lane V/C Ratio	0.002	-	-	-	-
HCM Control Delay (s)	12.1	0	-	-	0
HCM Lane LOS	B	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗			↑↑↑	
Traffic Vol, veh/h	0	31	0	0	749	184
Future Vol, veh/h	0	31	0	0	749	184
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	16974	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	34	0	0	814	200
Major/Minor	Minor2		Major2			
Conflicting Flow All	-	507	-	-	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.14	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.92	-	-	-	-
Pot Cap-1 Maneuver	0	437	-	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	437	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		SB			
HCM Control Delay, s	13.9		0			
HCM LOS	B					
Minor Lane/Major Mvmt	EBLn1	SBT	SBR			
Capacity (veh/h)	437	-	-			
HCM Lane V/C Ratio	0.077	-	-			
HCM Control Delay (s)	13.9	-	-			
HCM Lane LOS	B	-	-			
HCM 95th %tile Q(veh)	0.2	-	-			

Intersection												
Int Delay, s/veh	1.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔			↔			↔	
Traffic Vol, veh/h	0	48	115	33	275	7	17	0	8	2	0	5
Future Vol, veh/h	0	48	115	33	275	7	17	0	8	2	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	52	125	36	299	8	18	0	9	2	0	5
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	307	0	0	177	0	0	337	494	89	401	552	154
Stage 1	-	-	-	-	-	-	115	115	-	375	375	-
Stage 2	-	-	-	-	-	-	222	379	-	26	177	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1250	-	-	1396	-	-	593	475	951	534	440	864
Stage 1	-	-	-	-	-	-	877	799	-	618	615	-
Stage 2	-	-	-	-	-	-	760	613	-	988	752	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1250	-	-	1396	-	-	575	460	951	516	426	864
Mov Cap-2 Maneuver	-	-	-	-	-	-	575	460	-	516	426	-
Stage 1	-	-	-	-	-	-	877	799	-	618	596	-
Stage 2	-	-	-	-	-	-	732	594	-	979	752	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.9			10.7			10		
HCM LOS							B			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	658	1250	-	-	1396	-	-	724				
HCM Lane V/C Ratio	0.041	-	-	-	0.026	-	-	0.011				
HCM Control Delay (s)	10.7	0	-	-	7.6	0.1	-	10				
HCM Lane LOS	B	A	-	-	A	A	-	B				
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	0				

North Harwood Tower
HCM 6th TWSC

Phase 1 Background + Site - AM Peak Hour
22: Adjacent North Drive/Adjacent South Drive & Harwood

Intersection														
Int Delay, s/veh	2.3													
Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↔↔			↔↔				↔			↔	
Traffic Vol, veh/h	2	135	172	39	28	127	140	1	1	1	0	0	0	0
Future Vol, veh/h	2	135	172	39	28	127	140	1	1	1	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	-	None	-	-	None	-	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	-	0	-	-	0	-	-	-	0	-	-	0	-
Grade, %	-	-	0	-	-	0	-	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	147	187	42	30	138	152	1	1	1	0	0	0	0
Major/Minor	Major1			Major2			Minor1			Minor2				
Conflicting Flow All	290	290	0	0	229	0	0	0	635	856	115	666	801	145
Stage 1	-	-	-	-	-	-	-	0	506	506	-	274	274	-
Stage 2	-	-	-	-	-	-	-	0	129	350	-	392	527	-
Critical Hdwy	6.44	4.14	-	-	4.14	-	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.52	2.22	-	-	2.22	-	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	940	1269	-	-	1336	-	-	0	363	294	916	345	316	876
Stage 1	-	-	-	-	-	-	-	0	517	538	-	709	682	-
Stage 2	-	-	-	-	-	-	-	0	861	631	-	604	527	-
Platoon blocked, %			-	-		-	-	-						
Mov Cap-1 Maneuver	1263	1263	-	-	1336	-	-	0	319	247	916	302	266	876
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	0	319	247	-	302	266	-
Stage 1	-	-	-	-	-	-	-	0	447	465	-	613	664	-
Stage 2	-	-	-	-	-	-	-	0	838	614	-	521	455	-
Approach	EB			WB			NB			SB				
HCM Control Delay, s	3.4			0.8			18.1			0				
HCM LOS							C			A				
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1						
Capacity (veh/h)	278	1263	-	-	1336	-	-	-						
HCM Lane V/C Ratio	0.008	0.116	-	-	0.023	-	-	-						
HCM Control Delay (s)	18.1	8.2	0.4	-	7.8	0.1	-	0						
HCM Lane LOS		C	A	A	-	A	A	-	A					
HCM 95th %tile Q(veh)		0	0.4	-	-	0.1	-	-	-					

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour

1: McKinney & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	158	111	96	14	104	87	21	232	19	10	65	314
Future Volume (vph)	158	111	96	14	104	87	21	232	19	10	65	314
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor	0.95	0.95			0.96			0.99				0.97
Frt		0.931			0.936			0.989				0.979
Flt Protected	0.950				0.997			0.996				0.992
Satd. Flow (prot)	1770	1643	0	0	3174	0	0	3453	0	0	0	3375
Flt Permitted	0.950				0.924			0.916				0.821
Satd. Flow (perm)	1673	1643	0	0	2929	0	0	3166	0	0	0	2755
Right Turn on Red			Yes			Yes			Yes			
Satd. Flow (RTOR)		51			123			11				19
Link Speed (mph)		30			30			30				30
Link Distance (ft)		424			269			526				348
Travel Time (s)		9.6			6.1			12.0				7.9
Confl. Peds. (#/hr)	46		59	59		46	67		72		72	
Peak Hour Factor	0.80	0.80	0.80	0.71	0.71	0.71	0.92	0.92	0.92	0.84	0.84	0.84
Adj. Flow (vph)	198	139	120	20	146	123	23	252	21	12	77	374
Shared Lane Traffic (%)												
Lane Group Flow (vph)	198	259	0	0	289	0	0	296	0	0	0	539
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	R NA	Left	Left
Median Width(ft)		12			12			0				0
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	9	15	
Turn Type	Prot	NA		Perm	NA		pm+pt	NA		Perm	Perm	NA
Protected Phases	8!				4!		5	2				6
Permitted Phases		8		4			2			6	6	
Minimum Split (s)	23.4	23.4		23.4	23.4		8.0	23.4		23.4	23.4	23.4
Total Split (s)	44.0	44.0		44.0	44.0		19.0	56.0		37.0	37.0	37.0
Total Split (%)	44.0%	44.0%		44.0%	44.0%		19.0%	56.0%		37.0%	37.0%	37.0%
Maximum Green (s)	38.6	38.6		38.6	38.6		15.0	50.6		31.6	31.6	31.6
Yellow Time (s)	3.6	3.6		3.6	3.6		3.5	3.2		3.2	3.2	3.2
All-Red Time (s)	1.8	1.8		1.8	1.8		0.5	2.2		2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0			0.0			0.0				0.0
Total Lost Time (s)	5.4	5.4			5.4			5.4				5.4
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Walk Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	4.0
Flash Dont Walk (s)	13.0	13.0		13.0	13.0			13.0		13.0	13.0	13.0
Pedestrian Calls (#/hr)	0	0		0	0			0		0	0	0
Act Effect Green (s)	38.6	38.6			38.6			50.6				31.6
Actuated g/C Ratio	0.39	0.39			0.39			0.51				0.32
v/c Ratio	0.29	0.39			0.24			0.18				0.61
Control Delay	15.7	12.3			11.4			22.5				24.1

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	64
Future Volume (vph)	64
Ideal Flow (vphpl)	1900
Lane Util. Factor	0.95
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	67
Peak Hour Factor	0.84
Adj. Flow (vph)	76
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Enter Blocked Intersection	No
Lane Alignment	Right
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	1.00
Turning Speed (mph)	9
Turn Type	
Protected Phases	
Permitted Phases	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Maximum Green (s)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour

1: McKinney & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Queue Delay	0.0	0.0			0.0			0.0				0.3
Total Delay	15.7	12.3			11.4			22.5				24.3
LOS	B	B			B			C				C
Approach Delay		13.8			11.4			22.5				24.3
Approach LOS		B			B			C				C
Queue Length 50th (ft)	49	43			34			89				166
Queue Length 95th (ft)	70	65			42			131				211
Internal Link Dist (ft)		344			189			446				268
Turn Bay Length (ft)												
Base Capacity (vph)	683	665			1206			1646				883
Starvation Cap Reductn	0	0			0			0				59
Spillback Cap Reductn	0	0			0			0				0
Storage Cap Reductn	0	0			0			0				0
Reduced v/c Ratio	0.29	0.39			0.24			0.18				0.65

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 48 (48%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.61

Intersection Signal Delay: 18.6

Intersection LOS: B

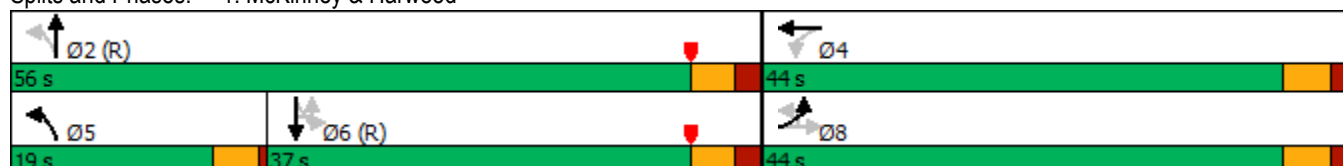
Intersection Capacity Utilization 76.3%

ICU Level of Service D

Analysis Period (min) 15

! Phase conflict between lane groups.

Splits and Phases: 1: McKinney & Harwood





Lane Group	SBR
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour

2: Cedar Springs & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	219	0	0	0	283	1	1069	23	0	0	0
Future Volume (vph)	68	219	0	0	0	283	1	1069	23	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	0.88	0.81	0.81	0.81	1.00	1.00	1.00
Ped Bike Factor		0.98				0.91		1.00				
Frt						0.850		0.997				
Flt Protected		0.988										
Satd. Flow (prot)	0	3497	0	0	0	2787	0	7505	0	0	0	0
Flt Permitted		0.988										
Satd. Flow (perm)	0	3433	0	0	0	2543	0	7504	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						62		6				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		269			424			493			445	
Travel Time (s)		6.1			9.6			11.2			10.1	
Confl. Peds. (#/hr)	41		44	44		41	34		44			
Peak Hour Factor	0.80	0.80	0.80	0.94	0.94	0.94	0.95	0.95	0.95	0.92	0.92	0.92
Adj. Flow (vph)	85	274	0	0	0	301	1	1125	24	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	359	0	0	0	301	0	1150	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			-24			24	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA				Perm	Perm	NA				
Protected Phases		4						2				
Permitted Phases	4					4	2					
Minimum Split (s)	21.4	21.4				21.4	21.3	21.3				
Total Split (s)	47.0	47.0				47.0	53.0	53.0				
Total Split (%)	47.0%	47.0%				47.0%	53.0%	53.0%				
Maximum Green (s)	41.6	41.6				41.6	47.7	47.7				
Yellow Time (s)	3.6	3.6				3.6	3.6	3.6				
All-Red Time (s)	1.8	1.8				1.8	1.7	1.7				
Lost Time Adjust (s)		0.0				0.0		0.0				
Total Lost Time (s)		5.4				5.4		5.3				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0	4.0				4.0	4.0	4.0				
Flash Dont Walk (s)	12.0	12.0				12.0	10.0	10.0				
Pedestrian Calls (#/hr)	0	0				0	0	0				
Act Effct Green (s)		41.6				41.6		47.7				
Actuated g/C Ratio		0.42				0.42		0.48				
v/c Ratio		0.25				0.28		0.32				
Control Delay		7.0				13.9		28.7				

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour

2: Cedar Springs & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0				0.0		0.0				
Total Delay		7.0				13.9		28.7				
LOS		A				B		C				
Approach Delay		7.0			13.9			28.7				
Approach LOS		A			B			C				
Queue Length 50th (ft)		14				52		190				
Queue Length 95th (ft)		26				74		m208				
Internal Link Dist (ft)		189			344			413			365	
Turn Bay Length (ft)												
Base Capacity (vph)		1428				1094		3582				
Starvation Cap Reductn		0				0		0				
Spillback Cap Reductn		0				0		56				
Storage Cap Reductn		0				0		0				
Reduced v/c Ratio		0.25				0.28		0.33				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 52 (52%), Referenced to phase 2:NBTL, Start of Yellow

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.32

Intersection Signal Delay: 21.9

Intersection LOS: C

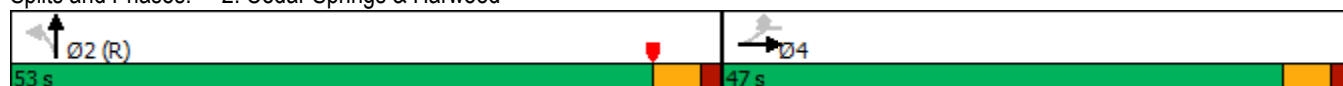
Intersection Capacity Utilization 52.9%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Cedar Springs & Harwood



North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour

3: McKinney & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	0	0	0	72	684	329	1	36	406	0	0	267
Future Volume (vph)	0	0	0	72	684	329	1	36	406	0	0	267
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	0.95	1.00	1.00	0.95
Ped Bike Factor					0.99	0.95			0.99			0.96
Frt						0.850						0.960
Flt Protected					0.995				0.996			
Satd. Flow (prot)	0	0	0	0	3522	1583	0	0	3525	0	0	3258
Flt Permitted					0.995				0.885			
Satd. Flow (perm)	0	0	0	0	3472	1507	0	0	3113	0	0	3258
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)						143						60
Link Speed (mph)		30			30				30			30
Link Distance (ft)		536			836				348			457
Travel Time (s)		12.2			19.0				7.9			10.4
Confl. Peds. (#/hr)				88		22		86		69		
Peak Hour Factor	0.92	0.92	0.92	0.88	0.88	0.88	0.92	0.92	0.92	0.92	0.91	0.91
Adj. Flow (vph)	0	0	0	82	777	374	1	39	441	0	0	293
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	859	374	0	0	481	0	0	401
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	Left	Left
Median Width(ft)		0			0				0			0
Link Offset(ft)		16			0				0			0
Crosswalk Width(ft)		16			16				16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	9	15		9	15	
Turn Type				Perm	NA	Perm	Perm	Perm	NA			NA
Protected Phases					4				2			2
Permitted Phases				4		4	2	2				
Minimum Split (s)				23.3	23.3	23.3	23.4	23.4	23.4			23.4
Total Split (s)				57.0	57.0	57.0	43.0	43.0	43.0			43.0
Total Split (%)				57.0%	57.0%	57.0%	43.0%	43.0%	43.0%			43.0%
Maximum Green (s)				51.7	51.7	51.7	37.6	37.6	37.6			37.6
Yellow Time (s)				3.2	3.2	3.2	3.2	3.2	3.2			3.2
All-Red Time (s)				2.1	2.1	2.1	2.2	2.2	2.2			2.2
Lost Time Adjust (s)					0.0	0.0			0.0			0.0
Total Lost Time (s)					5.3	5.3			5.4			5.4
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)				4.0	4.0	4.0	4.0	4.0	4.0			4.0
Flash Dont Walk (s)				14.0	14.0	14.0	14.0	14.0	14.0			14.0
Pedestrian Calls (#/hr)				0	0	0	0	0	0			0
Act Effect Green (s)					51.7	51.7			37.6			37.6
Actuated g/C Ratio					0.52	0.52			0.38			0.38
v/c Ratio					0.48	0.44			0.41			0.32
Control Delay					12.4	6.7			26.9			18.2

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	98
Future Volume (vph)	98
Ideal Flow (vphpl)	1900
Lane Util. Factor	0.95
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	86
Peak Hour Factor	0.91
Adj. Flow (vph)	108
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Enter Blocked Intersection	No
Lane Alignment	Right
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	1.00
Turning Speed (mph)	9
Turn Type	
Protected Phases	
Permitted Phases	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Maximum Green (s)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour

3: McKinney & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Queue Delay					0.0	0.0			0.5			0.0
Total Delay					12.4	6.7			27.4			18.2
LOS					B	A			C			B
Approach Delay					10.6				27.4			18.2
Approach LOS					B				C			B
Queue Length 50th (ft)					114	41			160			100
Queue Length 95th (ft)					134	72			213			m135
Internal Link Dist (ft)		456			756				268			377
Turn Bay Length (ft)												
Base Capacity (vph)					1795	848			1170			1262
Starvation Cap Reductn					0	0			328			0
Spillback Cap Reductn					0	0			0			0
Storage Cap Reductn					0	0			0			0
Reduced v/c Ratio					0.48	0.44			0.57			0.32

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 47 (47%), Referenced to phase 2:NBSB and 6:, Start of Yellow

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.48

Intersection Signal Delay: 15.9

Intersection LOS: B

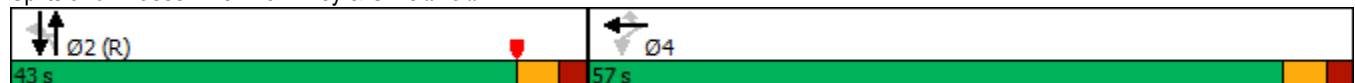
Intersection Capacity Utilization 64.4%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: McKinney & Olive #16 #21





Lane Group	SBR
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour

4: Cedar Springs & Akard /Akard & St Paul

										
Lane Group	EBU	EBL	EBT	EBR	WBL	WBR	WBR2	NBL	NBT	NBR
Lane Configurations										
Traffic Volume (vph)	16	713	828	122	24	756	7	312	33	87
Future Volume (vph)	16	713	828	122	24	756	7	312	33	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.97	0.91	0.91	1.00	0.88	1.00	0.97	1.00	1.00
Ped Bike Factor		0.99	0.98			0.89		0.95	0.97	
Frt			0.981			0.850			0.891	
Flt Protected		0.950			0.950			0.950		
Satd. Flow (prot)	0	3433	4913	0	1770	2787	0	3433	1602	0
Flt Permitted		0.950			0.950			0.950		
Satd. Flow (perm)	0	3385	4913	0	1770	2480	0	3250	1602	0
Right Turn on Red				Yes			Yes			Yes
Satd. Flow (RTOR)			49			96			95	
Link Speed (mph)			30						30	
Link Distance (ft)			385						581	
Travel Time (s)			8.8						13.2	
Confl. Peds. (#/hr)		14		58		14	26	32		22
Peak Hour Factor	0.97	0.97	0.97	0.97	0.93	0.93	0.93	0.92	0.92	0.92
Adj. Flow (vph)	16	735	854	126	26	813	8	339	36	95
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	751	980	0	26	821	0	339	131	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	Left	Right	Right	Left	Left	Right
Median Width(ft)			0						24	
Link Offset(ft)			24						0	
Crosswalk Width(ft)			16						16	
Two way Left Turn Lane										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15		9	15	9	9	15		9
Turn Type	custom	Prot	NA		Prot	Perm		Prot	NA	
Protected Phases		5			1			4		
Permitted Phases	5		2			6			4	
Minimum Split (s)	11.9	11.9	20.0		8.0	21.5		23.9	23.9	
Total Split (s)	36.0	36.0	64.0		10.0	38.0		26.0	26.0	
Total Split (%)	36.0%	36.0%	64.0%		10.0%	38.0%		26.0%	26.0%	
Maximum Green (s)	30.1	30.1	60.0		6.0	32.5		20.1	20.1	
Yellow Time (s)	3.6	3.6	3.5		3.5	3.6		3.6	3.6	
All-Red Time (s)	2.3	2.3	0.5		0.5	1.9		2.3	2.3	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.9	4.0		4.0	5.5		5.9	5.9	
Lead/Lag	Lag	Lag	Lag		Lead	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes				
Walk Time (s)			5.0			4.0		4.0	4.0	
Flash Dont Walk (s)			11.0			8.0		14.0	14.0	
Pedestrian Calls (#/hr)			0			0		0	0	
Act Effect Green (s)		30.1	60.0		6.0	32.5		20.1	20.1	
Actuated g/C Ratio		0.30	0.60		0.06	0.32		0.20	0.20	
v/c Ratio		0.74	0.33		0.25	0.94		0.49	0.33	
Control Delay		36.9	6.2		72.4	37.0		38.2	14.3	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour

4: Cedar Springs & Akard /Akard & St Paul



Lane Group	EBU	EBL	EBT	EBR	WBL	WBR	WBR2	NBL	NBT	NBR
Queue Delay		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay		36.9	6.2		72.4	37.0		38.2	14.3	
LOS		D	A		E	D		D	B	
Approach Delay			19.5						31.6	
Approach LOS			B						C	
Queue Length 50th (ft)		263	109		16	267		99	19	
Queue Length 95th (ft)		324	128		m40	#402		143	70	
Internal Link Dist (ft)			305						501	
Turn Bay Length (ft)										
Base Capacity (vph)		1018	2967		106	870		690	397	
Starvation Cap Reductn		0	0		0	0		0	0	
Spillback Cap Reductn		0	0		0	0		0	0	
Storage Cap Reductn		0	0		0	0		0	0	
Reduced v/c Ratio		0.74	0.33		0.25	0.94		0.49	0.33	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBR, Start of Yellow

Natural Cycle: 90

Control Type: Pretimed

Maximum v/c Ratio: 0.94

Intersection Signal Delay: 26.5

Intersection LOS: C

Intersection Capacity Utilization 76.7%

ICU Level of Service D

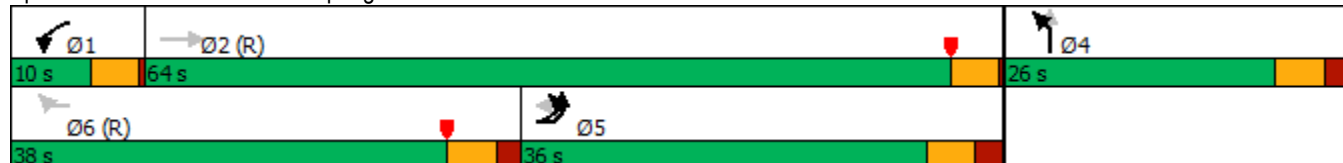
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Cedar Springs & Akard /Akard & St Paul



North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour

5: McKinney & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	48	728	5	0	0	0	0	219	17	153	239	0
Future Volume (vph)	48	728	5	0	0	0	0	219	17	153	239	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	1.00
Ped Bike Factor	0.98	1.00						0.99			0.98	
Frt		0.999						0.989				
Flt Protected	0.950										0.981	
Satd. Flow (prot)	1770	3534	0	0	0	0	0	3478	0	0	3472	0
Flt Permitted	0.950										0.693	
Satd. Flow (perm)	1727	3534	0	0	0	0	0	3478	0	0	2408	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1						9				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		323			182			264			526	
Travel Time (s)		7.3			4.1			6.0			12.0	
Confl. Peds. (#/hr)	12		22	22		12	44		49	49		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.72	0.72	0.72	0.77	0.77	0.77
Adj. Flow (vph)	52	791	5	0	0	0	0	304	24	199	310	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	52	796	0	0	0	0	0	328	0	0	509	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			24			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA						NA		Perm	NA	
Protected Phases	4							2			2	
Permitted Phases		4					2			2		
Minimum Split (s)	21.2	21.2					24.6	24.6		24.6	24.6	
Total Split (s)	40.0	40.0					40.0	40.0		40.0	40.0	
Total Split (%)	40.0%	40.0%					40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	35.1	35.1					34.6	34.6		34.6	34.6	
Yellow Time (s)	3.2	3.2					3.2	3.2		3.2	3.2	
All-Red Time (s)	1.7	1.7					2.2	2.2		2.2	2.2	
Lost Time Adjust (s)	0.0	0.0						0.0			0.0	
Total Lost Time (s)	4.9	4.9						5.4			5.4	
Lead/Lag	Lag	Lag										
Lead-Lag Optimize?	Yes	Yes										
Walk Time (s)	4.0	4.0					4.0	4.0		4.0	4.0	
Flash Dont Walk (s)	11.0	11.0					15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0					0	0		0	0	
Act Effct Green (s)	35.1	35.1						34.6			34.6	
Actuated g/C Ratio	0.35	0.35						0.35			0.35	
v/c Ratio	0.08	0.64						0.27			0.61	
Control Delay	3.7	5.3						20.9			25.7	

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Minimum Split (s)	9.5
Total Split (s)	20.0
Total Split (%)	20%
Maximum Green (s)	16.0
Yellow Time (s)	3.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour

5: McKinney & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.5						0.6			0.2	
Total Delay	3.7	5.7						21.4			25.9	
LOS	A	A						C			C	
Approach Delay		5.6						21.4			25.9	
Approach LOS		A						C			C	
Queue Length 50th (ft)	3	24						56			158	
Queue Length 95th (ft)	m5	32						64			174	
Internal Link Dist (ft)		243			102			184			446	
Turn Bay Length (ft)												
Base Capacity (vph)	621	1241						1209			833	
Starvation Cap Reductn	0	137						534			0	
Spillback Cap Reductn	0	0						69			47	
Storage Cap Reductn	0	0						0			0	
Reduced v/c Ratio	0.08	0.72						0.49			0.65	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 85 (85%), Referenced to phase 2:NBSB and 6:, Start of Yellow

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 14.8

Intersection LOS: B

Intersection Capacity Utilization 60.3%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: McKinney & St Paul



Lane Group	Ø3
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour

6: McKinney & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	762	54	11	752	185	3	15	23	96	105	41
Future Volume (vph)	25	762	54	11	752	185	3	15	23	96	105	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor		0.99			0.98			0.97			0.97	
Frt		0.990			0.971			0.915			0.974	
Flt Protected		0.999			0.999			0.996			0.981	
Satd. Flow (prot)	0	4999	0	0	4857	0	0	3133	0	0	3333	0
Flt Permitted		0.885			0.926			0.936			0.809	
Satd. Flow (perm)	0	4427	0	0	4501	0	0	2934	0	0	2709	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			86			31			28	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		383			222			432			264	
Travel Time (s)		8.7			5.0			9.8			6.0	
Confl. Peds. (#/hr)	34		42	42		34	47		25	25		47
Peak Hour Factor	0.93	0.93	0.93	0.98	0.98	0.98	0.75	0.75	0.75	0.78	0.78	0.78
Adj. Flow (vph)	27	819	58	11	767	189	4	20	31	123	135	53
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	904	0	0	967	0	0	55	0	0	311	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			6			2	
Permitted Phases	4			4			6			2		
Minimum Split (s)	21.2	21.2		21.2	21.2		24.4	24.4		24.4	24.4	
Total Split (s)	57.0	57.0		57.0	57.0		43.0	43.0		43.0	43.0	
Total Split (%)	57.0%	57.0%		57.0%	57.0%		43.0%	43.0%		43.0%	43.0%	
Maximum Green (s)	51.8	51.8		51.8	51.8		37.6	37.6		37.6	37.6	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.6	1.6		1.6	1.6		2.4	2.4		2.4	2.4	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.2			5.2			5.4			5.4	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)		51.8			51.8			37.6			37.6	
Actuated g/C Ratio		0.52			0.52			0.38			0.38	
v/c Ratio		0.39			0.41			0.05			0.30	
Control Delay		6.4			14.6			11.0			52.7	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour

6: McKinney & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.2			8.1			0.0			1.3	
Total Delay		6.6			22.7			11.0			53.9	
LOS		A			C			B			D	
Approach Delay		6.6			22.7			11.0			53.9	
Approach LOS		A			C			B			D	
Queue Length 50th (ft)		39			123			4			105	
Queue Length 95th (ft)		51			155			13			130	
Internal Link Dist (ft)		303			142			352			184	
Turn Bay Length (ft)												
Base Capacity (vph)		2300			2372			1122			1036	
Starvation Cap Reductn		0			1361			0			510	
Spillback Cap Reductn		609			137			2			1	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.53			0.96			0.05			0.59	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 57 (57%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.41

Intersection Signal Delay: 20.2

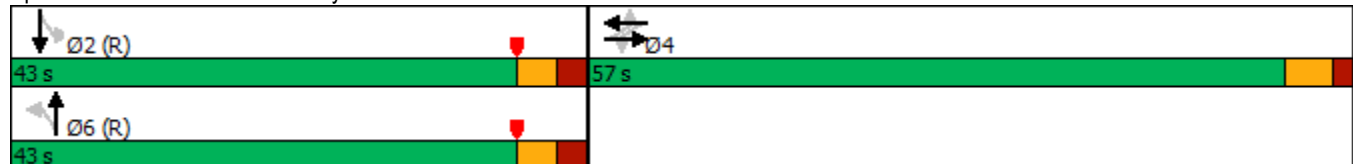
Intersection LOS: C

Intersection Capacity Utilization 59.2%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 6: McKinney & Akard



North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour

7: Woodall WBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑									↑↑↑	
Traffic Volume (vph)	0	941	80	0	0	0	0	0	0	303	789	0
Future Volume (vph)	0	941	80	0	0	0	0	0	0	303	789	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00
Ped Bike Factor		1.00									1.00	
Frt		0.988										
Flt Protected											0.986	
Satd. Flow (prot)	0	5016	0	0	0	0	0	0	0	0	5014	0
Flt Permitted											0.986	
Satd. Flow (perm)	0	5016	0	0	0	0	0	0	0	0	5011	0
Right Turn on Red			Yes			Yes			Yes	No		No
Satd. Flow (RTOR)		13										
Link Speed (mph)		30			30			24			26	
Link Distance (ft)		196			58			216			231	
Travel Time (s)		4.5			1.3			6.1			6.1	
Confl. Peds. (#/hr)			4							1		
Peak Hour Factor	0.95	0.95	0.95	0.92	0.92	0.92	0.92	0.92	0.92	0.89	0.89	0.89
Adj. Flow (vph)	0	991	84	0	0	0	0	0	0	340	887	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1075	0	0	0	0	0	0	0	0	1227	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		-24			24			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type		NA								Split	NA	
Protected Phases		2								4	4	
Permitted Phases												
Minimum Split (s)		21.6								21.3	21.3	
Total Split (s)		32.0								41.0	41.0	
Total Split (%)		32.0%								41.0%	41.0%	
Maximum Green (s)		26.4								35.7	35.7	
Yellow Time (s)		3.6								3.6	3.6	
All-Red Time (s)		2.0								1.7	1.7	
Lost Time Adjust (s)		0.0									0.0	
Total Lost Time (s)		5.6									5.3	
Lead/Lag		Lag										
Lead-Lag Optimize?		Yes										
Walk Time (s)		4.0								4.0	4.0	
Flash Dont Walk (s)		8.0								9.0	9.0	
Pedestrian Calls (#/hr)		0								0	0	
Act Effct Green (s)		26.4									35.7	
Actuated g/C Ratio		0.26									0.36	
v/c Ratio		0.81									0.69	
Control Delay		49.9									28.7	

Lane Group	Ø1
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	1
Permitted Phases	
Minimum Split (s)	21.3
Total Split (s)	27.0
Total Split (%)	27%
Maximum Green (s)	21.7
Yellow Time (s)	3.6
All-Red Time (s)	1.7
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour

7: Woodall WBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		1.8									1.6	
Total Delay		51.7									30.3	
LOS		D									C	
Approach Delay		51.7									30.3	
Approach LOS		D									C	
Queue Length 50th (ft)		263									279	
Queue Length 95th (ft)		311									319	
Internal Link Dist (ft)		116			1			136			151	
Turn Bay Length (ft)												
Base Capacity (vph)		1333									1789	
Starvation Cap Reductn		128									207	
Spillback Cap Reductn		46									363	
Storage Cap Reductn		0									0	
Reduced v/c Ratio		0.89									0.86	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 5 (5%), Referenced to phase 2:EBT and 6:, Start of Yellow

Natural Cycle: 70

Control Type: Pretimed

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 40.3

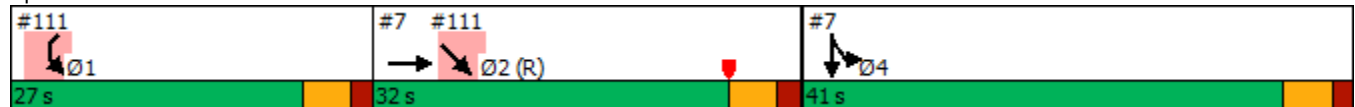
Intersection LOS: D

Intersection Capacity Utilization 50.5%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 7: Woodall WBFR & St Paul



Lane Group	Ø1
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour

8: Woodall EBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑						↑↑↑				
Traffic Volume (vph)	392	1064	0	0	0	0	0	428	171	0	0	0
Future Volume (vph)	392	1064	0	0	0	0	0	428	171	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00
Ped Bike Factor		0.96						0.97				
Frt								0.957				
Flt Protected		0.987										
Satd. Flow (prot)	0	5019	0	0	0	0	0	4710	0	0	0	0
Flt Permitted		0.987										
Satd. Flow (perm)	0	4803	0	0	0	0	0	4710	0	0	0	0
Right Turn on Red	Yes		Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		139						52				
Link Speed (mph)		30			30			26			30	
Link Distance (ft)		204			1246			248			416	
Travel Time (s)		4.6			28.3			6.5			9.5	
Confl. Peds. (#/hr)	64								55			
Peak Hour Factor	0.90	0.90	0.90	0.92	0.92	0.92	0.81	0.81	0.81	0.92	0.92	0.92
Adj. Flow (vph)	436	1182	0	0	0	0	0	528	211	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1618	0	0	0	0	0	739	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		-24			24			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA						NA				
Protected Phases		2						4				
Permitted Phases	2											
Minimum Split (s)	21.0	21.0						21.8				
Total Split (s)	57.0	57.0						43.0				
Total Split (%)	57.0%	57.0%						43.0%				
Maximum Green (s)	52.0	52.0						37.2				
Yellow Time (s)	3.6	3.6						3.6				
All-Red Time (s)	1.4	1.4						2.2				
Lost Time Adjust (s)		0.0						0.0				
Total Lost Time (s)		5.0						5.8				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0	4.0						4.0				
Flash Dont Walk (s)	8.0	8.0						12.0				
Pedestrian Calls (#/hr)	0	0						0				
Act Effct Green (s)		52.0						37.2				
Actuated g/C Ratio		0.52						0.37				
v/c Ratio		0.63						0.41				
Control Delay		8.6						17.8				

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour

8: Woodall EBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.9						0.8				
Total Delay		9.6						18.6				
LOS		A						B				
Approach Delay		9.6						18.6				
Approach LOS		A						B				
Queue Length 50th (ft)		108						87				
Queue Length 95th (ft)		127						100				
Internal Link Dist (ft)		124			1166			168			336	
Turn Bay Length (ft)												
Base Capacity (vph)		2564						1784				
Starvation Cap Reductn		610						700				
Spillback Cap Reductn		0						0				
Storage Cap Reductn		0						0				
Reduced v/c Ratio		0.83						0.68				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 23 (23%), Referenced to phase 2:EBTL and 6:, Start of Yellow

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.63

Intersection Signal Delay: 12.4

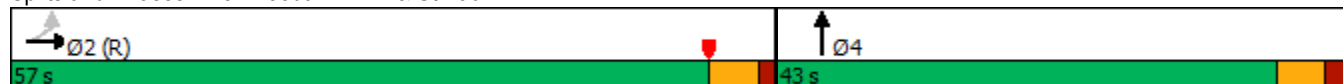
Intersection LOS: B

Intersection Capacity Utilization 50.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: Woodall EBFR & St Paul



North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour

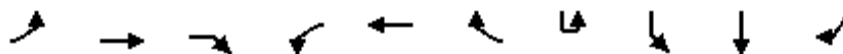
9: Woodall WBFR & Akard WB On-Ramp & Akard

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBU	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑			↑	↑↑	
Traffic Volume (vph)	1	740	206	238	81	821	33	448	291	96
Future Volume (vph)	1	740	206	238	81	821	33	448	291	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.95	1.00	0.95	0.95
Ped Bike Factor		0.97			0.88				0.98	
Frt		0.967			0.892				0.963	
Flt Protected					0.990			0.950		
Satd. Flow (prot)	0	4746	0	0	3938	0	0	1770	3348	0
Flt Permitted		0.939			0.676			0.950		
Satd. Flow (perm)	0	4456	0	0	2689	0	0	1770	3348	0
Right Turn on Red						Yes				Yes
Satd. Flow (RTOR)					912				47	
Link Speed (mph)		30			30				30	
Link Distance (ft)		222			279				216	
Travel Time (s)		5.0			6.3				4.9	
Confl. Peds. (#/hr)			43	43		40				34
Peak Hour Factor	0.93	0.93	0.93	0.90	0.90	0.90	0.88	0.88	0.88	0.88
Adj. Flow (vph)	1	796	222	264	90	912	38	509	331	109
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	1019	0	0	1266	0	0	547	440	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right
Median Width(ft)		0			0				12	
Link Offset(ft)		0			0				0	
Crosswalk Width(ft)		16			16				16	
Two way Left Turn Lane										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	9	15		9
Turn Type	Perm	NA		pm+pt	NA		Perm	Split	NA	
Protected Phases		2		1	6			4	4	
Permitted Phases	2			6			4			
Minimum Split (s)	21.3	21.3		8.0	21.3		22.5	22.5	22.5	
Total Split (s)	30.0	30.0		32.0	62.0		38.0	38.0	38.0	
Total Split (%)	30.0%	30.0%		32.0%	62.0%		38.0%	38.0%	38.0%	
Maximum Green (s)	24.7	24.7		28.0	56.7		32.5	32.5	32.5	
Yellow Time (s)	3.6	3.6		3.5	3.6		3.6	3.6	3.6	
All-Red Time (s)	1.7	1.7		0.5	1.7		1.9	1.9	1.9	
Lost Time Adjust (s)		0.0			0.0			0.0	0.0	
Total Lost Time (s)		5.3			5.3			5.5	5.5	
Lead/Lag	Lag	Lag		Lead						
Lead-Lag Optimize?	Yes	Yes		Yes						
Walk Time (s)	4.0	4.0			4.0		4.0	4.0	4.0	
Flash Dont Walk (s)	11.0	11.0			9.0		13.0	13.0	13.0	
Pedestrian Calls (#/hr)	0	0			0		0	0	0	
Act Effct Green (s)		24.7			56.7			32.5	32.5	
Actuated g/C Ratio		0.25			0.57			0.32	0.32	
v/c Ratio		0.93			0.56			0.95	0.39	
Control Delay		38.5			1.9			40.9	7.2	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour

9: Woodall WBFR & Akard WB On-Ramp & Akard



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBU	SBL	SBT	SBR
Queue Delay		45.6			0.7			43.9	1.8	
Total Delay		84.1			2.6			84.8	9.0	
LOS		F			A			F	A	
Approach Delay		84.1			2.6				51.0	
Approach LOS		F			A				D	
Queue Length 50th (ft)		242			3			380	68	
Queue Length 95th (ft)		#325			4			m#552	m84	
Internal Link Dist (ft)		142			199				136	
Turn Bay Length (ft)										
Base Capacity (vph)		1100			2253			575	1119	
Starvation Cap Reductn		214			571			133	500	
Spillback Cap Reductn		0			202			0	36	
Storage Cap Reductn		0			0			0	0	
Reduced v/c Ratio		1.15			0.75			1.24	0.71	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 21 (21%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 42.6

Intersection LOS: D

Intersection Capacity Utilization 87.1%

ICU Level of Service E

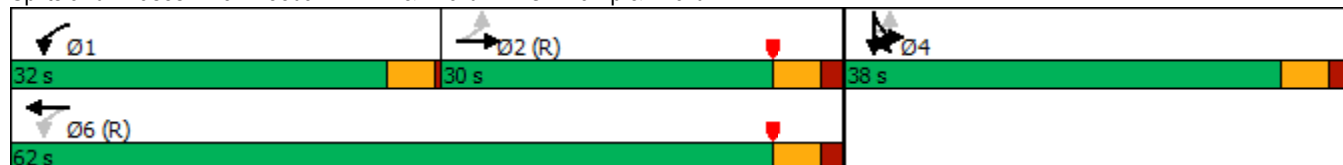
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Woodall WBFR & Akard WB On-Ramp & Akard



North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour

10: Woodall EBFR & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↑↑↑			↑↑↑				↑↑↑			
Traffic Volume (vph)	178	602	0	0	978	135	30	127	265	55	0	0
Future Volume (vph)	178	602	0	0	978	135	30	127	265	55	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	1.00	1.00	0.91	0.91	0.91	0.91	0.91	0.91	1.00	1.00
Ped Bike Factor		1.00			0.99				0.98			
Frt					0.982				0.983			0.850
Flt Protected		0.989							0.984			
Satd. Flow (prot)	0	5029	0	0	4948	0	0	0	4834	0	0	0
Flt Permitted		0.653							0.984			
Satd. Flow (perm)	0	3316	0	0	4948	0	0	0	4830	0	0	0
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)					31				22			141
Link Speed (mph)		30			30				26			30
Link Distance (ft)		279			374				181			248
Travel Time (s)		6.3			8.5				4.7			5.6
Confl. Peds. (#/hr)	35					35		1		56		
Peak Hour Factor	0.94	0.94	0.94	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.92
Adj. Flow (vph)	189	640	0	0	1087	150	33	141	294	61	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	829	0	0	1237	0	0	0	529	0	0	1
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	Left	Left
Median Width(ft)		0			0				0			0
Link Offset(ft)		0			0				-24			24
Crosswalk Width(ft)		16			16				16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	9	15		9	15	
Turn Type	pm+pt	NA			NA		Perm	Perm	NA			
Protected Phases	15	2			6				4			
Permitted Phases	2						4	4				
Minimum Split (s)	8.2	21.1			21.1		21.6	21.6	21.6			
Total Split (s)	22.0	69.0			47.0		31.0	31.0	31.0			
Total Split (%)	22.0%	69.0%			47.0%		31.0%	31.0%	31.0%			
Maximum Green (s)	16.8	63.9			41.9		25.4	25.4	25.4			
Yellow Time (s)	3.2	3.6			3.6		3.6	3.6	3.6			
All-Red Time (s)	2.0	1.5			1.5		2.0	2.0	2.0			
Lost Time Adjust (s)		0.0			0.0				0.0			
Total Lost Time (s)		5.1			5.1				5.6			
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		4.0			4.0		4.0	4.0	4.0			
Flash Dont Walk (s)		8.0			12.0		8.0	8.0	8.0			
Pedestrian Calls (#/hr)		0			0		0	0	0			
Act Effct Green (s)		63.9			41.9				25.4			0.0
Actuated g/C Ratio		0.64			0.42				0.25			0.00
v/c Ratio		0.34			0.59				0.43			0.01
Control Delay		8.3			18.6				31.1			0.0

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	1
Future Volume (vph)	1
Ideal Flow (vphpl)	1900
Lane Util. Factor	1.00
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	0.92
Adj. Flow (vph)	1
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Enter Blocked Intersection	No
Lane Alignment	Right
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	1.00
Turning Speed (mph)	9
Turn Type	
Protected Phases	
Permitted Phases	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Maximum Green (s)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour

10: Woodall EBFR & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Queue Delay		0.5			0.3				0.0			0.0
Total Delay		8.7			18.9				31.1			0.0
LOS		A			B				C			A
Approach Delay		8.7			18.9				31.1			
Approach LOS		A			B				C			
Queue Length 50th (ft)		51			136				98			0
Queue Length 95th (ft)		m67			158				133			0
Internal Link Dist (ft)		199			294				101			168
Turn Bay Length (ft)												
Base Capacity (vph)		2408			2091				1243			141
Starvation Cap Reductn		1029			273				0			0
Spillback Cap Reductn		0			9				54			0
Storage Cap Reductn		0			0				0			0
Reduced v/c Ratio		0.60			0.68				0.44			0.01

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 98 (98%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.59

Intersection Signal Delay: 18.1

Intersection LOS: B

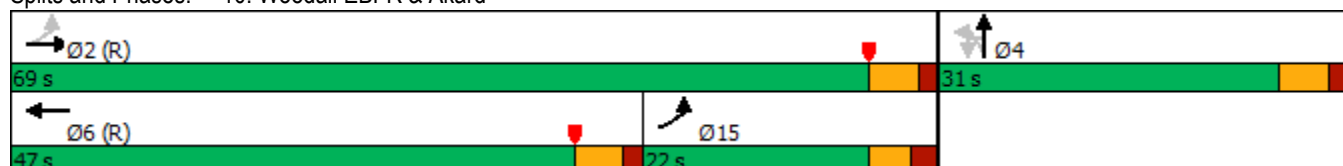
Intersection Capacity Utilization Err%

ICU Level of Service H

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Woodall EBFR & Akard





Lane Group	SBR
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour

11: Field /Field #11 #12 & Woodall WBFR

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations			↑↑↑↑	↑	↑	↑↑↑↑					↑	↑
Traffic Volume (vph)	2	0	1132	343	424	603	0	0	0	0	169	403
Future Volume (vph)	2	0	1132	343	424	603	0	0	0	0	169	403
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		150		200	0		0	0		0	0	
Storage Lanes		1		3	1		0	0		0	1	
Taper Length (ft)		25			25			25			25	
Lane Util. Factor	0.86	1.00	0.86	1.00	0.86	0.86	1.00	1.00	1.00	1.00	0.95	0.91
Ped Bike Factor				0.92								1.00
Frt				0.850								0.990
Flt Protected					0.950	0.987					0.950	0.998
Satd. Flow (prot)	0	0	6408	1583	1522	4743	0	0	0	0	1681	1668
Flt Permitted			0.931		0.103	0.675					0.950	0.998
Satd. Flow (perm)	0	0	5966	1453	165	3244	0	0	0	0	1681	1668
Right Turn on Red				Yes			Yes			Yes		
Satd. Flow (RTOR)				152								3
Link Speed (mph)			30			30			30			26
Link Distance (ft)			675			234			238			187
Travel Time (s)			15.3			5.3			5.4			4.9
Confl. Peds. (#/hr)				33	33							
Peak Hour Factor	0.86	0.86	0.86	0.86	0.84	0.84	0.84	0.92	0.92	0.92	0.95	0.95
Adj. Flow (vph)	2	0	1316	399	505	718	0	0	0	0	178	424
Shared Lane Traffic (%)					50%						10%	
Lane Group Flow (vph)	0	0	1318	399	252	971	0	0	0	0	160	474
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left
Median Width(ft)			20			20			12			12
Link Offset(ft)			0			0			-20			24
Crosswalk Width(ft)			16			16			16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15		9	15		9	15		9	15	
Turn Type	Perm		NA	Perm	pm+pt	NA					Split	NA
Protected Phases			2		3 11	2 3 11					4	4
Permitted Phases	2			2	11 2 3							
Minimum Split (s)	23.2		23.2	23.2							40.1	40.1
Total Split (s)	44.0		44.0	44.0							44.0	44.0
Total Split (%)	33.8%		33.8%	33.8%							33.8%	33.8%
Maximum Green (s)	38.8		38.8	38.8							37.9	37.9
Yellow Time (s)	5.2		5.2	5.2							6.1	6.1
All-Red Time (s)	0.0		0.0	0.0							0.0	0.0
Lost Time Adjust (s)			0.0	0.0							0.0	0.0
Total Lost Time (s)			5.2	5.2							6.1	6.1
Lead/Lag											Lag	Lag
Lead-Lag Optimize?											Yes	Yes
Walk Time (s)	4.0		4.0	4.0							4.0	4.0
Flash Dont Walk (s)	14.0		14.0	14.0							29.0	29.0
Pedestrian Calls (#/hr)	0		0	0							0	0
Act Effect Green (s)			38.8	38.8	78.0	75.6					37.9	37.9

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour

11: Field /Field #11 #12 & Woodall WBFR

Lane Group	SBR	Ø3	Ø5	Ø6	Ø8	Ø11
Lane Configurations						
Traffic Volume (vph)	305					
Future Volume (vph)	305					
Ideal Flow (vphpl)	1900					
Storage Length (ft)	0					
Storage Lanes	1					
Taper Length (ft)						
Lane Util. Factor	0.95					
Ped Bike Factor	0.94					
Frt	0.850					
Flt Protected						
Satd. Flow (prot)	1504					
Flt Permitted						
Satd. Flow (perm)	1416					
Right Turn on Red	Yes					
Satd. Flow (RTOR)	226					
Link Speed (mph)						
Link Distance (ft)						
Travel Time (s)						
Confl. Peds. (#/hr)	40					
Peak Hour Factor	0.95					
Adj. Flow (vph)	321					
Shared Lane Traffic (%)	10%					
Lane Group Flow (vph)	289					
Enter Blocked Intersection	No					
Lane Alignment	Right					
Median Width(ft)						
Link Offset(ft)						
Crosswalk Width(ft)						
Two way Left Turn Lane						
Headway Factor	1.00					
Turning Speed (mph)	9					
Turn Type	Perm					
Protected Phases		3	5	6	8	11
Permitted Phases	4					
Minimum Split (s)	40.1	8.0	8.0	21.9	31.0	8.0
Total Split (s)	44.0	9.0	35.0	42.0	53.0	33.0
Total Split (%)	33.8%	7%	27%	32%	41%	25%
Maximum Green (s)	37.9	5.0	30.0	36.6	47.0	29.0
Yellow Time (s)	6.1	3.5	5.0	5.4	6.0	3.5
All-Red Time (s)	0.0	0.5	0.0	0.0	0.0	0.5
Lost Time Adjust (s)	0.0					
Total Lost Time (s)	6.1					
Lead/Lag	Lag	Lead	Lead	Lag		
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		
Walk Time (s)	4.0			4.0	4.0	
Flash Dont Walk (s)	29.0			12.0	20.0	
Pedestrian Calls (#/hr)	0			0	0	
Act Effect Green (s)	37.9					

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour

11: Field /Field #11 #12 & Woodall WBFR

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Actuated g/C Ratio			0.30	0.30	0.60	0.58					0.29	0.29
v/c Ratio			0.74	0.74	0.51	0.42					0.33	0.97
Control Delay			31.1	21.8	5.8	3.4					38.4	79.7
Queue Delay			0.2	0.0	3.3	0.3					0.0	0.0
Total Delay			31.3	21.8	9.0	3.8					38.4	79.7
LOS			C	C	A	A					D	E
Approach Delay			29.1			4.9						51.5
Approach LOS			C			A						D
Queue Length 50th (ft)			313	219	15	20					111	431
Queue Length 95th (ft)			343	328	19	21					177	#678
Internal Link Dist (ft)			595			154			158			107
Turn Bay Length (ft)				200								
Base Capacity (vph)			1780	540	495	2310					490	488
Starvation Cap Reductn			0	0	155	697					0	0
Spillback Cap Reductn			65	0	0	0					0	0
Storage Cap Reductn			0	0	0	0					0	0
Reduced v/c Ratio			0.77	0.74	0.74	0.60					0.33	0.97

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 72 (55%), Referenced to phase 2:EBWB, Start of Yellow

Natural Cycle: 90

Control Type: Pretimed

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 26.8

Intersection LOS: C

Intersection Capacity Utilization 80.6%

ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 11: Field /Field #11 #12 & Woodall WBFR

#11  Ø2 (R)	#11  Ø11	#11  Ø3	#11  Ø4
44 s	33 s	9 s	44 s
#12  Ø5	#12  Ø6	#12  Ø8	
35 s	42 s	53 s	

Lane Group	SBR	Ø3	Ø5	Ø6	Ø8	Ø11
Actuated g/C Ratio	0.29					
v/c Ratio	0.51					
Control Delay	12.5					
Queue Delay	0.0					
Total Delay	12.5					
LOS	B					
Approach Delay						
Approach LOS						
Queue Length 50th (ft)	41					
Queue Length 95th (ft)	130					
Internal Link Dist (ft)						
Turn Bay Length (ft)						
Base Capacity (vph)	572					
Starvation Cap Reductn	0					
Spillback Cap Reductn	0					
Storage Cap Reductn	0					
Reduced v/c Ratio	0.51					
Intersection Summary						

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour
12: Woodall EBFR & Field #11 #12 & Field EB On-Ramp

												
Lane Group	EBU	EBL2	EBL	EBT	WBU	WBT	WBR	WBR2	NBU	NBL	NBT	NBR
Lane Configurations				  		  					  	
Traffic Volume (vph)	1	0	332	993	3	931	182	192	131	88	809	91
Future Volume (vph)	1	0	332	993	3	931	182	192	131	88	809	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)			0				0			0		0
Storage Lanes			1				1			1		0
Taper Length (ft)			25							25		
Lane Util. Factor	0.91	1.00	0.91	0.91	0.91	0.91	1.00	0.91	0.91	0.86	0.86	0.91
Frt							0.850				0.985	
Flt Protected		0.950		0.988						0.950	0.999	
Satd. Flow (prot)	0	1770	0	5024	0	5085	1583	0	0	1522	4729	0
Flt Permitted		0.067		0.669		0.935				0.950	0.999	
Satd. Flow (perm)	0	125	0	3402	0	4755	1583	0	0	1522	4729	0
Right Turn on Red								Yes				Yes
Satd. Flow (RTOR)							102				15	
Link Speed (mph)				30		30					30	
Link Distance (ft)				234		419					191	
Travel Time (s)				5.3		9.5					4.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	0	361	1079	3	1012	198	209	142	96	879	99
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	0	1	0	1440	0	1015	407	0	0	228	988	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Left	R NA	Left	Right	Right	R NA	Left	Left	Right
Median Width(ft)				20		12					12	
Link Offset(ft)				0		12					-24	
Crosswalk Width(ft)				16		16					16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15	15		9		9	9	9	15		9
Turn Type	custom	pm+pt	pm+pt	NA	Perm	NA	Perm		Perm	Split	NA	
Protected Phases		5	5	5 6		6				8	8	
Permitted Phases	5	5 6	5 6		6		6		8			
Minimum Split (s)	8.0	8.0	8.0		21.9	21.9	21.9		31.0	31.0	31.0	
Total Split (s)	35.0	35.0	35.0		42.0	42.0	42.0		53.0	53.0	53.0	
Total Split (%)	26.9%	26.9%	26.9%		32.3%	32.3%	32.3%		40.8%	40.8%	40.8%	
Maximum Green (s)	30.0	30.0	30.0		36.6	36.6	36.6		47.0	47.0	47.0	
Yellow Time (s)	5.0	5.0	5.0		5.4	5.4	5.4		6.0	6.0	6.0	
All-Red Time (s)	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	
Lost Time Adjust (s)		0.0				0.0	0.0			0.0	0.0	
Total Lost Time (s)		5.0				5.4	5.4			6.0	6.0	
Lead/Lag	Lead	Lead	Lead		Lag	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes	Yes					
Walk Time (s)					4.0	4.0	4.0		4.0	4.0	4.0	
Flash Dont Walk (s)					12.0	12.0	12.0		20.0	20.0	20.0	
Pedestrian Calls (#/hr)					0	0	0		0	0	0	
Act Effect Green (s)		72.0		67.0		36.6	36.6			47.0	47.0	
Actuated g/C Ratio		0.55		0.52		0.28	0.28			0.36	0.36	
v/c Ratio		0.01		0.68		0.76	0.79			0.41	0.57	

Lane Group	Ø2	Ø3	Ø4	Ø11
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Ideal Flow (vphpl)				
Storage Length (ft)				
Storage Lanes				
Taper Length (ft)				
Lane Util. Factor				
Frt				
Flt Protected				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (mph)				
Link Distance (ft)				
Travel Time (s)				
Peak Hour Factor				
Adj. Flow (vph)				
Shared Lane Traffic (%)				
Lane Group Flow (vph)				
Enter Blocked Intersection				
Lane Alignment				
Median Width(ft)				
Link Offset(ft)				
Crosswalk Width(ft)				
Two way Left Turn Lane				
Headway Factor				
Turning Speed (mph)				
Turn Type				
Protected Phases	2	3	4	11
Permitted Phases				
Minimum Split (s)	23.2	8.0	40.1	8.0
Total Split (s)	44.0	9.0	44.0	33.0
Total Split (%)	34%	7%	34%	25%
Maximum Green (s)	38.8	5.0	37.9	29.0
Yellow Time (s)	5.2	3.5	6.1	3.5
All-Red Time (s)	0.0	0.5	0.0	0.5
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag		Lead	Lag	
Lead-Lag Optimize?		Yes	Yes	
Walk Time (s)	4.0		4.0	
Flash Dont Walk (s)	14.0		29.0	
Pedestrian Calls (#/hr)	0		0	
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour
12: Woodall EBFR & Field #11 #12 & Field EB On-Ramp

												
Lane Group	EBU	EBL2	EBL	EBT	WBU	WBT	WBR	WBR2	NBU	NBL	NBT	NBR
Control Delay		4.0		8.1		42.0	38.3			34.0	34.5	
Queue Delay		0.0		1.6		1.0	2.3			0.0	0.0	
Total Delay		4.0		9.7		42.9	40.5			34.0	34.5	
LOS		A		A		D	D			C	C	
Approach Delay				9.7		42.3					34.4	
Approach LOS				A		D					C	
Queue Length 50th (ft)		0		92		309	108			167	254	
Queue Length 95th (ft)		m0		m140		362	#207			254	304	
Internal Link Dist (ft)				154		339					111	
Turn Bay Length (ft)												
Base Capacity (vph)		69		2127		1338	518			550	1719	
Starvation Cap Reductn		0		471		126	40			0	0	
Spillback Cap Reductn		0		132		28	0			0	0	
Storage Cap Reductn		0		0		0	0			0	0	
Reduced v/c Ratio		0.01		0.87		0.84	0.85			0.41	0.57	

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 72 (55%), Referenced to phase 2:EBWB, Start of Yellow

Natural Cycle: 90

Control Type: Pretimed

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 28.4

Intersection LOS: C

Intersection Capacity Utilization 79.3%

ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: Woodall EBFR & Field #11 #12 & Field EB On-Ramp

#11  Ø2 (R)	#11  Ø11	#11  Ø3	#11  Ø4
44 s	33 s	9 s	44 s
#12  Ø5	#12  Ø6	#12  Ø8	
35 s	42 s	53 s	

Lane Group	Ø2	Ø3	Ø4	Ø11
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				
Queue Length 50th (ft)				
Queue Length 95th (ft)				
Internal Link Dist (ft)				
Turn Bay Length (ft)				
Base Capacity (vph)				
Starvation Cap Reductn				
Spillback Cap Reductn				
Storage Cap Reductn				
Reduced v/c Ratio				
Intersection Summary				

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour

13: Woodall WBFR & Harwood

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↰↰			↱↱↱	
Traffic Volume (vph)	0	279	0	0	728	65
Future Volume (vph)	0	279	0	0	728	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.88	1.00	1.00	0.91	0.91
Ped Bike Factor		0.91			1.00	
Frt		0.850			0.988	
Flt Protected						
Satd. Flow (prot)	0	2787	0	0	5004	0
Flt Permitted						
Satd. Flow (perm)	0	2543	0	0	5004	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		144			37	
Link Speed (mph)	30			30	24	
Link Distance (ft)	246			202	260	
Travel Time (s)	5.6			4.6	7.4	
Confl. Peds. (#/hr)		82				41
Peak Hour Factor	0.82	0.82	0.92	0.92	0.94	0.94
Adj. Flow (vph)	0	340	0	0	774	69
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	340	0	0	843	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			12	-12	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Turn Type		Perm			NA	
Protected Phases					8	
Permitted Phases		6				
Minimum Split (s)		20.0			20.0	
Total Split (s)		24.0			26.0	
Total Split (%)		48.0%			52.0%	
Maximum Green (s)		20.0			22.0	
Yellow Time (s)		3.5			3.5	
All-Red Time (s)		0.5			0.5	
Lost Time Adjust (s)		0.0			0.0	
Total Lost Time (s)		4.0			4.0	
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)		5.0			5.0	
Flash Dont Walk (s)		11.0			11.0	
Pedestrian Calls (#/hr)		0			0	
Act Effct Green (s)		20.0			22.0	
Actuated g/C Ratio		0.40			0.44	
v/c Ratio		0.31			0.38	
Control Delay		4.7			9.3	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour

13: Woodall WBFR & Harwood

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Queue Delay		0.0			0.0	
Total Delay		4.7			9.3	
LOS		A			A	
Approach Delay	4.7				9.3	
Approach LOS	A				A	
Queue Length 50th (ft)		16			73	
Queue Length 95th (ft)		30			83	
Internal Link Dist (ft)	166			122	180	
Turn Bay Length (ft)						
Base Capacity (vph)		1103			2222	
Starvation Cap Reductn		0			0	
Spillback Cap Reductn		0			0	
Storage Cap Reductn		0			0	
Reduced v/c Ratio		0.31			0.38	

Intersection Summary

Area Type: Other

Cycle Length: 50

Actuated Cycle Length: 50

Offset: 1 (2%), Referenced to phase 6:EBR, Start of Yellow

Natural Cycle: 40

Control Type: Pretimed

Maximum v/c Ratio: 0.38

Intersection Signal Delay: 7.9

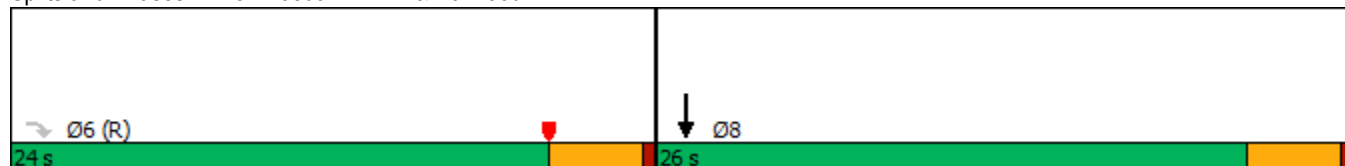
Intersection LOS: A

Intersection Capacity Utilization 37.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 13: Woodall WBFR & Harwood



North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour

14: Woodall EBFR & Harwood

							
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø2
Lane Configurations			↑↑↑				
Traffic Volume (vph)	0	0	922	137	0	0	
Future Volume (vph)	0	0	922	137	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	0.91	0.91	1.00	1.00	
Ped Bike Factor			0.99				
Frt			0.981				
Flt Protected							
Satd. Flow (prot)	0	0	4930	0	0	0	
Flt Permitted							
Satd. Flow (perm)	0	0	4930	0	0	0	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)			66				
Link Speed (mph)	30		26			30	
Link Distance (ft)	974		416			261	
Travel Time (s)	22.1		10.9			5.9	
Confl. Peds. (#/hr)				32			
Peak Hour Factor	0.92	0.92	0.96	0.96	0.92	0.92	
Adj. Flow (vph)	0	0	960	143	0	0	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	0	1103	0	0	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Right	Left	Left	
Median Width(ft)	0		0			0	
Link Offset(ft)	24		0			0	
Crosswalk Width(ft)	16		16			16	
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9		9	15		
Turn Type			NA				
Protected Phases			4			2	
Permitted Phases							
Minimum Split (s)			20.9			21.0	
Total Split (s)			75.0			25.0	
Total Split (%)			75.0%			25%	
Maximum Green (s)			70.1			20.0	
Yellow Time (s)			3.6			3.6	
All-Red Time (s)			1.3			1.4	
Lost Time Adjust (s)			0.0				
Total Lost Time (s)			4.9				
Lead/Lag							
Lead-Lag Optimize?							
Walk Time (s)			4.0			4.0	
Flash Dont Walk (s)			8.0			8.0	
Pedestrian Calls (#/hr)			0			0	
Act Effect Green (s)			70.1				
Actuated g/C Ratio			0.70				
v/c Ratio			0.32				
Control Delay			3.7				

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour

14: Woodall EBFR & Harwood

							
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø2
Queue Delay			0.2				
Total Delay			3.9				
LOS			A				
Approach Delay			3.9				
Approach LOS			A				
Queue Length 50th (ft)			43				
Queue Length 95th (ft)			59				
Internal Link Dist (ft)	894		336			181	
Turn Bay Length (ft)							
Base Capacity (vph)			3475				
Starvation Cap Reductn			1322				
Spillback Cap Reductn			893				
Storage Cap Reductn			0				
Reduced v/c Ratio			0.51				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 30 (30%), Referenced to phase 2: Ped, Start of Yellow

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.32

Intersection Signal Delay: 3.9

Intersection LOS: A

Intersection Capacity Utilization 25.3%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 14: Woodall EBFR & Harwood



North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour

15: Woodall WBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	315	578	0	0	0	0	0	509	118
Future Volume (vph)	0	0	0	315	578	0	0	0	0	0	509	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	0.91	0.91
Ped Bike Factor					0.92						0.96	
Frt											0.972	
Flt Protected					0.983							
Satd. Flow (prot)	0	0	0	0	4999	0	0	0	0	0	4731	0
Flt Permitted					0.983							
Satd. Flow (perm)	0	0	0	0	4584	0	0	0	0	0	4731	0
Right Turn on Red			Yes	Yes		Yes			Yes			Yes
Satd. Flow (RTOR)					147						64	
Link Speed (mph)		30			30			30			24	
Link Distance (ft)		836			267			260			433	
Travel Time (s)		19.0			6.1			5.9			12.3	
Confl. Peds. (#/hr)				94								88
Peak Hour Factor	0.92	0.92	0.92	0.97	0.97	0.97	0.92	0.92	0.92	0.82	0.82	0.82
Adj. Flow (vph)	0	0	0	325	596	0	0	0	0	0	621	144
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	921	0	0	0	0	0	765	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		20			-20			12			-12	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type				Perm	NA						NA	
Protected Phases					2						4	
Permitted Phases				2								
Minimum Split (s)				21.2	21.2						21.2	
Total Split (s)				54.0	54.0						46.0	
Total Split (%)				54.0%	54.0%						46.0%	
Maximum Green (s)				48.8	48.8						40.8	
Yellow Time (s)				3.6	3.6						3.6	
All-Red Time (s)				1.6	1.6						1.6	
Lost Time Adjust (s)					0.0						0.0	
Total Lost Time (s)					5.2						5.2	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)				4.0	4.0						4.0	
Flash Dont Walk (s)				8.0	8.0						8.0	
Pedestrian Calls (#/hr)				0	0						0	
Act Effect Green (s)					48.8						40.8	
Actuated g/C Ratio					0.49						0.41	
v/c Ratio					0.40						0.39	
Control Delay					2.8						19.3	

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour

15: Woodall WBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay					0.1						0.0	
Total Delay					2.9						19.3	
LOS					A						B	
Approach Delay					2.9						19.3	
Approach LOS					A						B	
Queue Length 50th (ft)					5						104	
Queue Length 95th (ft)					8						m100	
Internal Link Dist (ft)		756			187			180			353	
Turn Bay Length (ft)												
Base Capacity (vph)					2312						1968	
Starvation Cap Reductn					431						0	
Spillback Cap Reductn					0						0	
Storage Cap Reductn					0						0	
Reduced v/c Ratio					0.49						0.39	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 87 (87%), Referenced to phase 2:WBTL and 6:, Start of Yellow

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.40

Intersection Signal Delay: 10.3

Intersection LOS: B

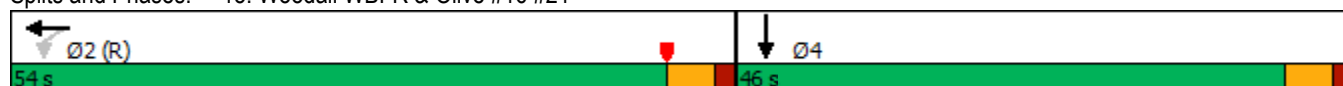
Intersection Capacity Utilization 39.8%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 15: Woodall WBFR & Olive #16 #21



North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour

16: Woodall EBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑	↑		↑↑↑				
Traffic Volume (vph)	0	0	0	0	847	368	60	837	0	0	0	0
Future Volume (vph)	0	0	0	0	847	368	60	837	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00
Ped Bike Factor						0.96		1.00				
Frt						0.850						
Flt Protected								0.997				
Satd. Flow (prot)	0	0	0	0	5085	1583	0	5070	0	0	0	0
Flt Permitted								0.997				
Satd. Flow (perm)	0	0	0	0	5085	1522	0	5050	0	0	0	0
Right Turn on Red			Yes			Yes	Yes		Yes			Yes
Satd. Flow (RTOR)						36		34				
Link Speed (mph)		30			30			26			30	
Link Distance (ft)		267			231			261			427	
Travel Time (s)		6.1			5.3			6.8			9.7	
Confl. Peds. (#/hr)						11	24					
Peak Hour Factor	0.92	0.92	0.92	0.96	0.96	0.96	0.90	0.90	0.90	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	882	383	67	930	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	882	383	0	997	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		20			-20			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type					NA	Perm	Perm	NA				
Protected Phases					2			4				
Permitted Phases						2	4					
Minimum Split (s)					22.1	22.1	21.1	21.1				
Total Split (s)					58.0	58.0	42.0	42.0				
Total Split (%)					58.0%	58.0%	42.0%	42.0%				
Maximum Green (s)					51.9	51.9	36.9	36.9				
Yellow Time (s)					3.6	3.6	3.6	3.6				
All-Red Time (s)					2.5	2.5	1.5	1.5				
Lost Time Adjust (s)					0.0	0.0		0.0				
Total Lost Time (s)					6.1	6.1		5.1				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)					4.0	4.0	4.0	4.0				
Flash Dont Walk (s)					8.0	8.0	8.0	8.0				
Pedestrian Calls (#/hr)					0	0	0	0				
Act Effct Green (s)					51.9	51.9		36.9				
Actuated g/C Ratio					0.52	0.52		0.37				
v/c Ratio					0.33	0.47		0.53				
Control Delay					14.4	16.2		31.0				

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour

16: Woodall EBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay					0.0	0.0		8.8				
Total Delay					14.4	16.2		39.8				
LOS					B	B		D				
Approach Delay					15.0			39.8				
Approach LOS					B			D				
Queue Length 50th (ft)					114	134		204				
Queue Length 95th (ft)					143	212		258				
Internal Link Dist (ft)		187			151			181			347	
Turn Bay Length (ft)												
Base Capacity (vph)					2639	807		1884				
Starvation Cap Reductn					0	0		851				
Spillback Cap Reductn					0	1		244				
Storage Cap Reductn					0	0		0				
Reduced v/c Ratio					0.33	0.48		0.97				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 82 (82%), Referenced to phase 2:WBT and 6:, Start of Yellow

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.53

Intersection Signal Delay: 25.9

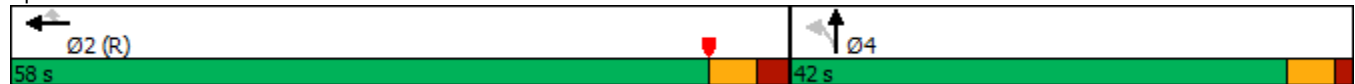
Intersection LOS: C

Intersection Capacity Utilization 50.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 16: Woodall EBFR & Olive #16 #21



North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour

17: Woodall WBFR & Pearl #17 #18

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations			↑↑↑	↑	↑	↑↑↑						↑↑↑
Traffic Volume (vph)	1	0	1564	182	164	890	0	0	0	0	89	298
Future Volume (vph)	1	0	1564	182	164	890	0	0	0	0	89	298
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		250		0	0		0	0		0	0	
Storage Lanes		1		1	1		0	0		0	0	
Taper Length (ft)		25			25			25			25	
Lane Util. Factor	0.91	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	0.91	0.91
Ped Bike Factor				0.95								0.90
Frt				0.850								0.938
Flt Protected					0.950							0.993
Satd. Flow (prot)	0	0	5085	1583	1770	5085	0	0	0	0	0	4266
Flt Permitted			0.940		0.089							0.993
Satd. Flow (perm)	0	0	4780	1504	166	5085	0	0	0	0	0	4266
Right Turn on Red				Yes			Yes			Yes		
Satd. Flow (RTOR)				186								153
Link Speed (mph)			30			30			30			30
Link Distance (ft)			1034			257			433			138
Travel Time (s)			23.5			5.8			9.8			3.1
Confl. Peds. (#/hr)				13	13							
Peak Hour Factor	0.98	0.98	0.98	0.98	0.92	0.92	0.92	0.92	0.92	0.92	0.78	0.78
Adj. Flow (vph)	1	0	1596	186	178	967	0	0	0	0	114	382
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	1597	186	178	967	0	0	0	0	0	850
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left
Median Width(ft)			12			12			0			0
Link Offset(ft)			0			0			0			0
Crosswalk Width(ft)			16			16			16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15		9	15		9	15		9	15	
Turn Type	Perm		NA	Perm	pm+pt	NA					Split	NA
Protected Phases			2		1 11	6					4	4
Permitted Phases	2			2	6							
Minimum Split (s)	21.1		21.1	21.1		28.1					22.0	22.0
Total Split (s)	40.0		40.0	40.0		78.0					22.0	22.0
Total Split (%)	40.0%		40.0%	40.0%		78.0%					22.0%	22.0%
Maximum Green (s)	34.9		34.9	34.9		72.9					16.0	16.0
Yellow Time (s)	3.6		3.6	3.6		3.6					3.9	3.9
All-Red Time (s)	1.5		1.5	1.5		1.5					2.1	2.1
Lost Time Adjust (s)			0.0	0.0		0.0						0.0
Total Lost Time (s)			5.1	5.1		5.1						6.0
Lead/Lag	Lag		Lag	Lag								
Lead-Lag Optimize?	Yes		Yes	Yes								
Walk Time (s)	4.0		4.0	4.0		4.0					4.0	4.0
Flash Dont Walk (s)	6.0		6.0	6.0		19.0					6.0	6.0
Pedestrian Calls (#/hr)	0		0	0		0					0	0
Act Effect Green (s)			34.9	34.9	73.0	72.9						16.0

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour

17: Woodall WBFR & Pearl #17 #18

Lane Group	SBR	Ø1	Ø11
Lane Configurations			
Traffic Volume (vph)	276		
Future Volume (vph)	276		
Ideal Flow (vphpl)	1900		
Storage Length (ft)	0		
Storage Lanes	0		
Taper Length (ft)			
Lane Util. Factor	0.91		
Ped Bike Factor			
Frt			
Flt Protected			
Satd. Flow (prot)	0		
Flt Permitted			
Satd. Flow (perm)	0		
Right Turn on Red	Yes		
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Peds. (#/hr)	77		
Peak Hour Factor	0.78		
Adj. Flow (vph)	354		
Shared Lane Traffic (%)			
Lane Group Flow (vph)	0		
Enter Blocked Intersection	No		
Lane Alignment	Right		
Median Width(ft)			
Link Offset(ft)			
Crosswalk Width(ft)			
Two way Left Turn Lane			
Headway Factor	1.00		
Turning Speed (mph)	9		
Turn Type			
Protected Phases	1	11	
Permitted Phases			
Minimum Split (s)	8.0	8.0	
Total Split (s)	20.0	18.0	
Total Split (%)	20%	18%	
Maximum Green (s)	15.0	14.0	
Yellow Time (s)	3.0	3.5	
All-Red Time (s)	2.0	0.5	
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead		
Lead-Lag Optimize?	Yes		
Walk Time (s)			
Flash Dont Walk (s)			
Pedestrian Calls (#/hr)			
Act Effect Green (s)			

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour

17: Woodall WBFR & Pearl #17 #18

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Actuated g/C Ratio			0.35	0.35	0.73	0.73						0.16
v/c Ratio			0.96	0.29	0.31	0.26						1.05
Control Delay			25.9	1.1	18.9	1.6						79.2
Queue Delay			0.8	0.0	2.3	0.3						0.0
Total Delay			26.7	1.1	21.2	2.0						79.2
LOS			C	A	C	A						E
Approach Delay			24.1			5.0						79.2
Approach LOS			C			A						E
Queue Length 50th (ft)			388	2	50	23						~184
Queue Length 95th (ft)			m#478	m2	m91	m26						#204
Internal Link Dist (ft)			954			177			353			58
Turn Bay Length (ft)												
Base Capacity (vph)			1668	645	570	3706						811
Starvation Cap Reductn			0	0	274	1980						0
Spillback Cap Reductn			14	0	0	0						0
Storage Cap Reductn			0	0	0	0						0
Reduced v/c Ratio			0.97	0.29	0.60	0.56						1.05

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 88 (88%), Referenced to phase 2:EBTU and 6:WBTL, Start of Yellow

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 1.05

Intersection Signal Delay: 30.7

Intersection LOS: C

Intersection Capacity Utilization 74.1%

ICU Level of Service D

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

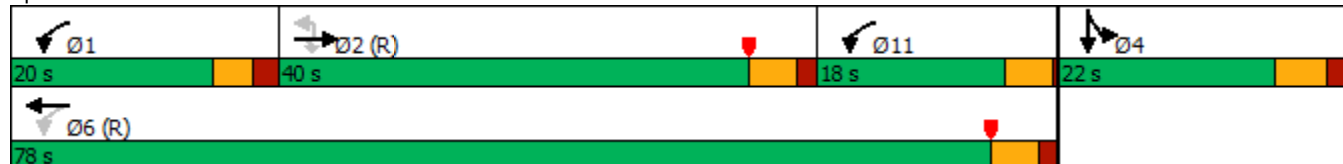
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 17: Woodall WBFR & Pearl #17 #18





Lane Group	SBR	Ø1	Ø11
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)			
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			
Intersection Summary			

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour

18: Woodall EBFR & Pearl #17 #18

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 			  			  				
Traffic Volume (vph)	663	1065	0	0	925	141	142	934	136	0	0	0
Future Volume (vph)	663	1065	0	0	925	141	142	934	136	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	250		0	0		0	0		0
Storage Lanes	2		0	1		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	1.00	0.91	1.00	0.91	0.91	0.91	1.00	1.00	1.00
Frt						0.850		0.983				
Flt Protected	0.950							0.994				
Satd. Flow (prot)	3433	3539	0	0	5085	1583	0	4969	0	0	0	0
Flt Permitted	0.155							0.994				
Satd. Flow (perm)	560	3539	0	0	5085	1583	0	4969	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						92		22				
Link Speed (mph)		30			30			26			30	
Link Distance (ft)		257			1016			427			143	
Travel Time (s)		5.8			23.1			11.2			3.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	721	1158	0	0	1005	153	154	1015	148	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	721	1158	0	0	1005	153	0	1317	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			0			0	
Link Offset(ft)		0			0			-12			12	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA			NA	Perm	Perm	NA				
Protected Phases	15	2			6			4				
Permitted Phases	2					6	4					
Minimum Split (s)	8.0	21.4			27.0	27.0	23.1	23.1				
Total Split (s)	34.0	66.0			32.0	32.0	34.0	34.0				
Total Split (%)	34.0%	66.0%			32.0%	32.0%	34.0%	34.0%				
Maximum Green (s)	29.0	60.6			27.0	27.0	28.0	28.0				
Yellow Time (s)	3.0	3.6			3.6	3.6	3.6	3.6				
All-Red Time (s)	2.0	1.8			1.4	1.4	2.4	2.4				
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0				
Total Lost Time (s)	5.0	5.4			5.0	5.0		6.0				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		4.0			4.0	4.0	4.0	4.0				
Flash Dont Walk (s)		8.0			18.0	18.0	8.0	8.0				
Pedestrian Calls (#/hr)		0			0	0	0	0				
Act Effect Green (s)	61.0	60.6			27.0	27.0		28.0				
Actuated g/C Ratio	0.61	0.61			0.27	0.27		0.28				
v/c Ratio	0.61	0.54			0.73	0.31		0.94				

North Harwood Tower
Lanes, Volumes, Timings

Phase 1 Background + Site Conditions - PM Peak Hour

18: Woodall EBFR & Pearl #17 #18

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	5.6	2.1			37.0	14.4		34.7				
Queue Delay	0.0	0.6			0.0	0.0		0.0				
Total Delay	5.6	2.7			37.0	14.4		34.7				
LOS	A	A			D	B		C				
Approach Delay		3.8			34.0			34.7				
Approach LOS		A			C			C				
Queue Length 50th (ft)	40	36			213	30		328				
Queue Length 95th (ft)	m42	m38			263	82		#405				
Internal Link Dist (ft)		177			936			347				63
Turn Bay Length (ft)												
Base Capacity (vph)	1174	2144			1372	494		1407				
Starvation Cap Reductn	0	547			0	0		0				
Spillback Cap Reductn	0	0			0	0		0				
Storage Cap Reductn	0	0			0	0		0				
Reduced v/c Ratio	0.61	0.73			0.73	0.31		0.94				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 65 (65%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 70

Control Type: Pretimed

Maximum v/c Ratio: 0.94

Intersection Signal Delay: 21.2

Intersection LOS: C

Intersection Capacity Utilization 74.1%

ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Woodall EBFR & Pearl #17 #18



Intersection												
Int Delay, s/veh	1.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑↑								↑	↑		
Traffic Vol, veh/h	0	748	3	0	0	0	0	0	98	14	0	0
Future Vol, veh/h	0	748	3	0	0	0	0	0	98	14	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	0	-	-
Veh in Median Storage, #	-	0	-	-	16979	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	813	3	0	0	0	0	0	107	15	0	0

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	0	0	0	-	-	-	408	325	-
Stage 1	-	-	-	-	-	-	-	0	-
Stage 2	-	-	-	-	-	-	-	325	-
Critical Hdwy	5.34	-	-	-	-	-	7.14	6.44	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	6.74	-
Follow-up Hdwy	3.12	-	-	-	-	-	3.92	3.82	-
Pot Cap-1 Maneuver	-	-	-	0	0	0	506	623	0
Stage 1	-	-	-	0	0	-	-	0	0
Stage 2	-	-	-	0	0	-	606	0	0
Platoon blocked, %	-	-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	-	506	492	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	492	-
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	478	-

Approach	EB	NB	SB
HCM Control Delay, s	0	14	12.6
HCM LOS		B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	506	-	-	-	492
HCM Lane V/C Ratio	0.211	-	-	-	0.031
HCM Control Delay (s)	14	0	-	-	12.6
HCM Lane LOS	B	A	-	-	B
HCM 95th %tile Q(veh)	0.8	-	-	-	0.1

Intersection						
Int Delay, s/veh	3.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗			↖↖↖	
Traffic Vol, veh/h	0	198	0	0	956	49
Future Vol, veh/h	0	198	0	0	956	49
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	16974	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	211	0	0	1017	52

Major/Minor	Minor2		Major2	
Conflicting Flow All	-	535	-	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	7.14	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	3.92	-	-
Pot Cap-1 Maneuver	0	419	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-
Platoon blocked, %			-	-
Mov Cap-1 Maneuver	-	419	-	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	SB
HCM Control Delay, s	22	0
HCM LOS	C	

Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	419	-	-
HCM Lane V/C Ratio	0.503	-	-
HCM Control Delay (s)	22	-	-
HCM Lane LOS	C	-	-
HCM 95th %tile Q(veh)	2.7	-	-

Intersection												
Int Delay, s/veh	4.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔			↔↔			↕			↕		
Traffic Vol, veh/h	0	191	29	8	56	2	108	0	54	29	0	10
Future Vol, veh/h	0	191	29	8	56	2	108	0	54	29	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	208	32	9	61	2	117	0	59	32	0	11
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	63	0	0	240	0	0	273	305	120	184	320	32
Stage 1	-	-	-	-	-	-	224	224	-	80	80	-
Stage 2	-	-	-	-	-	-	49	81	-	104	240	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1538	-	-	1324	-	-	658	607	909	760	596	1035
Stage 1	-	-	-	-	-	-	758	717	-	919	828	-
Stage 2	-	-	-	-	-	-	958	827	-	890	706	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1538	-	-	1324	-	-	647	603	909	707	592	1035
Mov Cap-2 Maneuver	-	-	-	-	-	-	647	603	-	707	592	-
Stage 1	-	-	-	-	-	-	758	717	-	919	822	-
Stage 2	-	-	-	-	-	-	941	821	-	833	706	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.9			11.7			9.9		
HCM LOS							B			A		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	716	1538	-	-	1324	-	-	770				
HCM Lane V/C Ratio	0.246	-	-	-	0.007	-	-	0.055				
HCM Control Delay (s)	11.7	0	-	-	7.7	0	-	9.9				
HCM Lane LOS	B	A	-	-	A	A	-	A				
HCM 95th %tile Q(veh)	1	0	-	-	0	-	-	0.2				

North Harwood Tower
HCM 6th TWSC

Phase 1 Background + Site Conditions - PM Peak Hour
22: Adjacent North Drive/Adjacent South Drive & Harwood

Intersection													
Int Delay, s/veh	1.9												
Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↕↕			↕↕			↕↕			↕↕	
Traffic Vol, veh/h	2	15	214	1	1	161	13	48	0	18	0	0	0
Future Vol, veh/h	2	15	214	1	1	161	13	48	0	18	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	16	233	1	1	175	14	52	0	20	0	0	0
Major/Minor	Major1			Major2			Minor1			Minor2			
Conflicting Flow All	189	189	0	0	234	0	0	360	461	117	337	454	95
Stage 1	-	-	-	-	-	-	-	270	270	-	184	184	-
Stage 2	-	-	-	-	-	-	-	90	191	-	153	270	-
Critical Hdwy	6.44	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.52	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1088	1382	-	-	1331	-	-	571	496	913	593	500	943
Stage 1	-	-	-	-	-	-	-	713	685	-	800	746	-
Stage 2	-	-	-	-	-	-	-	907	741	-	834	685	-
Platoon blocked, %			-	-		-	-						
Mov Cap-1 Maneuver	1339	1339	-	-	1331	-	-	564	488	913	573	492	943
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	564	488	-	573	492	-
Stage 1	-	-	-	-	-	-	-	702	675	-	788	745	-
Stage 2	-	-	-	-	-	-	-	906	740	-	804	675	-
Approach	EB			WB			NB			SB			
HCM Control Delay, s	0.7			0			11.4			0			
HCM LOS							B			A			
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1					
Capacity (veh/h)	630	1339	-	-	1331	-	-	-					
HCM Lane V/C Ratio	0.114	0.012	-	-	0.001	-	-	-					
HCM Control Delay (s)	11.4	7.7	0.1	-	7.7	0	-	0					
HCM Lane LOS	B	A	A	-	A	A	-	A					
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	-					



SynchroTM Output - 2027 Background Traffic

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour

1: McKinney & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	91	176	37	12	112	5	1	34	175	62	7	89
Future Volume (vph)	91	176	37	12	112	5	1	34	175	62	7	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor	0.92	0.99			0.99				0.96			
Frt		0.974			0.995				0.966			
Flt Protected	0.950				0.995				0.994			
Satd. Flow (prot)	1770	1790	0	0	3491	0	0	0	3274	0	0	0
Flt Permitted	0.950				0.926				0.836			
Satd. Flow (perm)	1631	1790	0	0	3235	0	0	0	2739	0	0	0
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)		13			4				55			
Link Speed (mph)		30			30				30			
Link Distance (ft)		424			278				526			
Travel Time (s)		9.6			6.3				12.0			
Confl. Peds. (#/hr)	54		37	37		54		60		86		86
Peak Hour Factor	0.96	0.96	0.96	0.92	0.92	0.92	0.86	0.86	0.86	0.86	0.93	0.93
Adj. Flow (vph)	95	183	39	13	122	5	1	40	203	72	8	96
Shared Lane Traffic (%)												
Lane Group Flow (vph)	95	222	0	0	140	0	0	0	316	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	R NA	Left
Median Width(ft)		12			12				0			
Link Offset(ft)		0			0				0			
Crosswalk Width(ft)		16			16				16			
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	9	15		9	9	15
Turn Type	Prot	NA		Perm	NA		Perm	Perm	NA		Perm	Perm
Protected Phases	8!				4!				2			
Permitted Phases		8		4			2	2			6	6
Minimum Split (s)	23.4	23.4		23.4	23.4		23.4	23.4	23.4		23.4	23.4
Total Split (s)	46.0	46.0		46.0	46.0		54.0	54.0	54.0		54.0	54.0
Total Split (%)	46.0%	46.0%		46.0%	46.0%		54.0%	54.0%	54.0%		54.0%	54.0%
Maximum Green (s)	40.6	40.6		40.6	40.6		48.6	48.6	48.6		48.6	48.6
Yellow Time (s)	3.6	3.6		3.6	3.6		3.2	3.2	3.2		3.2	3.2
All-Red Time (s)	1.8	1.8		1.8	1.8		2.2	2.2	2.2		2.2	2.2
Lost Time Adjust (s)	-1.4	0.0			-1.4				-1.4			
Total Lost Time (s)	4.0	5.4			4.0				4.0			
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0		4.0	4.0
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		13.0	13.0	13.0		13.0	13.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0		0	0
Act Effect Green (s)	42.0	40.6			42.0				50.0			
Actuated g/C Ratio	0.42	0.41			0.42				0.50			
v/c Ratio	0.13	0.30			0.10				0.23			
Control Delay	12.5	13.8			15.6				3.9			

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour

1: McKinney & Harwood

	↓	↙
Lane Group	SBT	SBR
Lane Configurations	4T	
Traffic Volume (vph)	278	157
Future Volume (vph)	278	157
Ideal Flow (vphpl)	1900	1900
Lane Util. Factor	0.95	0.95
Ped Bike Factor	0.95	
Frt	0.956	
Flt Protected	0.991	
Satd. Flow (prot)	3238	0
Flt Permitted	0.812	
Satd. Flow (perm)	2608	0
Right Turn on Red		Yes
Satd. Flow (RTOR)	92	
Link Speed (mph)	30	
Link Distance (ft)	348	
Travel Time (s)	7.9	
Confl. Peds. (#/hr)		60
Peak Hour Factor	0.93	0.93
Adj. Flow (vph)	299	169
Shared Lane Traffic (%)		
Lane Group Flow (vph)	572	0
Enter Blocked Intersection	No	No
Lane Alignment	Left	Right
Median Width(ft)	0	
Link Offset(ft)	0	
Crosswalk Width(ft)	16	
Two way Left Turn Lane		
Headway Factor	1.00	1.00
Turning Speed (mph)		9
Turn Type	NA	
Protected Phases	6	
Permitted Phases		
Minimum Split (s)	23.4	
Total Split (s)	54.0	
Total Split (%)	54.0%	
Maximum Green (s)	48.6	
Yellow Time (s)	3.2	
All-Red Time (s)	2.2	
Lost Time Adjust (s)	-1.4	
Total Lost Time (s)	4.0	
Lead/Lag		
Lead-Lag Optimize?		
Walk Time (s)	4.0	
Flash Dont Walk (s)	13.0	
Pedestrian Calls (#/hr)	0	
Act Effct Green (s)	50.0	
Actuated g/C Ratio	0.50	
v/c Ratio	0.42	
Control Delay	6.7	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour

1: McKinney & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Queue Delay	0.0	0.0			0.0				0.0			
Total Delay	12.5	13.8			15.6				3.9			
LOS	B	B			B				A			
Approach Delay		13.4			15.6				3.9			
Approach LOS		B			B				A			
Queue Length 50th (ft)	17	40			33				20			
Queue Length 95th (ft)	34	67			59				19			
Internal Link Dist (ft)		344			198				446			
Turn Bay Length (ft)												
Base Capacity (vph)	743	734			1361				1397			
Starvation Cap Reductn	0	0			0				0			
Spillback Cap Reductn	0	0			0				0			
Storage Cap Reductn	0	0			0				0			
Reduced v/c Ratio	0.13	0.30			0.10				0.23			

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 38 (38%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.42

Intersection Signal Delay: 8.7

Intersection LOS: A

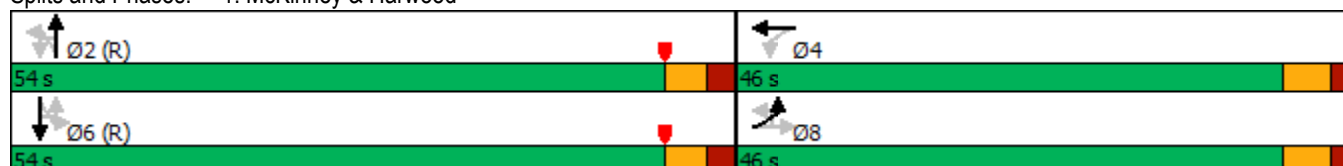
Intersection Capacity Utilization 57.2%

ICU Level of Service B

Analysis Period (min) 15

! Phase conflict between lane groups.

Splits and Phases: 1: McKinney & Harwood





Lane Group	SBT	SBR
Queue Delay	0.4	
Total Delay	7.1	
LOS	A	
Approach Delay	7.1	
Approach LOS	A	
Queue Length 50th (ft)	34	
Queue Length 95th (ft)	48	
Internal Link Dist (ft)	268	
Turn Bay Length (ft)		
Base Capacity (vph)	1350	
Starvation Cap Reductn	321	
Spillback Cap Reductn	0	
Storage Cap Reductn	0	
Reduced v/c Ratio	0.56	
Intersection Summary		

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour

2: Cedar Springs & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	390	0	0	0	78	0	615	33	0	0	0
Future Volume (vph)	42	390	0	0	0	78	0	615	33	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	0.88	1.00	0.81	0.81	1.00	1.00	1.00
Ped Bike Factor		1.00				0.96		1.00				
Frt						0.850		0.992				
Flt Protected		0.995										
Satd. Flow (prot)	0	3522	0	0	0	2787	0	7465	0	0	0	0
Flt Permitted		0.995										
Satd. Flow (perm)	0	3511	0	0	0	2671	0	7465	0	0	0	0
Right Turn on Red	Yes		Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25				290		18				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		269			424			493			445	
Travel Time (s)		6.1			9.6			11.2			10.1	
Confl. Peds. (#/hr)	16		21	21		16	16		18	18		16
Peak Hour Factor	0.93	0.93	0.93	0.77	0.77	0.77	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	45	419	0	0	0	101	0	668	36	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	464	0	0	0	101	0	704	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			-24			24	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA				Perm		NA				
Protected Phases		4						2				
Permitted Phases	4					4						
Minimum Split (s)	21.4	21.4				21.4		21.3				
Total Split (s)	47.0	47.0				47.0		53.0				
Total Split (%)	47.0%	47.0%				47.0%		53.0%				
Maximum Green (s)	41.6	41.6				41.6		47.7				
Yellow Time (s)	3.6	3.6				3.6		3.6				
All-Red Time (s)	1.8	1.8				1.8		1.7				
Lost Time Adjust (s)		-1.4				-1.4		-1.3				
Total Lost Time (s)		4.0				4.0		4.0				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0	4.0				4.0		4.0				
Flash Dont Walk (s)	12.0	12.0				12.0		10.0				
Pedestrian Calls (#/hr)	0	0				0		0				
Act Effct Green (s)		43.0				43.0		49.0				
Actuated g/C Ratio		0.43				0.43		0.49				
v/c Ratio		0.30				0.08		0.19				
Control Delay		14.5				0.6		3.1				

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour

2: Cedar Springs & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0				0.0		0.0				
Total Delay		14.5				0.6		3.1				
LOS		B				A		A				
Approach Delay		14.5			0.6			3.1				
Approach LOS		B			A			A				
Queue Length 50th (ft)		63				0		16				
Queue Length 95th (ft)		98				0		14				
Internal Link Dist (ft)		189			344			413			365	
Turn Bay Length (ft)												
Base Capacity (vph)		1523				1313		3667				
Starvation Cap Reductn		0				0		0				
Spillback Cap Reductn		0				0		0				
Storage Cap Reductn		0				0		0				
Reduced v/c Ratio		0.30				0.08		0.19				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 40 (40%), Referenced to phase 2:NBT, Start of Yellow

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.30

Intersection Signal Delay: 7.1

Intersection LOS: A

Intersection Capacity Utilization 43.0%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: Cedar Springs & Harwood



North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour

3: McKinney & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	96	700	270	28	203	0	0	310	94
Future Volume (vph)	0	0	0	96	700	270	28	203	0	0	310	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor					0.98	0.94		0.99			0.96	
Frt						0.850					0.965	
Flt Protected					0.994			0.994				
Satd. Flow (prot)	0	0	0	0	3518	1583	0	3518	0	0	3276	0
Flt Permitted					0.994			0.862				
Satd. Flow (perm)	0	0	0	0	3461	1487	0	3025	0	0	3276	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						287					47	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		536			836			348			457	
Travel Time (s)		12.2			19.0			7.9			10.4	
Confl. Peds. (#/hr)				81		30	100					100
Peak Hour Factor	0.92	0.92	0.92	0.94	0.94	0.94	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	0	0	0	102	745	287	33	242	0	0	369	112
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	847	287	0	275	0	0	481	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		16			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					4			2			2	
Permitted Phases				4		4	2					
Minimum Split (s)				23.3	23.3	23.3	23.4	23.4			23.4	
Total Split (s)				57.0	57.0	57.0	43.0	43.0			43.0	
Total Split (%)				57.0%	57.0%	57.0%	43.0%	43.0%			43.0%	
Maximum Green (s)				51.7	51.7	51.7	37.6	37.6			37.6	
Yellow Time (s)				3.2	3.2	3.2	3.2	3.2			3.2	
All-Red Time (s)				2.1	2.1	2.1	2.2	2.2			2.2	
Lost Time Adjust (s)					-1.3	-1.3		-1.4			-1.4	
Total Lost Time (s)					4.0	4.0		4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	
Flash Dont Walk (s)				14.0	14.0	14.0	14.0	14.0			14.0	
Pedestrian Calls (#/hr)				0	0	0	0	0			0	
Act Effect Green (s)					53.0	53.0		39.0			39.0	
Actuated g/C Ratio					0.53	0.53		0.39			0.39	
v/c Ratio					0.46	0.31		0.23			0.37	
Control Delay					9.5	0.8		27.2			8.5	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour

3: McKinney & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay					0.0	0.0		0.0			0.0	
Total Delay					9.5	0.8		27.2			8.5	
LOS					A	A		C			A	
Approach Delay					7.3			27.2			8.5	
Approach LOS					A			C			A	
Queue Length 50th (ft)					112	1		70			30	
Queue Length 95th (ft)					129	m4		95			45	
Internal Link Dist (ft)		456			756			268			377	
Turn Bay Length (ft)												
Base Capacity (vph)					1834	923		1179			1306	
Starvation Cap Reductn					0	0		0			0	
Spillback Cap Reductn					0	0		0			0	
Storage Cap Reductn					0	0		0			0	
Reduced v/c Ratio					0.46	0.31		0.23			0.37	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 19 (19%), Referenced to phase 2:NBSB and 6:, Start of Yellow

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.46

Intersection Signal Delay: 10.5

Intersection LOS: B

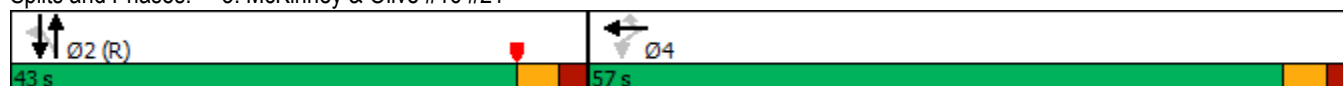
Intersection Capacity Utilization 55.5%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: McKinney & Olive #16 #21



North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour

4: Cedar Springs & Akard & St Paul

										
Lane Group	EBU	EBL	EBT	EBR	WBL	WBR	WBR2	NBL	NBT	NBR
Lane Configurations										
Traffic Volume (vph)	6	706	1169	97	12	411	10	230	16	68
Future Volume (vph)	6	706	1169	97	12	411	10	230	16	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.97	0.91	0.91	1.00	0.88	1.00	0.97	1.00	1.00
Ped Bike Factor		0.99	1.00			0.95		0.98	0.97	
Frt			0.989			0.850			0.879	
Flt Protected		0.950			0.950			0.950		
Satd. Flow (prot)	0	3433	5013	0	1770	2787	0	3433	1583	0
Flt Permitted		0.950			0.950			0.950		
Satd. Flow (perm)	0	3404	5013	0	1770	2637	0	3376	1583	0
Right Turn on Red				Yes			Yes			Yes
Satd. Flow (RTOR)			20			140			75	
Link Speed (mph)			30						30	
Link Distance (ft)			345						581	
Travel Time (s)			7.8						13.2	
Confl. Peds. (#/hr)		5		18			17	10		18
Peak Hour Factor	0.98	0.98	0.98	0.98	0.82	0.82	0.82	0.91	0.91	0.91
Adj. Flow (vph)	6	720	1193	99	15	501	12	253	18	75
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	726	1292	0	15	513	0	253	93	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	Left	Right	Right	Left	Left	Right
Median Width(ft)			0						24	
Link Offset(ft)			24						0	
Crosswalk Width(ft)			16						16	
Two way Left Turn Lane										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15		9	15	9	9	15		9
Turn Type	custom	Prot	NA		Prot	Perm		Prot	NA	
Protected Phases		5			1			4		
Permitted Phases	5		2			6			4	
Minimum Split (s)	23.9	23.9	23.0		8.0	21.5		23.9	23.9	
Total Split (s)	41.0	41.0	57.0		15.0	31.0		28.0	28.0	
Total Split (%)	41.0%	41.0%	57.0%		15.0%	31.0%		28.0%	28.0%	
Maximum Green (s)	35.1	35.1	52.0		11.0	25.5		22.1	22.1	
Yellow Time (s)	3.6	3.6	3.6		3.5	3.6		3.6	3.6	
All-Red Time (s)	2.3	2.3	1.4		0.5	1.9		2.3	2.3	
Lost Time Adjust (s)		-1.9	-1.0		0.0	-1.5		-1.9	-1.9	
Total Lost Time (s)		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lead	Lag		Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes				
Walk Time (s)	4.0	4.0	4.0			4.0		4.0	4.0	
Flash Dont Walk (s)	14.0	14.0	14.0			8.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0	0			0		0	0	
Act Effect Green (s)		37.0	53.0		11.0	27.0		24.0	24.0	
Actuated g/C Ratio		0.37	0.53		0.11	0.27		0.24	0.24	
v/c Ratio		0.58	0.48		0.08	0.63		0.31	0.21	
Control Delay		45.3	8.8		39.0	17.1		32.4	11.4	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour

4: Cedar Springs & Akard & St Paul



Lane Group	EBU	EBL	EBT	EBR	WBL	WBR	WBR2	NBL	NBT	NBR
Queue Delay		3.3	0.0		0.0	1.0		0.0	0.0	
Total Delay		48.6	8.8		39.0	18.2		32.4	11.4	
LOS		D	A		D	B		C	B	
Approach Delay			23.1						26.8	
Approach LOS			C						C	
Queue Length 50th (ft)		225	81		9	52		68	9	
Queue Length 95th (ft)		287	104		m27	64		103	49	
Internal Link Dist (ft)			265						501	
Turn Bay Length (ft)										
Base Capacity (vph)		1259	2666		194	814		823	436	
Starvation Cap Reductn		0	0		0	0		0	0	
Spillback Cap Reductn		420	25		0	119		0	15	
Storage Cap Reductn		0	0		0	0		0	0	
Reduced v/c Ratio		0.87	0.49		0.08	0.74		0.31	0.22	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBR, Start of Yellow

Natural Cycle: 70

Control Type: Pretimed

Maximum v/c Ratio: 0.63

Intersection Signal Delay: 22.8

Intersection LOS: C

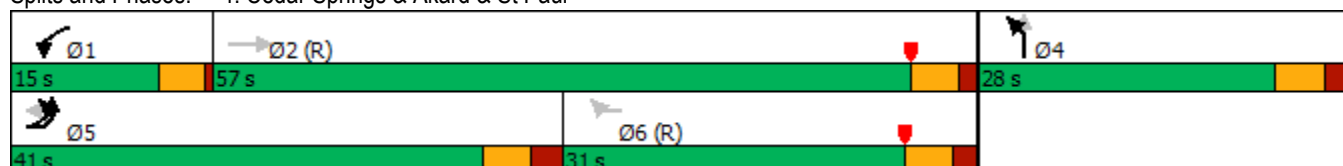
Intersection Capacity Utilization 60.0%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Cedar Springs & Akard & St Paul



North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour

5: McKinney & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	704	2	0	0	0	0	214	84	90	186	2
Future Volume (vph)	62	704	2	0	0	0	0	214	84	90	186	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor	0.98	1.00						0.98			0.99	
Frt								0.958			0.999	
Flt Protected	0.950										0.984	
Satd. Flow (prot)	1770	3539	0	0	0	0	0	3330	0	0	3477	0
Flt Permitted	0.950										0.741	
Satd. Flow (perm)	1734	3539	0	0	0	0	0	3330	0	0	2591	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)								66			1	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		323			197			264			526	
Travel Time (s)		7.3			4.5			6.0			12.0	
Confl. Peds. (#/hr)	10		10				33		33	33		33
Peak Hour Factor	0.89	0.89	0.89	0.92	0.92	0.92	0.96	0.96	0.96	0.89	0.89	0.89
Adj. Flow (vph)	70	791	2	0	0	0	0	223	88	101	209	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	70	793	0	0	0	0	0	311	0	0	312	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			24			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA						NA		Perm	NA	
Protected Phases	4							2			2	
Permitted Phases		4					2			2		
Minimum Split (s)	21.2	21.2					24.6	24.6		24.6	24.6	
Total Split (s)	38.0	38.0					41.0	41.0		41.0	41.0	
Total Split (%)	38.0%	38.0%					41.0%	41.0%		41.0%	41.0%	
Maximum Green (s)	33.1	33.1					35.6	35.6		35.6	35.6	
Yellow Time (s)	3.2	3.2					3.2	3.2		3.2	3.2	
All-Red Time (s)	1.7	1.7					2.2	2.2		2.2	2.2	
Lost Time Adjust (s)	-0.9	-0.9						-1.4			-1.4	
Total Lost Time (s)	4.0	4.0						4.0			4.0	
Lead/Lag	Lag	Lag										
Lead-Lag Optimize?	Yes	Yes										
Walk Time (s)	4.0	4.0					4.0	4.0		4.0	4.0	
Flash Dont Walk (s)	11.0	11.0					15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0					0	0		0	0	
Act Effct Green (s)	34.0	34.0						37.0			37.0	
Actuated g/C Ratio	0.34	0.34						0.37			0.37	
v/c Ratio	0.12	0.66						0.24			0.33	
Control Delay	21.7	32.6						16.3			15.5	

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Minimum Split (s)	9.5
Total Split (s)	21.0
Total Split (%)	21%
Maximum Green (s)	17.0
Yellow Time (s)	3.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour

5: McKinney & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	51.7						0.6			0.0	
Total Delay	21.7	84.3						16.9			15.5	
LOS	C	F						B			B	
Approach Delay		79.2						16.9			15.5	
Approach LOS		E						B			B	
Queue Length 50th (ft)	44	280						70			71	
Queue Length 95th (ft)	m80	340						109			90	
Internal Link Dist (ft)		243			117			184			446	
Turn Bay Length (ft)												
Base Capacity (vph)	601	1203						1273			959	
Starvation Cap Reductn	0	528						627			0	
Spillback Cap Reductn	0	0						0			0	
Storage Cap Reductn	0	0						0			0	
Reduced v/c Ratio	0.12	1.17						0.48			0.33	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 45 (45%), Referenced to phase 2:NBSB and 6:, Start of Yellow

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 52.8

Intersection LOS: D

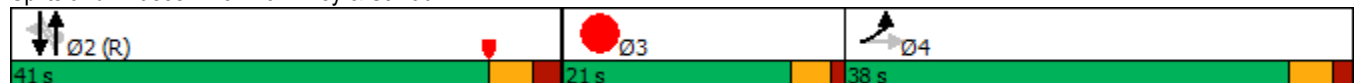
Intersection Capacity Utilization 61.2%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: McKinney & St Paul



Lane Group	Ø3
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour

6: McKinney & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	1076	31	9	468	277	6	10	10	96	57	33
Future Volume (vph)	12	1076	31	9	468	277	6	10	10	96	57	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor	1.00				0.98				0.98			
Frt	0.996				0.945				0.942			
Flt Protected	0.999				0.999				0.989			
Satd. Flow (prot)	0	5048	0	0	4714	0	0	3256	0	0	3323	0
Flt Permitted	0.927				0.921				0.907			
Satd. Flow (perm)	0	4684	0	0	4346	0	0	2963	0	0	2682	0
Right Turn on Red	Yes				Yes				Yes			
Satd. Flow (RTOR)	6				223				12			
Link Speed (mph)	30				30				30			
Link Distance (ft)	383				222				432			
Travel Time (s)	8.7				5.0				9.8			
Confl. Peds. (#/hr)	19		37	37		19	30		13	13		30
Peak Hour Factor	0.92	0.92	0.92	0.89	0.89	0.89	0.82	0.82	0.82	0.83	0.83	0.83
Adj. Flow (vph)	13	1170	34	10	526	311	7	12	12	116	69	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1217	0	0	847	0	0	31	0	0	225	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)	0				0				0			
Link Offset(ft)	0				0				0			
Crosswalk Width(ft)	16				16				16			
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	4				4				6			
Permitted Phases	4				4				2			
Minimum Split (s)	21.2	21.2		21.2	21.2		24.4	24.4		24.4	24.4	
Total Split (s)	57.0	57.0		57.0	57.0		43.0	43.0		43.0	43.0	
Total Split (%)	57.0%	57.0%		57.0%	57.0%		43.0%	43.0%		43.0%	43.0%	
Maximum Green (s)	51.8	51.8		51.8	51.8		37.6	37.6		37.6	37.6	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.6	1.6		1.6	1.6		2.4	2.4		2.4	2.4	
Lost Time Adjust (s)	-1.2				-1.2				-1.4			
Total Lost Time (s)	4.0				4.0				4.0			
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	53.0				53.0				39.0			
Actuated g/C Ratio	0.53				0.53				0.39			
v/c Ratio	0.49				0.35				0.03			
Control Delay	7.8				12.2				13.5			

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour

6: McKinney & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.5			2.8			0.0			0.0	
Total Delay		8.3			15.0			13.5			10.9	
LOS		A			B			B			B	
Approach Delay		8.3			15.0			13.5			10.9	
Approach LOS		A			B			B			B	
Queue Length 50th (ft)		116			90			3			66	
Queue Length 95th (ft)		134			117			12			90	
Internal Link Dist (ft)		303			142			352			184	
Turn Bay Length (ft)												
Base Capacity (vph)		2485			2408			1162			1064	
Starvation Cap Reductn		729			1409			0			0	
Spillback Cap Reductn		524			0			0			1	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.69			0.85			0.03			0.21	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 68 (68%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.49

Intersection Signal Delay: 11.1

Intersection LOS: B

Intersection Capacity Utilization 52.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: McKinney & Akard

 Ø2 (R)	
43 s	57 s
 Ø6 (R)	
43 s	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour

7: Woodall WBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑									↑↑↑	
Traffic Volume (vph)	0	769	10	0	0	0	0	0	0	239	623	0
Future Volume (vph)	0	769	10	0	0	0	0	0	0	239	623	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00
Ped Bike Factor		1.00										
Frt		0.998										
Flt Protected											0.986	
Satd. Flow (prot)	0	5069	0	0	0	0	0	0	0	0	5014	0
Flt Permitted											0.986	
Satd. Flow (perm)	0	5069	0	0	0	0	0	0	0	0	5014	0
Right Turn on Red			Yes			Yes				Yes	No	No
Satd. Flow (RTOR)		2										
Link Speed (mph)		30			30			24			26	
Link Distance (ft)		183			58			216			216	
Travel Time (s)		4.2			1.3			6.1			5.7	
Confl. Peds. (#/hr)			34									
Peak Hour Factor	0.86	0.86	0.86	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	894	12	0	0	0	0	0	0	260	677	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	906	0	0	0	0	0	0	0	0	937	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		-24			24			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type		NA								Split	NA	
Protected Phases		2								4	4	
Permitted Phases												
Minimum Split (s)		21.6								21.3	21.3	
Total Split (s)		32.0								38.0	38.0	
Total Split (%)		32.0%								38.0%	38.0%	
Maximum Green (s)		26.4								32.7	32.7	
Yellow Time (s)		3.6								3.6	3.6	
All-Red Time (s)		2.0								1.7	1.7	
Lost Time Adjust (s)		-1.6									-1.3	
Total Lost Time (s)		4.0									4.0	
Lead/Lag		Lag										
Lead-Lag Optimize?		Yes										
Walk Time (s)		4.0								4.0	4.0	
Flash Dont Walk (s)		8.0								9.0	9.0	
Pedestrian Calls (#/hr)		0								0	0	
Act Effct Green (s)		28.0									34.0	
Actuated g/C Ratio		0.28									0.34	
v/c Ratio		0.64									0.55	
Control Delay		21.2									14.4	

Lane Group	Ø1
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	1
Permitted Phases	
Minimum Split (s)	21.3
Total Split (s)	30.0
Total Split (%)	30%
Maximum Green (s)	24.7
Yellow Time (s)	3.6
All-Red Time (s)	1.7
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour

7: Woodall WBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.1									0.7	
Total Delay		21.2									15.1	
LOS		C									B	
Approach Delay		21.2									15.1	
Approach LOS		C									B	
Queue Length 50th (ft)		165									140	
Queue Length 95th (ft)		163									161	
Internal Link Dist (ft)		103			1			136			136	
Turn Bay Length (ft)												
Base Capacity (vph)		1420									1704	
Starvation Cap Reductn		0									0	
Spillback Cap Reductn		41									414	
Storage Cap Reductn		0									0	
Reduced v/c Ratio		0.66									0.73	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 14 (14%), Referenced to phase 2:EBT and 6:, Start of Yellow

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 18.1

Intersection LOS: B

Intersection Capacity Utilization 38.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 7: Woodall WBFR & St Paul



Lane Group	Ø1
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour

8: Woodall EBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑						↑↑↑				
Traffic Volume (vph)	300	1134	1	0	0	0	0	660	178	0	0	0
Future Volume (vph)	300	1134	1	0	0	0	0	660	178	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	0.91	1.00	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00
Ped Bike Factor		0.96						0.96				
Frt								0.968				
Flt Protected		0.990										
Satd. Flow (prot)	0	5034	0	0	0	0	0	4736	0	0	0	0
Flt Permitted		0.990										
Satd. Flow (perm)	0	4829	0	0	0	0	0	4736	0	0	0	0
Right Turn on Red	Yes		Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		101						53				
Link Speed (mph)		30			30			26			30	
Link Distance (ft)		204			1246			248			416	
Travel Time (s)		4.6			28.3			6.5			9.5	
Confl. Peds. (#/hr)	78								91			
Peak Hour Factor	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95	0.92	0.92	0.92
Adj. Flow (vph)	316	1194	1	0	0	0	0	695	187	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1511	0	0	0	0	0	882	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		-24			24			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA						NA				
Protected Phases		2						4				
Permitted Phases	2											
Minimum Split (s)	21.0	21.0						21.8				
Total Split (s)	57.0	57.0						43.0				
Total Split (%)	57.0%	57.0%						43.0%				
Maximum Green (s)	52.0	52.0						37.2				
Yellow Time (s)	3.6	3.6						3.6				
All-Red Time (s)	1.4	1.4						2.2				
Lost Time Adjust (s)		-1.0						-1.8				
Total Lost Time (s)		4.0						4.0				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0	4.0						4.0				
Flash Dont Walk (s)	8.0	8.0						12.0				
Pedestrian Calls (#/hr)	0	0						0				
Act Effct Green (s)		53.0						39.0				
Actuated g/C Ratio		0.53						0.39				
v/c Ratio		0.58						0.47				
Control Delay		6.3						14.3				

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour

8: Woodall EBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		1.8						1.1				
Total Delay		8.1						15.4				
LOS		A						B				
Approach Delay		8.1						15.4				
Approach LOS		A						B				
Queue Length 50th (ft)		52						68				
Queue Length 95th (ft)		61						83				
Internal Link Dist (ft)		124			1166			168			336	
Turn Bay Length (ft)												
Base Capacity (vph)		2606						1879				
Starvation Cap Reductn		881						693				
Spillback Cap Reductn		0						0				
Storage Cap Reductn		0						0				
Reduced v/c Ratio		0.88						0.74				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 40 (40%), Referenced to phase 2:EBTL and 6:, Start of Yellow

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.58

Intersection Signal Delay: 10.8

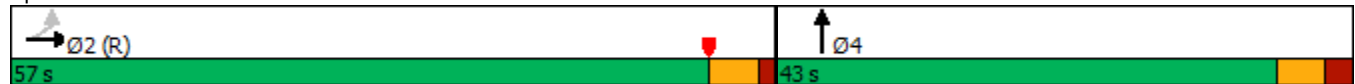
Intersection LOS: B

Intersection Capacity Utilization 52.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: Woodall EBFR & St Paul



North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour

9: Woodall WBFR & Akard WB On-Ramp & Akard

									
Lane Group	EBT	EBR	WBL	WBT	WBR	SBU	SBL	SBT	SBR
Lane Configurations	↑↑↑			↑↑↑			↑	↑↑	
Traffic Volume (vph)	1096	72	38	26	663	168	142	244	95
Future Volume (vph)	1096	72	38	26	663	168	142	244	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.95	1.00	0.95	0.95
Ped Bike Factor	0.99			0.91			1.00		
Frt	0.991			0.863				0.958	
Flt Protected				0.997			0.950		
Satd. Flow (prot)	4999	0	0	3995	0	0	1770	3391	0
Flt Permitted				0.848			0.950		
Satd. Flow (perm)	4999	0	0	3398	0	0	1764	3391	0
Right Turn on Red					Yes				Yes
Satd. Flow (RTOR)				453				55	
Link Speed (mph)	30			30				30	
Link Distance (ft)	222			279				216	
Travel Time (s)	5.0			6.3				4.9	
Confl. Peds. (#/hr)		34	34		20		1		
Peak Hour Factor	0.93	0.93	0.86	0.86	0.86	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1178	77	44	30	771	177	149	257	100
Shared Lane Traffic (%)									
Lane Group Flow (vph)	1255	0	0	845	0	0	326	357	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Right	R NA	Left	Left	Right
Median Width(ft)	0			0				12	
Link Offset(ft)	0			0				0	
Crosswalk Width(ft)	16			16				16	
Two way Left Turn Lane									
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		9	9	15		9
Turn Type	NA		pm+pt	NA		Perm	Split	NA	
Protected Phases	2		1	6			4	4	
Permitted Phases			6			4			
Minimum Split (s)	21.3		8.0	21.3		22.5	22.5	22.5	
Total Split (s)	46.0		24.0	70.0		30.0	30.0	30.0	
Total Split (%)	46.0%		24.0%	70.0%		30.0%	30.0%	30.0%	
Maximum Green (s)	40.7		20.0	64.7		24.5	24.5	24.5	
Yellow Time (s)	3.6		3.5	3.6		3.6	3.6	3.6	
All-Red Time (s)	1.7		0.5	1.7		1.9	1.9	1.9	
Lost Time Adjust (s)	-1.3			-1.3			-1.5	-1.5	
Total Lost Time (s)	4.0			4.0			4.0	4.0	
Lead/Lag	Lag		Lead						
Lead-Lag Optimize?	Yes		Yes						
Walk Time (s)	4.0			4.0		4.0	4.0	4.0	
Flash Dont Walk (s)	11.0			9.0		13.0	13.0	13.0	
Pedestrian Calls (#/hr)	0			0		0	0	0	
Act Effect Green (s)	42.0			66.0			26.0	26.0	
Actuated g/C Ratio	0.42			0.66			0.26	0.26	
v/c Ratio	0.60			0.34			0.71	0.39	
Control Delay	14.4			2.6			16.9	5.7	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour

9: Woodall WBFR & Akard WB On-Ramp & Akard

	→	↗	↘	←	↖	↗	↓	↓	↘
Lane Group	EBT	EBR	WBL	WBT	WBR	SBU	SBL	SBT	SBR
Queue Delay	0.2			0.1			1.3	0.7	
Total Delay	14.6			2.8			18.2	6.4	
LOS	B			A			B	A	
Approach Delay	14.6			2.8				12.0	
Approach LOS	B			A				B	
Queue Length 50th (ft)	286			22			181	54	
Queue Length 95th (ft)	336			30			290	69	
Internal Link Dist (ft)	142			199				136	
Turn Bay Length (ft)									
Base Capacity (vph)	2099			2516			458	922	
Starvation Cap Reductn	224			693			36	281	
Spillback Cap Reductn	83			45			0	0	
Storage Cap Reductn	0			0			0	0	
Reduced v/c Ratio	0.67			0.46			0.77	0.56	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 29 (29%), Referenced to phase 2:EBT and 6:WBTL, Start of Yellow

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 10.4

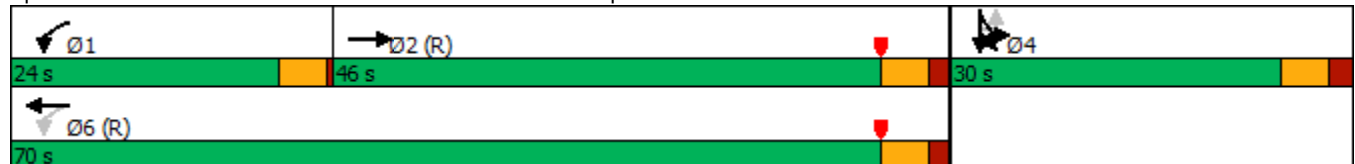
Intersection LOS: B

Intersection Capacity Utilization 68.2%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 9: Woodall WBFR & Akard WB On-Ramp & Akard



North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour

10: Woodall EBFR & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↑↑↑			↑↑↑				↑↑↑			
Traffic Volume (vph)	242	1049	0	0	516	84	7	194	510	51	0	0
Future Volume (vph)	242	1049	0	0	516	84	7	194	510	51	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	1.00	1.00	0.91	0.91	0.91	0.91	0.91	0.91	1.00	1.00
Ped Bike Factor		1.00			0.99				0.98			
Frt					0.979				0.990			
Flt Protected		0.991							0.987			
Satd. Flow (prot)	0	5040	0	0	4936	0	0	0	4869	0	0	0
Flt Permitted		0.697							0.987			
Satd. Flow (perm)	0	3534	0	0	4936	0	0	0	4869	0	0	0
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)					37				11			
Link Speed (mph)		30			30				26			30
Link Distance (ft)		279			374				181			248
Travel Time (s)		6.3			8.5				4.7			5.6
Confl. Peds. (#/hr)	27		44	44		27				117		
Peak Hour Factor	0.91	0.91	0.91	0.88	0.88	0.88	0.95	0.95	0.95	0.95	0.92	0.92
Adj. Flow (vph)	266	1153	0	0	586	95	7	204	537	54	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1419	0	0	681	0	0	0	802	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	Left	Left
Median Width(ft)		0			0				0			0
Link Offset(ft)		0			0				-24			24
Crosswalk Width(ft)		16			16				16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	9	15		9	15	
Turn Type	pm+pt	NA			NA		Perm	Perm	NA			
Protected Phases	15	2			6				4			
Permitted Phases	2						4	4				
Minimum Split (s)	8.2	21.1			21.1		21.6	21.6	21.6			
Total Split (s)	23.0	67.0			44.0		33.0	33.0	33.0			
Total Split (%)	23.0%	67.0%			44.0%		33.0%	33.0%	33.0%			
Maximum Green (s)	17.8	61.9			38.9		27.4	27.4	27.4			
Yellow Time (s)	3.2	3.6			3.6		3.6	3.6	3.6			
All-Red Time (s)	2.0	1.5			1.5		2.0	2.0	2.0			
Lost Time Adjust (s)		-1.1			-1.1				-1.6			
Total Lost Time (s)		4.0			4.0				4.0			
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		4.0			4.0		4.0	4.0	4.0			
Flash Dont Walk (s)		8.0			12.0		8.0	8.0	8.0			
Pedestrian Calls (#/hr)		0			0		0	0	0			
Act Effct Green (s)		63.0			40.0				29.0			
Actuated g/C Ratio		0.63			0.40				0.29			
v/c Ratio		0.56			0.34				0.57			
Control Delay		5.4			16.5				31.6			

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour

10: Woodall EBFR & Akard

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	0
Future Volume (vph)	0
Ideal Flow (vphpl)	1900
Lane Util. Factor	1.00
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	0.92
Adj. Flow (vph)	0
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Enter Blocked Intersection	No
Lane Alignment	Right
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	1.00
Turning Speed (mph)	9
Turn Type	
Protected Phases	
Permitted Phases	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Maximum Green (s)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour

10: Woodall EBFR & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Queue Delay		0.1			0.0				0.0			
Total Delay		5.5			16.5				31.6			
LOS		A			B				C			
Approach Delay		5.5			16.5				31.6			
Approach LOS		A			B				C			
Queue Length 50th (ft)		61			67				156			
Queue Length 95th (ft)		46			82				198			
Internal Link Dist (ft)		199			294				101			168
Turn Bay Length (ft)												
Base Capacity (vph)		2512			1996				1419			
Starvation Cap Reductn		154			0				0			
Spillback Cap Reductn		0			0				0			
Storage Cap Reductn		0			0				0			
Reduced v/c Ratio		0.60			0.34				0.57			

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 8 (8%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 15.3

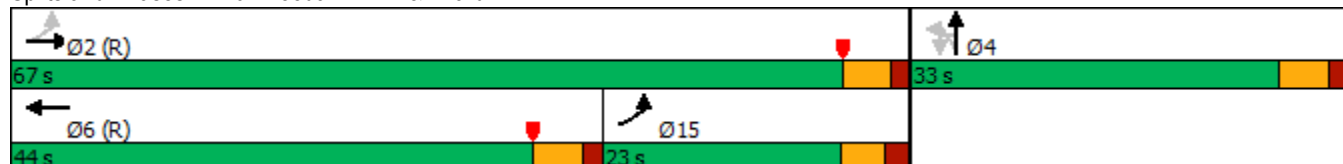
Intersection LOS: B

Intersection Capacity Utilization 64.0%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 10: Woodall EBFR & Akard





Lane Group	SBR
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour

11: Field/Field #11 #12 & Woodall WBFR

												
Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↑↑↑	↗		↖	↗↑↑					↖	↗
Traffic Volume (vph)	0	795	188	2	119	838	0	0	0	0	232	452
Future Volume (vph)	0	795	188	2	119	838	0	0	0	0	232	452
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		200		0		0	0		0	0	
Storage Lanes	1		3		1		0	0		0	1	
Taper Length (ft)	25				25			25			25	
Lane Util. Factor	1.00	0.86	1.00	0.91	0.86	0.86	1.00	1.00	1.00	1.00	0.95	0.91
Ped Bike Factor			0.93		0.99	1.00						1.00
Frt			0.850									0.990
Flt Protected					0.950	0.999					0.950	0.998
Satd. Flow (prot)	0	6408	1583	0	1522	4801	0	0	0	0	1681	1671
Flt Permitted					0.165	0.940					0.950	0.998
Satd. Flow (perm)	0	6408	1477	0	261	4517	0	0	0	0	1681	1671
Right Turn on Red			Yes				Yes			Yes		
Satd. Flow (RTOR)			204									3
Link Speed (mph)		30				30			30			26
Link Distance (ft)		675				234			238			187
Travel Time (s)		15.3				5.3			5.4			4.9
Confl. Peds. (#/hr)			26		26							
Peak Hour Factor	0.92	0.92	0.92	0.91	0.91	0.91	0.91	0.92	0.92	0.92	0.96	0.96
Adj. Flow (vph)	0	864	204	2	131	921	0	0	0	0	242	471
Shared Lane Traffic (%)					10%						10%	
Lane Group Flow (vph)	0	864	204	0	120	934	0	0	0	0	218	532
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	R NA	Left	Left	Right	Left	Left	Right	Left	Left
Median Width(ft)		20				20			12			12
Link Offset(ft)		0				0			-20			24
Crosswalk Width(ft)		16				16			16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	9	15		9	15		9	15	
Turn Type		NA	Perm	custom	pm+pt	NA					Split	NA
Protected Phases		2			1	2 1					4 12	4 12
Permitted Phases			2	1	2 1							
Minimum Split (s)		23.2	23.2	8.0	8.0							
Total Split (s)		32.0	32.0	56.0	56.0							
Total Split (%)		24.6%	24.6%	43.1%	43.1%							
Maximum Green (s)		26.8	26.8	52.0	52.0							
Yellow Time (s)		5.2	5.2	3.5	3.5							
All-Red Time (s)		0.0	0.0	0.5	0.5							
Lost Time Adjust (s)		-1.2	-1.2		-1.0							
Total Lost Time (s)		4.0	4.0		3.0							
Lead/Lag		Lead	Lead	Lag	Lag							
Lead-Lag Optimize?		Yes	Yes	Yes	Yes							
Walk Time (s)		4.0	4.0									
Flash Dont Walk (s)		14.0	14.0									
Pedestrian Calls (#/hr)		0	0									
Act Effect Green (s)		28.0	28.0		82.0	79.6					38.0	38.0

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour

11: Field/Field #11 #12 & Woodall WBFR

Lane Group	SBR	Ø4	Ø5	Ø6	Ø8	Ø12	Ø16
Lane Configurations							
Traffic Volume (vph)	359						
Future Volume (vph)	359						
Ideal Flow (vphpl)	1900						
Storage Length (ft)	0						
Storage Lanes	1						
Taper Length (ft)							
Lane Util. Factor	0.95						
Ped Bike Factor	0.97						
Frt	0.850						
Flt Protected							
Satd. Flow (prot)	1504						
Flt Permitted							
Satd. Flow (perm)	1460						
Right Turn on Red	Yes						
Satd. Flow (RTOR)	156						
Link Speed (mph)							
Link Distance (ft)							
Travel Time (s)							
Confl. Peds. (#/hr)	15						
Peak Hour Factor	0.96						
Adj. Flow (vph)	374						
Shared Lane Traffic (%)	10%						
Lane Group Flow (vph)	337						
Enter Blocked Intersection	No						
Lane Alignment	Right						
Median Width(ft)							
Link Offset(ft)							
Crosswalk Width(ft)							
Two way Left Turn Lane							
Headway Factor	1.00						
Turning Speed (mph)	9						
Turn Type	Perm						
Protected Phases		4	5	6	8	12	16
Permitted Phases	4 12						
Minimum Split (s)		40.1	8.0	21.9	31.0	6.0	6.0
Total Split (s)		36.0	62.0	34.0	28.0	6.0	6.0
Total Split (%)		28%	48%	26%	22%	5%	5%
Maximum Green (s)		29.9	57.0	28.6	22.0	1.0	1.0
Yellow Time (s)		6.1	5.0	5.4	6.0	5.0	5.0
All-Red Time (s)		0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)							
Total Lost Time (s)							
Lead/Lag		Lag	Lag	Lead	Lag	Lead	Lead
Lead-Lag Optimize?		Yes	Yes	Yes	Yes	Yes	Yes
Walk Time (s)		4.0		4.0	4.0		
Flash Dont Walk (s)		29.0		12.0	20.0		
Pedestrian Calls (#/hr)		0		0	0		
Act Effect Green (s)	38.0						

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour

11: Field/Field #11 #12 & Woodall WBFR

												
Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Actuated g/C Ratio		0.22	0.22		0.63	0.61					0.29	0.29
v/c Ratio		0.63	0.43		0.18	0.32					0.44	1.09
Control Delay		27.5	9.9		2.0	3.0					40.9	109.0
Queue Delay		0.1	0.0		1.0	0.4					0.0	0.0
Total Delay		27.6	9.9		3.0	3.4					40.9	109.0
LOS		C	A		A	A					D	F
Approach Delay		24.2				3.4						69.8
Approach LOS		C				A						E
Queue Length 50th (ft)		197	84		6	19					157	~550
Queue Length 95th (ft)		237	155		m9	22					240	#798
Internal Link Dist (ft)		595				154			158			107
Turn Bay Length (ft)			200									
Base Capacity (vph)		1380	478		678	2878					491	490
Starvation Cap Reductn		0	0		377	1297					0	0
Spillback Cap Reductn		70	0		0	0					0	0
Storage Cap Reductn		0	0		0	0					0	0
Reduced v/c Ratio		0.66	0.43		0.40	0.59					0.44	1.09

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 58 (45%), Referenced to phase 2:EBWB, Start of Yellow

Natural Cycle: 120

Control Type: Pretimed

Maximum v/c Ratio: 1.09

Intersection Signal Delay: 32.8

Intersection LOS: C

Intersection Capacity Utilization 68.9%

ICU Level of Service C

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

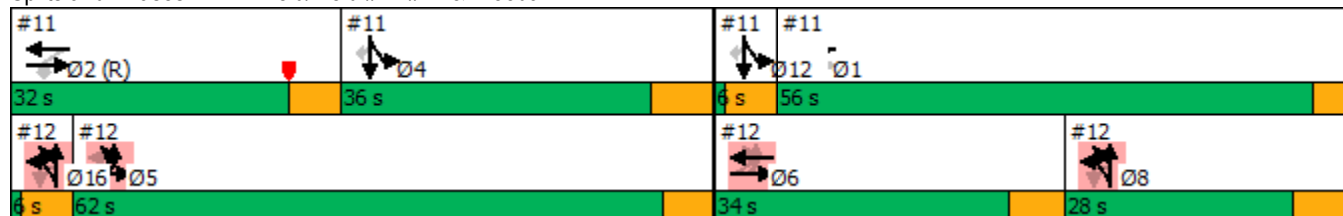
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: Field/Field #11 #12 & Woodall WBFR



Lane Group	SBR	Ø4	Ø5	Ø6	Ø8	Ø12	Ø16
Actuated g/C Ratio	0.29						
v/c Ratio	0.63						
Control Delay	26.6						
Queue Delay	0.0						
Total Delay	26.6						
LOS	C						
Approach Delay							
Approach LOS							
Queue Length 50th (ft)	138						
Queue Length 95th (ft)	252						
Internal Link Dist (ft)							
Turn Bay Length (ft)							
Base Capacity (vph)	537						
Starvation Cap Reductn	0						
Spillback Cap Reductn	0						
Storage Cap Reductn	0						
Reduced v/c Ratio	0.63						
Intersection Summary							

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour
12: Woodall EBFR & Field #11 #12 & Field EB On-Ramp

												
Lane Group	EBU	EBL2	EBL	EBT	WBU	WBT	WBR	WBR2	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Volume (vph)	1	148	0	903	2	763	90	93	61	184	630	247
Future Volume (vph)	1	148	0	903	2	763	90	93	61	184	630	247
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)			0				0			0		0
Storage Lanes			1				1			1		0
Taper Length (ft)			25							25		
Lane Util. Factor	0.91	0.91	1.00	0.91	0.91	0.91	1.00	0.91	0.91	0.86	0.86	0.91
Ped Bike Factor							0.97					
Frt							0.850				0.959	
Flt Protected			0.950							0.950	0.999	
Satd. Flow (prot)	0	0	1770	5085	0	5085	1583	0	0	1522	4604	0
Flt Permitted			0.135			0.938				0.950	0.999	
Satd. Flow (perm)	0	0	251	5085	0	4770	1530	0	0	1522	4604	0
Right Turn on Red								Yes				Yes
Satd. Flow (RTOR)							162				69	
Link Speed (mph)				30		30					30	
Link Distance (ft)				234		419					191	
Travel Time (s)				5.3		9.5					4.3	
Confl. Peds. (#/hr)		9					9					
Peak Hour Factor	0.92	0.92	0.92	0.92	0.89	0.89	0.89	0.89	0.87	0.87	0.87	0.87
Adj. Flow (vph)	1	161	0	982	2	857	101	104	70	211	724	284
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	0	0	162	982	0	859	205	0	0	260	1029	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Left	R NA	Left	Right	Right	R NA	Left	Left	Right
Median Width(ft)				20		12					12	
Link Offset(ft)				0		12					-24	
Crosswalk Width(ft)				16		16					16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15	15		9		9	9	9	15		9
Turn Type	custom	pm+pt	pm+pt	NA	Perm	NA	Perm		Perm	Split	NA	
Protected Phases		5	5	5 6		6				8 16	8 16	
Permitted Phases	5	5 6	5 6		6		6		8 16			
Minimum Split (s)	8.0	8.0	8.0		21.9	21.9	21.9					
Total Split (s)	62.0	62.0	62.0		34.0	34.0	34.0					
Total Split (%)	47.7%	47.7%	47.7%		26.2%	26.2%	26.2%					
Maximum Green (s)	57.0	57.0	57.0		28.6	28.6	28.6					
Yellow Time (s)	5.0	5.0	5.0		5.4	5.4	5.4					
All-Red Time (s)	0.0	0.0	0.0		0.0	0.0	0.0					
Lost Time Adjust (s)			-1.0			-1.4	-1.4					
Total Lost Time (s)			4.0			4.0	4.0					
Lead/Lag	Lag	Lag	Lag		Lead	Lead	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes	Yes					
Walk Time (s)					4.0	4.0	4.0					
Flash Dont Walk (s)					12.0	12.0	12.0					
Pedestrian Calls (#/hr)					0	0	0					
Act Effect Green (s)			88.0	92.0		30.0	30.0			30.0	30.0	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour
12: Woodall EBFR & Field #11 #12 & Field EB On-Ramp

Lane Group	Ø1	Ø2	Ø4	Ø8	Ø12	Ø16
Lane Configurations						
Traffic Volume (vph)						
Future Volume (vph)						
Ideal Flow (vphpl)						
Storage Length (ft)						
Storage Lanes						
Taper Length (ft)						
Lane Util. Factor						
Ped Bike Factor						
Frt						
Flt Protected						
Satd. Flow (prot)						
Flt Permitted						
Satd. Flow (perm)						
Right Turn on Red						
Satd. Flow (RTOR)						
Link Speed (mph)						
Link Distance (ft)						
Travel Time (s)						
Confl. Peds. (#/hr)						
Peak Hour Factor						
Adj. Flow (vph)						
Shared Lane Traffic (%)						
Lane Group Flow (vph)						
Enter Blocked Intersection						
Lane Alignment						
Median Width(ft)						
Link Offset(ft)						
Crosswalk Width(ft)						
Two way Left Turn Lane						
Headway Factor						
Turning Speed (mph)						
Turn Type						
Protected Phases	1	2	4	8	12	16
Permitted Phases						
Minimum Split (s)	8.0	23.2	40.1	31.0	6.0	6.0
Total Split (s)	56.0	32.0	36.0	28.0	6.0	6.0
Total Split (%)	43%	25%	28%	22%	5%	5%
Maximum Green (s)	52.0	26.8	29.9	22.0	1.0	1.0
Yellow Time (s)	3.5	5.2	6.1	6.0	5.0	5.0
All-Red Time (s)	0.5	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)						
Total Lost Time (s)						
Lead/Lag	Lag	Lead	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes
Walk Time (s)		4.0	4.0	4.0		
Flash Dont Walk (s)		14.0	29.0	20.0		
Pedestrian Calls (#/hr)		0	0	0		
Act Effect Green (s)						

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour
12: Woodall EBFR & Field #11 #12 & Field EB On-Ramp

												
Lane Group	EBU	EBL2	EBL	EBT	WBU	WBT	WBR	WBR2	NBU	NBL	NBT	NBR
Actuated g/C Ratio			0.68	0.71		0.23	0.23			0.23	0.23	
v/c Ratio			0.19	0.27		0.78	0.43			0.74	0.92	
Control Delay			0.7	1.5		46.2	10.5			60.4	59.5	
Queue Delay			0.6	0.7		0.4	0.0			0.0	6.8	
Total Delay			1.3	2.2		46.5	10.5			60.4	66.3	
LOS			A	A		D	B			E	E	
Approach Delay				2.1		39.6					65.1	
Approach LOS				A		D					E	
Queue Length 50th (ft)			1	2		264	25			238	311	
Queue Length 95th (ft)			m2	m2		310	81			343	#374	
Internal Link Dist (ft)				154		339					111	
Turn Bay Length (ft)												
Base Capacity (vph)			847	3598		1100	477			351	1115	
Starvation Cap Reductn			425	2141		13	0			0	0	
Spillback Cap Reductn			0	307		38	0			0	69	
Storage Cap Reductn			0	0		0	0			0	0	
Reduced v/c Ratio			0.38	0.67		0.81	0.43			0.74	0.98	

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 58 (45%), Referenced to phase 2:EBWB, Start of Yellow

Natural Cycle: 120

Control Type: Pretimed

Maximum v/c Ratio: 1.09

Intersection Signal Delay: 36.7

Intersection LOS: D

Intersection Capacity Utilization 59.2%

ICU Level of Service B

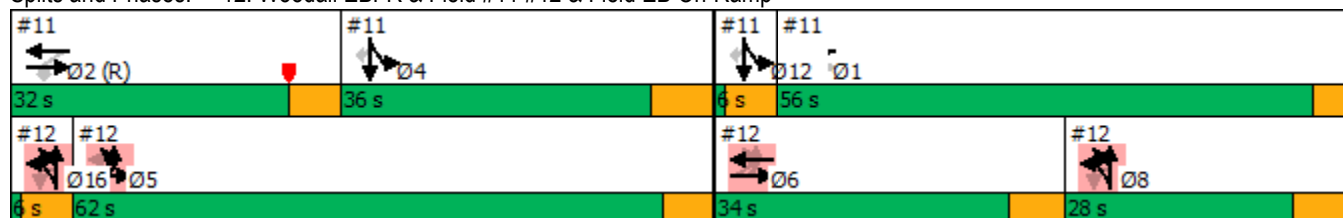
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: Woodall EBFR & Field #11 #12 & Field EB On-Ramp



Lane Group	Ø1	Ø2	Ø4	Ø8	Ø12	Ø16
Actuated g/C Ratio						
v/c Ratio						
Control Delay						
Queue Delay						
Total Delay						
LOS						
Approach Delay						
Approach LOS						
Queue Length 50th (ft)						
Queue Length 95th (ft)						
Internal Link Dist (ft)						
Turn Bay Length (ft)						
Base Capacity (vph)						
Starvation Cap Reductn						
Spillback Cap Reductn						
Storage Cap Reductn						
Reduced v/c Ratio						
Intersection Summary						

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour

13: Woodall WBFR & Harwood

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	54	0	0	763	313
Future Volume (vph)	0	54	0	0	763	313
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.88	1.00	1.00	0.91	0.91
Ped Bike Factor		0.90			0.99	
Frt		0.850			0.956	
Flt Protected						
Satd. Flow (prot)	0	2787	0	0	4806	0
Flt Permitted						
Satd. Flow (perm)	0	2513	0	0	4806	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		221			177	
Link Speed (mph)	30			30	24	
Link Distance (ft)	242			217	260	
Travel Time (s)	5.5			4.9	7.4	
Confl. Peds. (#/hr)		47				15
Peak Hour Factor	0.77	0.77	0.92	0.92	0.83	0.83
Adj. Flow (vph)	0	70	0	0	919	377
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	70	0	0	1296	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			12	-12	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Turn Type		Perm			NA	
Protected Phases					4	
Permitted Phases		2				
Minimum Split (s)		20.0			20.0	
Total Split (s)		38.0			62.0	
Total Split (%)		38.0%			62.0%	
Maximum Green (s)		34.0			58.0	
Yellow Time (s)		3.5			3.5	
All-Red Time (s)		0.5			0.5	
Lost Time Adjust (s)		0.0			0.0	
Total Lost Time (s)		4.0			4.0	
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)		5.0			5.0	
Flash Dont Walk (s)		11.0			11.0	
Pedestrian Calls (#/hr)		0			0	
Act Effct Green (s)		34.0			58.0	
Actuated g/C Ratio		0.34			0.58	
v/c Ratio		0.07			0.45	
Control Delay		0.1			3.2	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour

13: Woodall WBFR & Harwood

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Queue Delay		0.0			0.4	
Total Delay		0.1			3.6	
LOS		A			A	
Approach Delay	0.1				3.6	
Approach LOS	A				A	
Queue Length 50th (ft)		0			28	
Queue Length 95th (ft)		0			33	
Internal Link Dist (ft)	162			137	180	
Turn Bay Length (ft)						
Base Capacity (vph)		1000			2861	
Starvation Cap Reductn		0			911	
Spillback Cap Reductn		0			0	
Storage Cap Reductn		0			0	
Reduced v/c Ratio		0.07			0.66	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 91 (91%), Referenced to phase 2:EBR, Start of Yellow

Natural Cycle: 40

Control Type: Pretimed

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 3.4

Intersection LOS: A

Intersection Capacity Utilization 42.2%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 13: Woodall WBFR & Harwood



North Harwood Tower
Lanes, Volumes, Timings

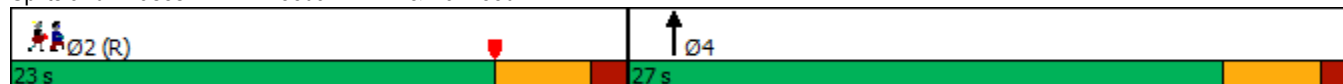
Phase 2 Background Conditions - AM Peak Hour

14: Woodall EBFR & Harwood

							
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø2
Lane Configurations			↑↑↑				
Traffic Volume (vph)	0	0	580	259	0	0	
Future Volume (vph)	0	0	580	259	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	0.91	0.91	1.00	1.00	
Ped Bike Factor			0.99				
Frt			0.954				
Flt Protected							
Satd. Flow (prot)	0	0	4802	0	0	0	
Flt Permitted							
Satd. Flow (perm)	0	0	4802	0	0	0	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)			291				
Link Speed (mph)	30		26			30	
Link Distance (ft)	974		416			261	
Travel Time (s)	22.1		10.9			5.9	
Confl. Peds. (#/hr)				17			
Peak Hour Factor	0.92	0.92	0.89	0.89	0.92	0.92	
Adj. Flow (vph)	0	0	652	291	0	0	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	0	943	0	0	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Right	Left	Left	
Median Width(ft)	0		0			0	
Link Offset(ft)	24		0			0	
Crosswalk Width(ft)	16		16			16	
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9		9	15		
Turn Type			NA				
Protected Phases			4			2	
Permitted Phases							
Minimum Split (s)			20.9			21.0	
Total Split (s)			27.0			23.0	
Total Split (%)			54.0%			46%	
Maximum Green (s)			22.1			18.0	
Yellow Time (s)			3.6			3.6	
All-Red Time (s)			1.3			1.4	
Lost Time Adjust (s)			-0.9				
Total Lost Time (s)			4.0				
Lead/Lag							
Lead-Lag Optimize?							
Walk Time (s)			4.0			4.0	
Flash Dont Walk (s)			8.0			8.0	
Pedestrian Calls (#/hr)			0			0	
Act Effct Green (s)			23.0				
Actuated g/C Ratio			0.46				
v/c Ratio			0.40				
Control Delay			12.6				

							
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø2
Queue Delay			0.0				
Total Delay			12.6				
LOS			B				
Approach Delay			12.6				
Approach LOS			B				
Queue Length 50th (ft)			94				
Queue Length 95th (ft)			124				
Internal Link Dist (ft)	894		336			181	
Turn Bay Length (ft)							
Base Capacity (vph)			2366				
Starvation Cap Reductn			0				
Spillback Cap Reductn			0				
Storage Cap Reductn			0				
Reduced v/c Ratio			0.40				
Intersection Summary							
Area Type:	Other						
Cycle Length: 50							
Actuated Cycle Length: 50							
Offset: 32 (64%), Referenced to phase 2:Ped, Start of Yellow							
Natural Cycle: 45							
Control Type: Pretimed							
Maximum v/c Ratio: 0.40							
Intersection Signal Delay: 12.6				Intersection LOS: B			
Intersection Capacity Utilization 20.8%				ICU Level of Service A			
Analysis Period (min) 15							

Splits and Phases: 14: Woodall EBFR & Harwood



North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour

15: Woodall WBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑						↑↑↑	
Traffic Volume (vph)	0	0	0	203	829	0	0	0	0	0	881	368
Future Volume (vph)	0	0	0	203	829	0	0	0	0	0	881	368
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	0.91	0.91
Ped Bike Factor					0.97						0.97	
Frt											0.956	
Flt Protected					0.990							
Satd. Flow (prot)	0	0	0	0	5034	0	0	0	0	0	4707	0
Flt Permitted					0.990							
Satd. Flow (perm)	0	0	0	0	4896	0	0	0	0	0	4707	0
Right Turn on Red			Yes	Yes		Yes			Yes			Yes
Satd. Flow (RTOR)					39						97	
Link Speed (mph)		30			30			30			24	
Link Distance (ft)		836			267			260			433	
Travel Time (s)		19.0			6.1			5.9			12.3	
Confl. Peds. (#/hr)				56								39
Peak Hour Factor	0.92	0.92	0.92	0.91	0.91	0.91	0.92	0.92	0.92	0.85	0.85	0.85
Adj. Flow (vph)	0	0	0	223	911	0	0	0	0	0	1036	433
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	1134	0	0	0	0	0	1469	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		20			-20			12			-12	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type				Perm	NA						NA	
Protected Phases					2						4	
Permitted Phases				2								
Minimum Split (s)				21.2	21.2						21.2	
Total Split (s)				54.0	54.0						46.0	
Total Split (%)				54.0%	54.0%						46.0%	
Maximum Green (s)				48.8	48.8						40.8	
Yellow Time (s)				3.6	3.6						3.6	
All-Red Time (s)				1.6	1.6						1.6	
Lost Time Adjust (s)					-1.2						-1.2	
Total Lost Time (s)					4.0						4.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)				4.0	4.0						4.0	
Flash Dont Walk (s)				8.0	8.0						8.0	
Pedestrian Calls (#/hr)				0	0						0	
Act Effect Green (s)					50.0						42.0	
Actuated g/C Ratio					0.50						0.42	
v/c Ratio					0.46						0.72	
Control Delay					6.8						23.7	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour

15: Woodall WBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay					0.1						0.5	
Total Delay					6.9						24.2	
LOS					A						C	
Approach Delay					6.9						24.2	
Approach LOS					A						C	
Queue Length 50th (ft)					37						197	
Queue Length 95th (ft)					45						m193	
Internal Link Dist (ft)		756			187			180			353	
Turn Bay Length (ft)												
Base Capacity (vph)					2467						2033	
Starvation Cap Reductn					391						216	
Spillback Cap Reductn					0						0	
Storage Cap Reductn					0						0	
Reduced v/c Ratio					0.55						0.81	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 87 (87%), Referenced to phase 2:WBTL and 6:, Start of Yellow

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 16.7

Intersection LOS: B

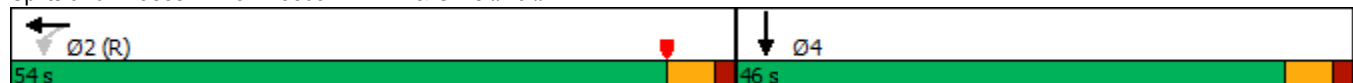
Intersection Capacity Utilization 53.0%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 15: Woodall WBFR & Olive #16 #21



North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour

16: Woodall EBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑	↑		↑↑↑				
Traffic Volume (vph)	0	0	0	0	957	924	92	481	0	0	0	0
Future Volume (vph)	0	0	0	0	957	924	92	481	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00
Ped Bike Factor						0.95		0.99				
Frt						0.850						
Flt Protected								0.992				
Satd. Flow (prot)	0	0	0	0	5085	1583	0	5045	0	0	0	0
Flt Permitted								0.992				
Satd. Flow (perm)	0	0	0	0	5085	1510	0	5004	0	0	0	0
Right Turn on Red			Yes			Yes	Yes		Yes			Yes
Satd. Flow (RTOR)						139		46				
Link Speed (mph)		30			30			26			30	
Link Distance (ft)		267			231			261			427	
Travel Time (s)		6.1			5.3			6.8			9.7	
Confl. Peds. (#/hr)						14	20					
Peak Hour Factor	0.92	0.92	0.92	0.95	0.95	0.95	0.80	0.80	0.80	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	1007	973	115	601	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	1007	973	0	716	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		20			-20			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type					NA	Perm	Perm	NA				
Protected Phases					2			4				
Permitted Phases						2	4					
Minimum Split (s)					22.1	22.1	21.1	21.1				
Total Split (s)					57.5	57.5	42.5	42.5				
Total Split (%)					57.5%	57.5%	42.5%	42.5%				
Maximum Green (s)					51.4	51.4	37.4	37.4				
Yellow Time (s)					3.6	3.6	3.6	3.6				
All-Red Time (s)					2.5	2.5	1.5	1.5				
Lost Time Adjust (s)					-2.1	-2.1		-1.1				
Total Lost Time (s)					4.0	4.0		4.0				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)					4.0	4.0	4.0	4.0				
Flash Dont Walk (s)					8.0	8.0	8.0	8.0				
Pedestrian Calls (#/hr)					0	0	0	0				
Act Effct Green (s)					53.5	53.5		38.5				
Actuated g/C Ratio					0.54	0.54		0.38				
v/c Ratio					0.37	1.12		0.37				
Control Delay					14.0	89.2		14.6				

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour

16: Woodall EBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay					0.0	0.1		0.7				
Total Delay					14.0	89.3		15.3				
LOS					B	F		B				
Approach Delay					51.0			15.3				
Approach LOS					D			B				
Queue Length 50th (ft)					129	~674		68				
Queue Length 95th (ft)					159	#919		71				
Internal Link Dist (ft)		187			151			181			347	
Turn Bay Length (ft)												
Base Capacity (vph)					2720	872		1954				
Starvation Cap Reductn					0	0		850				
Spillback Cap Reductn					0	16		581				
Storage Cap Reductn					0	0		0				
Reduced v/c Ratio					0.37	1.14		0.65				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 85 (85%), Referenced to phase 2:WBT and 6:, Start of Yellow

Natural Cycle: 90

Control Type: Pretimed

Maximum v/c Ratio: 1.12

Intersection Signal Delay: 41.5

Intersection LOS: D

Intersection Capacity Utilization 76.4%

ICU Level of Service D

Analysis Period (min) 15

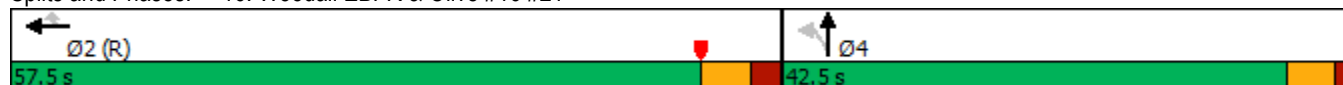
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 16: Woodall EBFR & Olive #16 #21



North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour

17: Woodall WBFR & Pearl #17 #18

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations			↑↑↑	↑	↑	↑↑↑						↑↑↑
Traffic Volume (vph)	1	0	993	98	141	1021	0	0	0	0	163	1035
Future Volume (vph)	1	0	993	98	141	1021	0	0	0	0	163	1035
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		250		0	0		0	0		0	0	
Storage Lanes		1		1	1		0	0		0	0	
Taper Length (ft)		25			25			25			25	
Lane Util. Factor	0.91	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	0.91	0.91
Ped Bike Factor				0.98								0.93
Frt				0.850								0.943
Flt Protected					0.950							0.996
Satd. Flow (prot)	0	0	5085	1583	1770	5085	0	0	0	0	0	4453
Flt Permitted			0.939		0.122							0.996
Satd. Flow (perm)	0	0	4775	1546	227	5085	0	0	0	0	0	4453
Right Turn on Red				Yes			Yes			Yes		
Satd. Flow (RTOR)				93								49
Link Speed (mph)			30			30			30			30
Link Distance (ft)			1034			257			433			138
Travel Time (s)			23.5			5.8			9.8			3.1
Confl. Peds. (#/hr)				4	4							
Peak Hour Factor	0.87	0.87	0.87	0.87	0.94	0.94	0.94	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	0	1141	113	150	1086	0	0	0	0	177	1125
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	1142	113	150	1086	0	0	0	0	0	2109
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left
Median Width(ft)			12			12			0			0
Link Offset(ft)			0			0			0			0
Crosswalk Width(ft)			16			16			16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15		9	15		9	15		9	15	
Turn Type	Perm		NA	Perm	pm+pt	NA					Split	NA
Protected Phases			2		11	6 11					4	4
Permitted Phases	2			2	6 11							
Minimum Split (s)	21.1		21.1	21.1	8.0						22.0	22.0
Total Split (s)	35.0		35.0	35.0	16.0						49.0	49.0
Total Split (%)	35.0%		35.0%	35.0%	16.0%						49.0%	49.0%
Maximum Green (s)	29.9		29.9	29.9	12.0						43.0	43.0
Yellow Time (s)	3.6		3.6	3.6	3.5						3.9	3.9
All-Red Time (s)	1.5		1.5	1.5	0.5						2.1	2.1
Lost Time Adjust (s)			-1.1	-1.1	-1.0							-2.0
Total Lost Time (s)			4.0	4.0	3.0							4.0
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0		4.0	4.0							4.0	4.0
Flash Dont Walk (s)	6.0		6.0	6.0							6.0	6.0
Pedestrian Calls (#/hr)	0		0	0							0	0
Act Effect Green (s)			31.0	31.0	48.0	46.9						45.0

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour

17: Woodall WBFR & Pearl #17 #18

Lane Group	SBR	Ø6
Lane Configurations		
Traffic Volume (vph)	742	
Future Volume (vph)	742	
Ideal Flow (vphpl)	1900	
Storage Length (ft)	0	
Storage Lanes	0	
Taper Length (ft)		
Lane Util. Factor	0.91	
Ped Bike Factor		
Frt		
Flt Protected		
Satd. Flow (prot)	0	
Flt Permitted		
Satd. Flow (perm)	0	
Right Turn on Red	Yes	
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)	56	
Peak Hour Factor	0.92	
Adj. Flow (vph)	807	
Shared Lane Traffic (%)		
Lane Group Flow (vph)	0	
Enter Blocked Intersection	No	
Lane Alignment	Right	
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor	1.00	
Turning Speed (mph)	9	
Turn Type		
Protected Phases	6	
Permitted Phases		
Minimum Split (s)	21.1	
Total Split (s)	51.0	
Total Split (%)	51%	
Maximum Green (s)	45.9	
Yellow Time (s)	3.6	
All-Red Time (s)	1.5	
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Walk Time (s)	4.0	
Flash Dont Walk (s)	6.0	
Pedestrian Calls (#/hr)	0	
Act Effect Green (s)		

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour

17: Woodall WBFR & Pearl #17 #18

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Actuated g/C Ratio			0.31	0.31	0.48	0.47						0.45
v/c Ratio			0.77	0.21	0.49	0.46						1.15dr
Control Delay			16.0	0.7	18.9	9.1						58.4
Queue Delay			0.0	0.0	35.2	0.1						0.0
Total Delay			16.0	0.7	54.1	9.2						58.4
LOS			B	A	D	A						E
Approach Delay			14.6			14.7						58.4
Approach LOS			B			B						E
Queue Length 50th (ft)			58	0	34	67						~528
Queue Length 95th (ft)			70	m1	m69	m76						#626
Internal Link Dist (ft)			954			177			353			58
Turn Bay Length (ft)												
Base Capacity (vph)			1480	543	309	2384						2030
Starvation Cap Reductn			0	0	157	339						0
Spillback Cap Reductn			0	0	0	0						0
Storage Cap Reductn			0	0	0	0						0
Reduced v/c Ratio			0.77	0.21	0.99	0.53						1.04

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 77 (77%), Referenced to phase 2:EBTU and 6:WBTL, Start of Yellow

Natural Cycle: 70

Control Type: Pretimed

Maximum v/c Ratio: 1.04

Intersection Signal Delay: 34.7

Intersection LOS: C

Intersection Capacity Utilization 78.6%

ICU Level of Service D

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

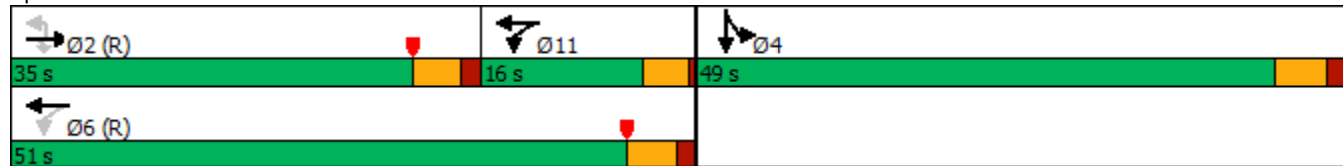
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 17: Woodall WBFR & Pearl #17 #18





Lane Group	SBR	Ø6
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour

18: Woodall EBFR & Pearl #17 #18

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 			  			  				
Traffic Volume (vph)	327	840	0	0	970	59	204	785	404	0	0	0
Future Volume (vph)	327	840	0	0	970	59	204	785	404	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	250		0	0		0	0		0
Storage Lanes	2		0	1		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	1.00	0.91	1.00	0.91	0.91	0.91	1.00	1.00	1.00
Ped Bike Factor	0.98					0.87		0.98				
Frt						0.850		0.956				
Flt Protected	0.950							0.993				
Satd. Flow (prot)	3433	3539	0	0	5085	1583	0	4746	0	0	0	0
Flt Permitted	0.163							0.993				
Satd. Flow (perm)	578	3539	0	0	5085	1376	0	4746	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						87		105				
Link Speed (mph)		30			30			26			30	
Link Distance (ft)		257			1016			427			143	
Travel Time (s)		5.8			23.1			11.2			3.3	
Confl. Peds. (#/hr)	89					89			19			
Peak Hour Factor	0.89	0.89	0.89	0.96	0.96	0.96	0.91	0.91	0.91	0.92	0.92	0.92
Adj. Flow (vph)	367	944	0	0	1010	61	224	863	444	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	367	944	0	0	1010	61	0	1531	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			0			0	
Link Offset(ft)		0			0			-12			12	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA			NA	Perm	Perm	NA				
Protected Phases	5	2			6			4				
Permitted Phases	2					6	4					
Minimum Split (s)	8.0	21.4			27.0	27.0	23.1	23.1				
Total Split (s)	25.0	66.0			41.0	41.0	34.0	34.0				
Total Split (%)	25.0%	66.0%			41.0%	41.0%	34.0%	34.0%				
Maximum Green (s)	20.0	60.6			36.0	36.0	28.0	28.0				
Yellow Time (s)	3.0	3.6			3.6	3.6	3.6	3.6				
All-Red Time (s)	2.0	1.8			1.4	1.4	2.4	2.4				
Lost Time Adjust (s)	-1.0	-1.4			-1.0	-1.0		-2.0				
Total Lost Time (s)	4.0	4.0			4.0	4.0		4.0				
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Walk Time (s)		4.0			4.0	4.0	4.0	4.0				
Flash Dont Walk (s)		8.0			18.0	18.0	8.0	8.0				
Pedestrian Calls (#/hr)		0			0	0	0	0				
Act Effect Green (s)	62.0	62.0			37.0	37.0		30.0				

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - AM Peak Hour

18: Woodall EBFR & Pearl #17 #18

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.62	0.62			0.37	0.37		0.30				
v/c Ratio	0.38	0.43			0.54	0.11		1.02				
Control Delay	19.3	1.9			26.1	2.7		51.7				
Queue Delay	0.5	0.3			0.0	0.0		1.3				
Total Delay	19.8	2.2			26.1	2.7		53.1				
LOS	B	A			C	A		D				
Approach Delay		7.1			24.7			53.1				
Approach LOS		A			C			D				
Queue Length 50th (ft)	49	27			182	0		~374				
Queue Length 95th (ft)	m73	m31			225	15		m#363				
Internal Link Dist (ft)		177			936			347				63
Turn Bay Length (ft)												
Base Capacity (vph)	957	2194			1881	563		1497				
Starvation Cap Reductn	253	623			0	0		6				
Spillback Cap Reductn	0	0			0	0		0				
Storage Cap Reductn	0	0			0	0		0				
Reduced v/c Ratio	0.52	0.60			0.54	0.11		1.03				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 95 (95%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 1.02

Intersection Signal Delay: 29.9

Intersection LOS: C

Intersection Capacity Utilization 78.6%

ICU Level of Service D

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Woodall EBFR & Pearl #17 #18



Intersection												
Int Delay, s/veh	0											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑↑								↑↑	↑		
Traffic Vol, veh/h	0	708	104	0	0	0	0	0	1	0	1	0
Future Vol, veh/h	0	708	104	0	0	0	0	0	1	0	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	0	-	-
Veh in Median Storage, #	-	0	-	-	16979	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	770	113	0	0	0	0	0	1	0	1	0

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	0	0	0	-	-	-	442	308	883
Stage 1	-	-	-	-	-	-	-	0	0
Stage 2	-	-	-	-	-	-	-	308	883
Critical Hdwy	5.34	-	-	-	-	-	7.14	6.44	6.54
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	6.74	5.54
Follow-up Hdwy	3.12	-	-	-	-	-	3.92	3.82	4.02
Pot Cap-1 Maneuver	-	-	-	0	0	0	482	637	283
Stage 1	-	-	-	0	0	-	-	-	0
Stage 2	-	-	-	0	0	-	621	362	0
Platoon blocked, %	-	-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	-	482	636	283
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	636	283
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	620	362

Approach	EB	NB	SB
HCM Control Delay, s	0	12.5	0
HCM LOS		B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	482	-	-	-	-
HCM Lane V/C Ratio	0.002	-	-	-	-
HCM Control Delay (s)	12.5	0	-	-	0
HCM Lane LOS	B	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗			↖↖↖	
Traffic Vol, veh/h	0	2	0	0	813	5
Future Vol, veh/h	0	2	0	0	813	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	16974	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	2	0	0	884	5
Major/Minor	Minor2		Major2			
Conflicting Flow All	-	445	-	-	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.14	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.92	-	-	-	-
Pot Cap-1 Maneuver	0	479	-	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	479	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		SB			
HCM Control Delay, s	12.6		0			
HCM LOS	B					
Minor Lane/Major Mvmt	EBLn1	SBT	SBR			
Capacity (veh/h)	479	-	-			
HCM Lane V/C Ratio	0.005	-	-			
HCM Control Delay (s)	12.6	-	-			
HCM Lane LOS	B	-	-			
HCM 95th %tile Q(veh)	0	-	-			

Intersection												
Int Delay, s/veh	0.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔			↔↔			↕			↕		
Traffic Vol, veh/h	6	52	1	3	302	8	3	0	0	2	0	6
Future Vol, veh/h	6	52	1	3	302	8	3	0	0	2	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	57	1	3	328	9	3	0	0	2	0	7
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	337	0	0	58	0	0	242	415	29	382	411	169
Stage 1	-	-	-	-	-	-	72	72	-	339	339	-
Stage 2	-	-	-	-	-	-	170	343	-	43	72	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1219	-	-	1544	-	-	692	527	1039	551	529	845
Stage 1	-	-	-	-	-	-	929	834	-	649	638	-
Stage 2	-	-	-	-	-	-	815	636	-	966	834	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1219	-	-	1544	-	-	682	523	1039	548	525	845
Mov Cap-2 Maneuver	-	-	-	-	-	-	682	523	-	548	525	-
Stage 1	-	-	-	-	-	-	923	829	-	645	637	-
Stage 2	-	-	-	-	-	-	807	635	-	960	829	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.8			0.1			10.3			9.9		
HCM LOS							B			A		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	682	1219	-	-	1544	-	-	744				
HCM Lane V/C Ratio	0.005	0.005	-	-	0.002	-	-	0.012				
HCM Control Delay (s)	10.3	8	0	-	7.3	0	-	9.9				
HCM Lane LOS	B	A	A	-	A	A	-	A				
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0				

North Harwood Tower
HCM 6th TWSC

Phase 2 Background Conditions - AM Peak Hour
22: Adjacent North Drive/Adjacent South Drive & Harwood

Intersection														
Int Delay, s/veh	2.7													
Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↕↕			↕↕				↕			↕	
Traffic Vol, veh/h	2	148	63	43	30	121	154	1	1	1	0	0	0	0
Future Vol, veh/h	2	148	63	43	30	121	154	1	1	1	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	-	None	-	-	None	-	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	-	0	-	-	0	-	-	-	0	-	-	0	-
Grade, %	-	-	0	-	-	0	-	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	161	68	47	33	132	167	1	1	1	0	0	0	0
Major/Minor	Major1			Major2			Minor1			Minor2				
Conflicting Flow All	299	299	0	0	115	0	0	0	550	783	58	643	723	150
Stage 1	-	-	-	-	-	-	-	0	418	418	-	282	282	-
Stage 2	-	-	-	-	-	-	-	0	132	365	-	361	441	-
Critical Hdwy	6.44	4.14	-	-	4.14	-	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.52	2.22	-	-	2.22	-	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	927	1259	-	-	1472	-	-	0	418	324	996	358	351	870
Stage 1	-	-	-	-	-	-	-	0	583	589	-	701	676	-
Stage 2	-	-	-	-	-	-	-	0	858	622	-	630	575	-
Platoon blocked, %			-	-		-	-	-						
Mov Cap-1 Maneuver	1253	1253	-	-	1472	-	-	0	366	271	996	312	294	870
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	0	366	271	-	312	294	-
Stage 1	-	-	-	-	-	-	-	0	501	507	-	603	658	-
Stage 2	-	-	-	-	-	-	-	0	835	605	-	541	495	-
Approach	EB			WB			NB			SB				
HCM Control Delay, s	4.9			0.8			16.7			0				
HCM LOS							C			A				
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1						
Capacity (veh/h)	311	1253	-	-	1472	-	-	-						
HCM Lane V/C Ratio	0.007	0.128	-	-	0.022	-	-	-						
HCM Control Delay (s)	16.7	8.3	0.2	-	7.5	0.1	-	0						
HCM Lane LOS	C	A	A	-	A	A	-	A						
HCM 95th %tile Q(veh)	0	0.4	-	-	0.1	-	-	-						

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour

1: McKinney & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	174	104	105	15	35	56	23	254	16	10	63	344
Future Volume (vph)	174	104	105	15	35	56	23	254	16	10	63	344
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor	0.93	0.94			0.94			0.99				0.97
Frt		0.925			0.920			0.992				0.979
Flt Protected	0.950				0.993			0.996				0.993
Satd. Flow (prot)	1770	1624	0	0	3076	0	0	3471	0	0	0	3378
Flt Permitted	0.950				0.896			0.910				0.825
Satd. Flow (perm)	1653	1624	0	0	2752	0	0	3163	0	0	0	2772
Right Turn on Red			Yes			Yes			Yes			
Satd. Flow (RTOR)		59			79			8				20
Link Speed (mph)		30			30			30				30
Link Distance (ft)		424			269			526				348
Travel Time (s)		9.6			6.1			12.0				7.9
Confl. Peds. (#/hr)	46		59	59		46	67		72		72	
Peak Hour Factor	0.80	0.80	0.80	0.71	0.71	0.71	0.92	0.92	0.92	0.84	0.84	0.84
Adj. Flow (vph)	218	130	131	21	49	79	25	276	17	12	75	410
Shared Lane Traffic (%)												
Lane Group Flow (vph)	218	261	0	0	149	0	0	318	0	0	0	580
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	R NA	Left	Left
Median Width(ft)		12			12			0				0
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	9	15	
Turn Type	Prot	NA		Perm	NA		pm+pt	NA		Perm	Perm	NA
Protected Phases	8!				4!		5	2				6
Permitted Phases		8		4			2			6	6	
Minimum Split (s)	23.4	23.4		23.4	23.4		8.0	23.4		23.4	23.4	23.4
Total Split (s)	44.0	44.0		44.0	44.0		19.0	56.0		37.0	37.0	37.0
Total Split (%)	44.0%	44.0%		44.0%	44.0%		19.0%	56.0%		37.0%	37.0%	37.0%
Maximum Green (s)	38.6	38.6		38.6	38.6		15.0	50.6		31.6	31.6	31.6
Yellow Time (s)	3.6	3.6		3.6	3.6		3.5	3.2		3.2	3.2	3.2
All-Red Time (s)	1.8	1.8		1.8	1.8		0.5	2.2		2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0			0.0			0.0				0.0
Total Lost Time (s)	5.4	5.4			5.4			5.4				5.4
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Walk Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	4.0
Flash Dont Walk (s)	13.0	13.0		13.0	13.0			13.0		13.0	13.0	13.0
Pedestrian Calls (#/hr)	0	0		0	0			0		0	0	0
Act Effect Green (s)	38.6	38.6			38.6			50.6				31.6
Actuated g/C Ratio	0.39	0.39			0.39			0.51				0.32
v/c Ratio	0.32	0.39			0.13			0.19				0.65
Control Delay	16.2	12.0			9.1			23.4				25.1

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	70
Future Volume (vph)	70
Ideal Flow (vphpl)	1900
Lane Util. Factor	0.95
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	67
Peak Hour Factor	0.84
Adj. Flow (vph)	83
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Enter Blocked Intersection	No
Lane Alignment	Right
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	1.00
Turning Speed (mph)	9
Turn Type	
Protected Phases	
Permitted Phases	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Maximum Green (s)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour

1: McKinney & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Queue Delay	0.0	0.0			0.0			0.0				0.3
Total Delay	16.2	12.0			9.1			23.4				25.4
LOS	B	B			A			C				C
Approach Delay		13.9			9.1			23.4				25.4
Approach LOS		B			A			C				C
Queue Length 50th (ft)	56	42			13			97				185
Queue Length 95th (ft)	78	65			22			141				226
Internal Link Dist (ft)		344			189			446				268
Turn Bay Length (ft)												
Base Capacity (vph)	683	663			1110			1646				889
Starvation Cap Reductn	0	0			0			0				55
Spillback Cap Reductn	0	0			0			0				0
Storage Cap Reductn	0	0			0			0				0
Reduced v/c Ratio	0.32	0.39			0.13			0.19				0.70

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 48 (48%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 19.8

Intersection LOS: B

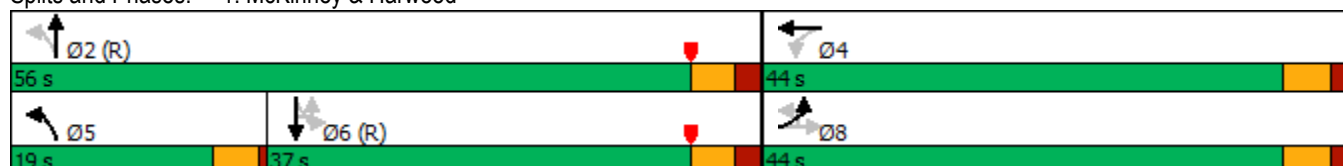
Intersection Capacity Utilization 60.7%

ICU Level of Service B

Analysis Period (min) 15

! Phase conflict between lane groups.

Splits and Phases: 1: McKinney & Harwood





Lane Group	SBR
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour

2: Cedar Springs & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	222	0	0	0	232	1	1172	26	0	0	0
Future Volume (vph)	75	222	0	0	0	232	1	1172	26	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	0.88	0.81	0.81	0.81	1.00	1.00	1.00
Ped Bike Factor		0.98				0.91		1.00				
Frt						0.850		0.997				
Flt Protected		0.988										
Satd. Flow (prot)	0	3497	0	0	0	2787	0	7505	0	0	0	0
Flt Permitted		0.988										
Satd. Flow (perm)	0	3429	0	0	0	2543	0	7504	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						45		7				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		269			424			493			445	
Travel Time (s)		6.1			9.6			11.2			10.1	
Confl. Peds. (#/hr)	41		44	44		41	34		44			
Peak Hour Factor	0.80	0.80	0.80	0.94	0.94	0.94	0.95	0.95	0.95	0.92	0.92	0.92
Adj. Flow (vph)	94	278	0	0	0	247	1	1234	27	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	372	0	0	0	247	0	1262	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			-24			24	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA				Perm	Perm	NA				
Protected Phases		4						2				
Permitted Phases	4					4	2					
Minimum Split (s)	21.4	21.4				21.4	21.3	21.3				
Total Split (s)	47.0	47.0				47.0	53.0	53.0				
Total Split (%)	47.0%	47.0%				47.0%	53.0%	53.0%				
Maximum Green (s)	41.6	41.6				41.6	47.7	47.7				
Yellow Time (s)	3.6	3.6				3.6	3.6	3.6				
All-Red Time (s)	1.8	1.8				1.8	1.7	1.7				
Lost Time Adjust (s)		0.0				0.0		0.0				
Total Lost Time (s)		5.4				5.4		5.3				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0	4.0				4.0	4.0	4.0				
Flash Dont Walk (s)	12.0	12.0				12.0	10.0	10.0				
Pedestrian Calls (#/hr)	0	0				0	0	0				
Act Effct Green (s)		41.6				41.6		47.7				
Actuated g/C Ratio		0.42				0.42		0.48				
v/c Ratio		0.26				0.23		0.35				
Control Delay		7.0				18.4		28.9				

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour

2: Cedar Springs & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0				0.0		0.0				
Total Delay		7.0				18.4		28.9				
LOS		A				B		C				
Approach Delay		7.0			18.4			28.9				
Approach LOS		A			B			C				
Queue Length 50th (ft)		14				58		209				
Queue Length 95th (ft)		27				89		m214				
Internal Link Dist (ft)		189			344			413			365	
Turn Bay Length (ft)												
Base Capacity (vph)		1426				1084		3583				
Starvation Cap Reductn		0				0		0				
Spillback Cap Reductn		0				0		41				
Storage Cap Reductn		0				0		0				
Reduced v/c Ratio		0.26				0.23		0.36				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 52 (52%), Referenced to phase 2:NBTL, Start of Yellow

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.35

Intersection Signal Delay: 23.2

Intersection LOS: C

Intersection Capacity Utilization 53.7%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Cedar Springs & Harwood



North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour

3: McKinney & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	0	0	0	79	752	361	1	40	407	0	0	284
Future Volume (vph)	0	0	0	79	752	361	1	40	407	0	0	284
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	0.95	1.00	1.00	0.95
Ped Bike Factor					0.99	0.95			0.99			0.96
Frt						0.850						0.959
Flt Protected					0.995				0.995			
Satd. Flow (prot)	0	0	0	0	3522	1583	0	0	3522	0	0	3252
Flt Permitted					0.995				0.873			
Satd. Flow (perm)	0	0	0	0	3472	1507	0	0	3070	0	0	3252
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)						143						63
Link Speed (mph)		30			30				30			30
Link Distance (ft)		536			836				348			457
Travel Time (s)		12.2			19.0				7.9			10.4
Confl. Peds. (#/hr)				88		22		86		69		
Peak Hour Factor	0.92	0.92	0.92	0.88	0.88	0.88	0.92	0.92	0.92	0.92	0.91	0.91
Adj. Flow (vph)	0	0	0	90	855	410	1	43	442	0	0	312
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	945	410	0	0	486	0	0	430
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	Left	Left
Median Width(ft)		0			0				0			0
Link Offset(ft)		16			0				0			0
Crosswalk Width(ft)		16			16				16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	9	15		9	15	
Turn Type				Perm	NA	Perm	Perm	Perm	NA			NA
Protected Phases					4				2			2
Permitted Phases				4		4	2	2				
Minimum Split (s)				23.3	23.3	23.3	23.4	23.4	23.4			23.4
Total Split (s)				57.0	57.0	57.0	43.0	43.0	43.0			43.0
Total Split (%)				57.0%	57.0%	57.0%	43.0%	43.0%	43.0%			43.0%
Maximum Green (s)				51.7	51.7	51.7	37.6	37.6	37.6			37.6
Yellow Time (s)				3.2	3.2	3.2	3.2	3.2	3.2			3.2
All-Red Time (s)				2.1	2.1	2.1	2.2	2.2	2.2			2.2
Lost Time Adjust (s)					0.0	0.0			0.0			0.0
Total Lost Time (s)					5.3	5.3			5.4			5.4
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)				4.0	4.0	4.0	4.0	4.0	4.0			4.0
Flash Dont Walk (s)				14.0	14.0	14.0	14.0	14.0	14.0			14.0
Pedestrian Calls (#/hr)				0	0	0	0	0	0			0
Act Effect Green (s)					51.7	51.7			37.6			37.6
Actuated g/C Ratio					0.52	0.52			0.38			0.38
v/c Ratio					0.53	0.48			0.42			0.34
Control Delay					12.8	7.5			25.8			18.6

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	107
Future Volume (vph)	107
Ideal Flow (vphpl)	1900
Lane Util. Factor	0.95
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	86
Peak Hour Factor	0.91
Adj. Flow (vph)	118
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Enter Blocked Intersection	No
Lane Alignment	Right
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	1.00
Turning Speed (mph)	9
Turn Type	
Protected Phases	
Permitted Phases	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Maximum Green (s)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour

3: McKinney & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Queue Delay					0.0	0.0			0.5			0.0
Total Delay					12.8	7.5			26.3			18.6
LOS					B	A			C			B
Approach Delay					11.2				26.3			18.6
Approach LOS					B				C			B
Queue Length 50th (ft)					125	49			162			108
Queue Length 95th (ft)					165	82			216			m143
Internal Link Dist (ft)		456			756				268			377
Turn Bay Length (ft)												
Base Capacity (vph)					1795	848			1154			1262
Starvation Cap Reductn					0	0			302			0
Spillback Cap Reductn					0	0			0			3
Storage Cap Reductn					0	0			0			0
Reduced v/c Ratio					0.53	0.48			0.57			0.34

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 47 (47%), Referenced to phase 2:NBSB and 6:, Start of Yellow

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.53

Intersection Signal Delay: 15.8

Intersection LOS: B

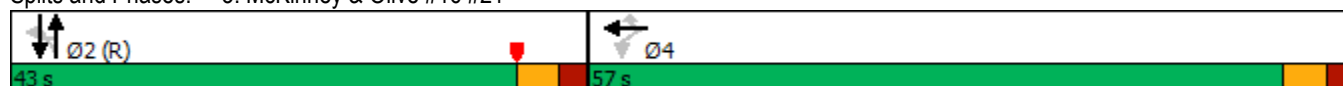
Intersection Capacity Utilization 66.5%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: McKinney & Olive #16 #21





Lane Group	SBR
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour

4: Cedar Springs & Akard /Akard & St Paul

										
Lane Group	EBU	EBL	EBT	EBR	WBL	WBR	WBR2	NBL	NBT	NBR
Lane Configurations										
Traffic Volume (vph)	17	783	907	134	25	829	7	343	36	94
Future Volume (vph)	17	783	907	134	25	829	7	343	36	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.97	0.91	0.91	1.00	0.88	1.00	0.97	1.00	1.00
Ped Bike Factor		0.99	0.98			0.89		0.95	0.97	
Frt			0.981			0.850			0.891	
Flt Protected		0.950			0.950			0.950		
Satd. Flow (prot)	0	3433	4913	0	1770	2787	0	3433	1602	0
Flt Permitted		0.950			0.950			0.950		
Satd. Flow (perm)	0	3385	4913	0	1770	2480	0	3250	1602	0
Right Turn on Red				Yes			Yes			Yes
Satd. Flow (RTOR)			49			96			102	
Link Speed (mph)			30						30	
Link Distance (ft)			385						581	
Travel Time (s)			8.8						13.2	
Confl. Peds. (#/hr)		14		58		14	26	32		22
Peak Hour Factor	0.97	0.97	0.97	0.97	0.93	0.93	0.93	0.92	0.92	0.92
Adj. Flow (vph)	18	807	935	138	27	891	8	373	39	102
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	825	1073	0	27	899	0	373	141	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	Left	Right	Right	Left	Left	Right
Median Width(ft)			0						24	
Link Offset(ft)			24						0	
Crosswalk Width(ft)			16						16	
Two way Left Turn Lane										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15		9	15	9	9	15		9
Turn Type	custom	Prot	NA		Prot	Perm		Prot	NA	
Protected Phases		5			1			4		
Permitted Phases	5		2			6			4	
Minimum Split (s)	11.9	11.9	20.0		8.0	21.5		23.9	23.9	
Total Split (s)	36.0	36.0	64.0		10.0	38.0		26.0	26.0	
Total Split (%)	36.0%	36.0%	64.0%		10.0%	38.0%		26.0%	26.0%	
Maximum Green (s)	30.1	30.1	60.0		6.0	32.5		20.1	20.1	
Yellow Time (s)	3.6	3.6	3.5		3.5	3.6		3.6	3.6	
All-Red Time (s)	2.3	2.3	0.5		0.5	1.9		2.3	2.3	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.9	4.0		4.0	5.5		5.9	5.9	
Lead/Lag	Lag	Lag	Lag		Lead	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes				
Walk Time (s)			5.0			4.0		4.0	4.0	
Flash Dont Walk (s)			11.0			8.0		14.0	14.0	
Pedestrian Calls (#/hr)			0			0		0	0	
Act Effect Green (s)		30.1	60.0		6.0	32.5		20.1	20.1	
Actuated g/C Ratio		0.30	0.60		0.06	0.32		0.20	0.20	
v/c Ratio		0.81	0.36		0.25	1.03		0.54	0.35	
Control Delay		40.1	6.9		71.2	59.6		39.2	14.3	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour

4: Cedar Springs & Akard /Akard & St Paul



Lane Group	EBU	EBL	EBT	EBR	WBL	WBR	WBR2	NBL	NBT	NBR
Queue Delay		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay		40.1	6.9		71.2	59.6		39.2	14.3	
LOS		D	A		E	E		D	B	
Approach Delay			21.3						32.4	
Approach LOS			C						C	
Queue Length 50th (ft)		287	125		17	~328		110	21	
Queue Length 95th (ft)		351	146		m41	#465		157	73	
Internal Link Dist (ft)			305						501	
Turn Bay Length (ft)										
Base Capacity (vph)		1018	2967		106	870		690	403	
Starvation Cap Reductn		0	0		0	0		0	0	
Spillback Cap Reductn		0	0		0	0		0	0	
Storage Cap Reductn		0	0		0	0		0	0	
Reduced v/c Ratio		0.81	0.36		0.25	1.03		0.54	0.35	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBR, Start of Yellow

Natural Cycle: 90

Control Type: Pretimed

Maximum v/c Ratio: 1.03

Intersection Signal Delay: 33.7

Intersection LOS: C

Intersection Capacity Utilization 81.3%

ICU Level of Service D

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

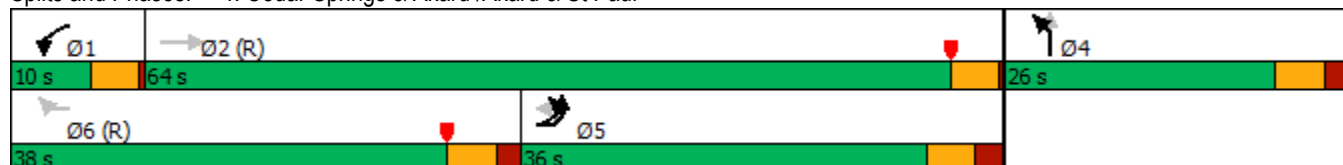
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Cedar Springs & Akard /Akard & St Paul



North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour

5: McKinney & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	798	6	0	0	0	0	236	19	168	261	0
Future Volume (vph)	52	798	6	0	0	0	0	236	19	168	261	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	1.00
Ped Bike Factor	0.98	1.00						0.99			0.98	
Frt		0.999						0.989				
Flt Protected	0.950										0.981	
Satd. Flow (prot)	1770	3534	0	0	0	0	0	3478	0	0	3472	0
Flt Permitted	0.950										0.680	
Satd. Flow (perm)	1727	3534	0	0	0	0	0	3478	0	0	2365	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1						9				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		323			182			264			526	
Travel Time (s)		7.3			4.1			6.0			12.0	
Confl. Peds. (#/hr)	12		22	22		12	44		49	49		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.72	0.72	0.72	0.77	0.77	0.77
Adj. Flow (vph)	57	867	7	0	0	0	0	328	26	218	339	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	57	874	0	0	0	0	0	354	0	0	557	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			24			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA						NA		Perm	NA	
Protected Phases	4							2			2	
Permitted Phases		4					2			2		
Minimum Split (s)	21.2	21.2					24.6	24.6		24.6	24.6	
Total Split (s)	40.0	40.0					40.0	40.0		40.0	40.0	
Total Split (%)	40.0%	40.0%					40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	35.1	35.1					34.6	34.6		34.6	34.6	
Yellow Time (s)	3.2	3.2					3.2	3.2		3.2	3.2	
All-Red Time (s)	1.7	1.7					2.2	2.2		2.2	2.2	
Lost Time Adjust (s)	0.0	0.0						0.0			0.0	
Total Lost Time (s)	4.9	4.9						5.4			5.4	
Lead/Lag	Lag	Lag										
Lead-Lag Optimize?	Yes	Yes										
Walk Time (s)	4.0	4.0					4.0	4.0		4.0	4.0	
Flash Dont Walk (s)	11.0	11.0					15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0					0	0		0	0	
Act Effct Green (s)	35.1	35.1						34.6			34.6	
Actuated g/C Ratio	0.35	0.35						0.35			0.35	
v/c Ratio	0.09	0.70						0.29			0.68	
Control Delay	3.6	5.7						22.0			27.4	

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Minimum Split (s)	9.5
Total Split (s)	20.0
Total Split (%)	20%
Maximum Green (s)	16.0
Yellow Time (s)	3.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour

5: McKinney & St Paul

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.8						0.7			0.8	
Total Delay	3.6	6.5						22.7			28.3	
LOS	A	A						C			C	
Approach Delay		6.3						22.7			28.3	
Approach LOS		A						C			C	
Queue Length 50th (ft)	3	27						64			174	
Queue Length 95th (ft)	m5	34						74			194	
Internal Link Dist (ft)		243			102			184			446	
Turn Bay Length (ft)												
Base Capacity (vph)	621	1241						1209			818	
Starvation Cap Reductn	0	136						532			0	
Spillback Cap Reductn	0	0						122			82	
Storage Cap Reductn	0	0						0			0	
Reduced v/c Ratio	0.09	0.79						0.52			0.76	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 85 (85%), Referenced to phase 2:NBSB and 6:, Start of Yellow

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 16.1

Intersection LOS: B

Intersection Capacity Utilization 63.3%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: McKinney & St Paul



Lane Group	Ø3
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour

6: McKinney & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	835	58	12	822	199	3	16	26	105	115	43
Future Volume (vph)	27	835	58	12	822	199	3	16	26	105	115	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor		0.99			0.98			0.97			0.97	
Frt		0.991			0.971			0.912			0.976	
Flt Protected		0.999			0.999			0.997			0.980	
Satd. Flow (prot)	0	5005	0	0	4858	0	0	3123	0	0	3338	0
Flt Permitted		0.878			0.924			0.936			0.806	
Satd. Flow (perm)	0	4397	0	0	4493	0	0	2923	0	0	2706	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			90			35			24	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		383			222			432			264	
Travel Time (s)		8.7			5.0			9.8			6.0	
Confl. Peds. (#/hr)	34		42	42		34	47		25	25		47
Peak Hour Factor	0.93	0.93	0.93	0.98	0.98	0.98	0.75	0.75	0.75	0.78	0.78	0.78
Adj. Flow (vph)	29	898	62	12	839	203	4	21	35	135	147	55
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	989	0	0	1054	0	0	60	0	0	337	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			6			2	
Permitted Phases	4			4			6			2		
Minimum Split (s)	21.2	21.2		21.2	21.2		24.4	24.4		24.4	24.4	
Total Split (s)	61.0	61.0		61.0	61.0		39.0	39.0		39.0	39.0	
Total Split (%)	61.0%	61.0%		61.0%	61.0%		39.0%	39.0%		39.0%	39.0%	
Maximum Green (s)	55.8	55.8		55.8	55.8		33.6	33.6		33.6	33.6	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.6	1.6		1.6	1.6		2.4	2.4		2.4	2.4	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.2			5.2			5.4			5.4	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)		55.8			55.8			33.6			33.6	
Actuated g/C Ratio		0.56			0.56			0.34			0.34	
v/c Ratio		0.40			0.41			0.06			0.36	
Control Delay		4.9			13.4			12.1			56.4	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour

6: McKinney & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.1			14.2			0.0			1.5	
Total Delay		5.0			27.6			12.1			57.9	
LOS		A			C			B			E	
Approach Delay		5.0			27.6			12.1			57.9	
Approach LOS		A			C			B			E	
Queue Length 50th (ft)		37			126			5			114	
Queue Length 95th (ft)		48			163			15			138	
Internal Link Dist (ft)		303			142			352			184	
Turn Bay Length (ft)												
Base Capacity (vph)		2461			2546			1005			925	
Starvation Cap Reductn		365			1488			0			400	
Spillback Cap Reductn		35			157			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.47			1.00			0.06			0.64	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 57 (57%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.41

Intersection Signal Delay: 22.2

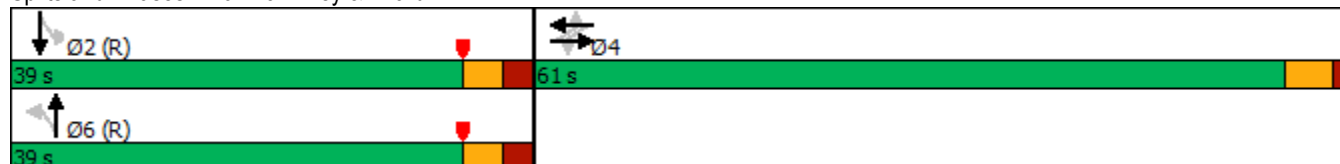
Intersection LOS: C

Intersection Capacity Utilization 62.1%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 6: McKinney & Akard



North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour

7: Woodall WBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑									↑↑↑	
Traffic Volume (vph)	0	1033	87	0	0	0	0	0	0	195	747	0
Future Volume (vph)	0	1033	87	0	0	0	0	0	0	195	747	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00
Ped Bike Factor		1.00									1.00	
Frt		0.988										
Flt Protected											0.990	
Satd. Flow (prot)	0	5016	0	0	0	0	0	0	0	0	5034	0
Flt Permitted											0.990	
Satd. Flow (perm)	0	5016	0	0	0	0	0	0	0	0	5032	0
Right Turn on Red			Yes			Yes				Yes	No	No
Satd. Flow (RTOR)		14										
Link Speed (mph)		30			30			24			26	
Link Distance (ft)		196			58			216			231	
Travel Time (s)		4.5			1.3			6.1			6.1	
Confl. Peds. (#/hr)			4							1		
Peak Hour Factor	0.95	0.95	0.95	0.92	0.92	0.92	0.92	0.92	0.92	0.89	0.89	0.89
Adj. Flow (vph)	0	1087	92	0	0	0	0	0	0	219	839	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1179	0	0	0	0	0	0	0	0	1058	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		-24			24			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type		NA								Split	NA	
Protected Phases		2								4	4	
Permitted Phases												
Minimum Split (s)		21.6								21.3	21.3	
Total Split (s)		34.0								42.0	42.0	
Total Split (%)		34.0%								42.0%	42.0%	
Maximum Green (s)		28.4								36.7	36.7	
Yellow Time (s)		3.6								3.6	3.6	
All-Red Time (s)		2.0								1.7	1.7	
Lost Time Adjust (s)		0.0									0.0	
Total Lost Time (s)		5.6									5.3	
Lead/Lag		Lag										
Lead-Lag Optimize?		Yes										
Walk Time (s)		4.0								4.0	4.0	
Flash Dont Walk (s)		8.0								9.0	9.0	
Pedestrian Calls (#/hr)		0								0	0	
Act Effct Green (s)		28.4									36.7	
Actuated g/C Ratio		0.28									0.37	
v/c Ratio		0.82									0.57	
Control Delay		48.3									25.9	

Lane Group	Ø1
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	1
Permitted Phases	
Minimum Split (s)	21.3
Total Split (s)	24.0
Total Split (%)	24%
Maximum Green (s)	18.7
Yellow Time (s)	3.6
All-Red Time (s)	1.7
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour

7: Woodall WBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		7.3									0.3	
Total Delay		55.6									26.3	
LOS		E									C	
Approach Delay		55.6									26.3	
Approach LOS		E									C	
Queue Length 50th (ft)		289									149	
Queue Length 95th (ft)		338									242	
Internal Link Dist (ft)		116			1			136			151	
Turn Bay Length (ft)												
Base Capacity (vph)		1434									1847	
Starvation Cap Reductn		221									0	
Spillback Cap Reductn		45									279	
Storage Cap Reductn		0									0	
Reduced v/c Ratio		0.97									0.67	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 5 (5%), Referenced to phase 2:EBT and 6:, Start of Yellow

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 41.7

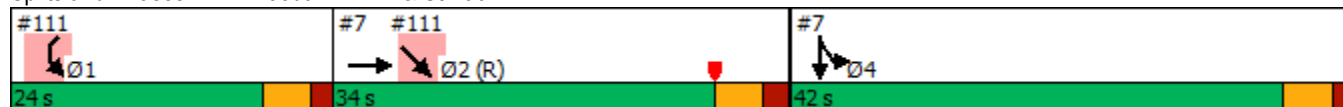
Intersection LOS: D

Intersection Capacity Utilization 49.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 7: Woodall WBFR & St Paul



Lane Group	Ø1
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour

8: Woodall EBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑						↑↑↑				
Traffic Volume (vph)	292	1168	0	0	0	0	0	465	188	0	0	0
Future Volume (vph)	292	1168	0	0	0	0	0	465	188	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00
Ped Bike Factor		0.97						0.97				
Frt								0.957				
Flt Protected		0.990										
Satd. Flow (prot)	0	5034	0	0	0	0	0	4708	0	0	0	0
Flt Permitted		0.990										
Satd. Flow (perm)	0	4874	0	0	0	0	0	4708	0	0	0	0
Right Turn on Red	Yes		Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		90						38				
Link Speed (mph)		30			30			26			30	
Link Distance (ft)		204			1246			248			416	
Travel Time (s)		4.6			28.3			6.5			9.5	
Confl. Peds. (#/hr)	64								55			
Peak Hour Factor	0.90	0.90	0.90	0.92	0.92	0.92	0.81	0.81	0.81	0.92	0.92	0.92
Adj. Flow (vph)	324	1298	0	0	0	0	0	574	232	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1622	0	0	0	0	0	806	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		-24			24			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA						NA				
Protected Phases		2						4				
Permitted Phases	2											
Minimum Split (s)	21.0	21.0						21.8				
Total Split (s)	57.0	57.0						43.0				
Total Split (%)	57.0%	57.0%						43.0%				
Maximum Green (s)	52.0	52.0						37.2				
Yellow Time (s)	3.6	3.6						3.6				
All-Red Time (s)	1.4	1.4						2.2				
Lost Time Adjust (s)		0.0						0.0				
Total Lost Time (s)		5.0						5.8				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0	4.0						4.0				
Flash Dont Walk (s)	8.0	8.0						12.0				
Pedestrian Calls (#/hr)	0	0						0				
Act Effct Green (s)		52.0						37.2				
Actuated g/C Ratio		0.52						0.37				
v/c Ratio		0.63						0.45				
Control Delay		9.2						19.8				

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour

8: Woodall EBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.7						1.0				
Total Delay		9.9						20.8				
LOS		A						C				
Approach Delay		9.9						20.8				
Approach LOS		A						C				
Queue Length 50th (ft)		115						101				
Queue Length 95th (ft)		135						112				
Internal Link Dist (ft)		124			1166			168			336	
Turn Bay Length (ft)												
Base Capacity (vph)		2577						1775				
Starvation Cap Reductn		547						668				
Spillback Cap Reductn		0						0				
Storage Cap Reductn		0						0				
Reduced v/c Ratio		0.80						0.73				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 23 (23%), Referenced to phase 2:EBTL and 6:, Start of Yellow

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.63

Intersection Signal Delay: 13.5

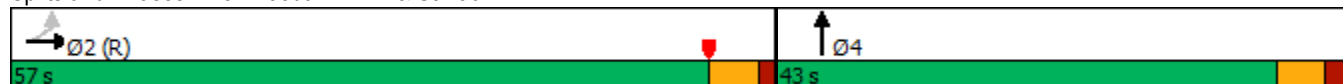
Intersection LOS: B

Intersection Capacity Utilization 51.9%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: Woodall EBFR & St Paul



North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour

9: Woodall WBFR & Akard WB On-Ramp & Akard

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBU	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑			↑	↑↑	
Traffic Volume (vph)	1	811	225	261	82	902	36	492	200	103
Future Volume (vph)	1	811	225	261	82	902	36	492	200	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.95	1.00	0.95	0.95
Ped Bike Factor		0.97			0.88				0.98	
Frt		0.967			0.891				0.949	
Flt Protected					0.990			0.950		
Satd. Flow (prot)	0	4746	0	0	3931	0	0	1770	3278	0
Flt Permitted		0.939			0.654			0.950		
Satd. Flow (perm)	0	4457	0	0	2597	0	0	1770	3278	0
Right Turn on Red						Yes				Yes
Satd. Flow (RTOR)					890				114	
Link Speed (mph)		30			30				30	
Link Distance (ft)		222			279				216	
Travel Time (s)		5.0			6.3				4.9	
Confl. Peds. (#/hr)			43	43		40				34
Peak Hour Factor	0.93	0.93	0.93	0.90	0.90	0.90	0.88	0.88	0.88	0.88
Adj. Flow (vph)	1	872	242	290	91	1002	41	559	227	117
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	1115	0	0	1383	0	0	600	344	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right
Median Width(ft)		0			0				12	
Link Offset(ft)		0			0				0	
Crosswalk Width(ft)		16			16				16	
Two way Left Turn Lane										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	9	15		9
Turn Type	Perm	NA		pm+pt	NA		Perm	Split	NA	
Protected Phases		2		1	6			4	4	
Permitted Phases	2			6			4			
Minimum Split (s)	21.3	21.3		8.0	21.3		22.5	22.5	22.5	
Total Split (s)	44.0	44.0		8.0	52.0		48.0	48.0	48.0	
Total Split (%)	44.0%	44.0%		8.0%	52.0%		48.0%	48.0%	48.0%	
Maximum Green (s)	38.7	38.7		4.0	46.7		42.5	42.5	42.5	
Yellow Time (s)	3.6	3.6		3.5	3.6		3.6	3.6	3.6	
All-Red Time (s)	1.7	1.7		0.5	1.7		1.9	1.9	1.9	
Lost Time Adjust (s)		0.0			0.0			0.0	0.0	
Total Lost Time (s)		5.3			5.3			5.5	5.5	
Lead/Lag	Lag	Lag		Lead						
Lead-Lag Optimize?	Yes	Yes		Yes						
Walk Time (s)	4.0	4.0			4.0		4.0	4.0	4.0	
Flash Dont Walk (s)	11.0	11.0			9.0		13.0	13.0	13.0	
Pedestrian Calls (#/hr)	0	0			0		0	0	0	
Act Effct Green (s)		38.7			46.7			42.5	42.5	
Actuated g/C Ratio		0.39			0.47			0.42	0.42	
v/c Ratio		0.65			0.88dr			0.80	0.24	
Control Delay		13.9			15.0			27.7	4.8	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour
9: Woodall WBFR & Akard WB On-Ramp & Akard

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBU	SBL	SBT	SBR
Queue Delay		0.9			48.3			52.7	0.9	
Total Delay		14.8			63.3			80.4	5.7	
LOS		B			E			F	A	
Approach Delay		14.8			63.3				53.2	
Approach LOS		B			E				D	
Queue Length 50th (ft)		98			240			416	40	
Queue Length 95th (ft)		119			298			m514	m51	
Internal Link Dist (ft)		142			199				136	
Turn Bay Length (ft)										
Base Capacity (vph)		1724			1723			752	1458	
Starvation Cap Reductn		319			551			292	824	
Spillback Cap Reductn		0			77			0	133	
Storage Cap Reductn		0			0			0	0	
Reduced v/c Ratio		0.79			1.18			1.30	0.54	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 21 (21%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 44.8

Intersection LOS: D

Intersection Capacity Utilization 93.9%

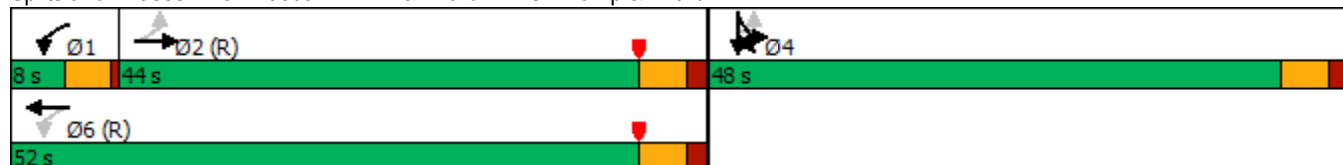
ICU Level of Service F

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 9: Woodall WBFR & Akard WB On-Ramp & Akard



North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour

10: Woodall EBFR & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↑↑↑			↑↑↑				↑↑↑			
Traffic Volume (vph)	195	641	0	0	1072	148	33	134	287	61	0	0
Future Volume (vph)	195	641	0	0	1072	148	33	134	287	61	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	1.00	1.00	0.91	0.91	0.91	0.91	0.91	0.91	1.00	1.00
Ped Bike Factor					0.99				0.98			
Frt					0.982				0.982			0.850
Flt Protected		0.988							0.984			
Satd. Flow (prot)	0	5024	0	0	4948	0	0	0	4827	0	0	0
Flt Permitted		0.657							0.984			
Satd. Flow (perm)	0	3341	0	0	4948	0	0	0	4823	0	0	0
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)					31				23			141
Link Speed (mph)		30			30				26			30
Link Distance (ft)		279			374				181			248
Travel Time (s)		6.3			8.5				4.7			5.6
Confl. Peds. (#/hr)	35					35		1		56		
Peak Hour Factor	0.94	0.94	0.94	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.92
Adj. Flow (vph)	207	682	0	0	1191	164	37	149	319	68	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	889	0	0	1355	0	0	0	573	0	0	1
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	Left	Left
Median Width(ft)		0			0				0			0
Link Offset(ft)		0			0				-24			24
Crosswalk Width(ft)		16			16				16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	9	15		9	15	
Turn Type	pm+pt	NA			NA		Perm	Perm	NA			
Protected Phases	15	2			6				4			
Permitted Phases	2						4	4				
Minimum Split (s)	8.2	21.1			21.1		21.6	21.6	21.6			
Total Split (s)	22.0	69.0			47.0		31.0	31.0	31.0			
Total Split (%)	22.0%	69.0%			47.0%		31.0%	31.0%	31.0%			
Maximum Green (s)	16.8	63.9			41.9		25.4	25.4	25.4			
Yellow Time (s)	3.2	3.6			3.6		3.6	3.6	3.6			
All-Red Time (s)	2.0	1.5			1.5		2.0	2.0	2.0			
Lost Time Adjust (s)		0.0			0.0				0.0			
Total Lost Time (s)		5.1			5.1				5.6			
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		4.0			4.0		4.0	4.0	4.0			
Flash Dont Walk (s)		8.0			12.0		8.0	8.0	8.0			
Pedestrian Calls (#/hr)		0			0		0	0	0			
Act Effct Green (s)		63.9			41.9				25.4			0.0
Actuated g/C Ratio		0.64			0.42				0.25			0.00
v/c Ratio		0.37			0.65				0.46			0.01
Control Delay		2.7			19.4				31.6			0.0

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	1
Future Volume (vph)	1
Ideal Flow (vphpl)	1900
Lane Util. Factor	1.00
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	0.92
Adj. Flow (vph)	1
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Enter Blocked Intersection	No
Lane Alignment	Right
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	1.00
Turning Speed (mph)	9
Turn Type	
Protected Phases	
Permitted Phases	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Maximum Green (s)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour

10: Woodall EBFR & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Queue Delay		0.1			0.9				0.1			0.0
Total Delay		2.8			20.3				31.8			0.0
LOS		A			C				C			A
Approach Delay		2.8			20.3				31.8			
Approach LOS		A			C				C			
Queue Length 50th (ft)		15			152				108			0
Queue Length 95th (ft)		17			177				144			0
Internal Link Dist (ft)		199			294				101			168
Turn Bay Length (ft)												
Base Capacity (vph)		2419			2091				1242			141
Starvation Cap Reductn		581			235				0			0
Spillback Cap Reductn		0			418				133			0
Storage Cap Reductn		0			0				0			0
Reduced v/c Ratio		0.48			0.81				0.52			0.01

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 98 (98%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 17.1

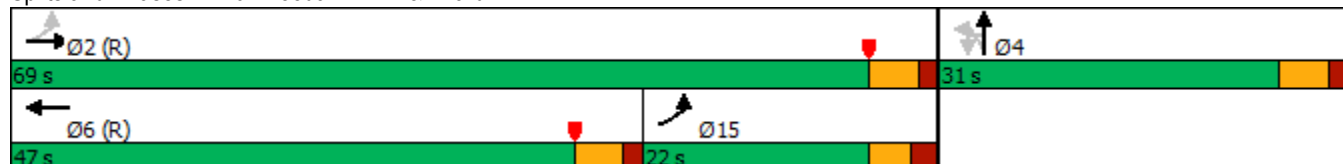
Intersection LOS: B

Intersection Capacity Utilization Err%

ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 10: Woodall EBFR & Akard





Lane Group	SBR
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour

11: Field /Field #11 #12 & Woodall WBFR

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations			↑↑↑↑	↑	↑	↑↑↑↑					↑	↑
Traffic Volume (vph)	2	0	1243	376	466	662	0	0	0	0	165	443
Future Volume (vph)	2	0	1243	376	466	662	0	0	0	0	165	443
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		150		200	0		0	0		0	0	
Storage Lanes		1		3	1		0	0		0	1	
Taper Length (ft)		25			25			25			25	
Lane Util. Factor	0.86	1.00	0.86	1.00	0.86	0.86	1.00	1.00	1.00	1.00	0.95	0.91
Ped Bike Factor				0.92								1.00
Frt				0.850								0.990
Flt Protected					0.950	0.987					0.950	0.998
Satd. Flow (prot)	0	0	6408	1583	1522	4743	0	0	0	0	1681	1668
Flt Permitted			0.931		0.103	0.682					0.950	0.998
Satd. Flow (perm)	0	0	5966	1453	165	3278	0	0	0	0	1681	1668
Right Turn on Red				Yes			Yes			Yes		
Satd. Flow (RTOR)				127								3
Link Speed (mph)			30			30			30			26
Link Distance (ft)			675			234			238			187
Travel Time (s)			15.3			5.3			5.4			4.9
Confl. Peds. (#/hr)				33	33							
Peak Hour Factor	0.86	0.86	0.86	0.86	0.84	0.84	0.84	0.92	0.92	0.92	0.95	0.95
Adj. Flow (vph)	2	0	1445	437	555	788	0	0	0	0	174	466
Shared Lane Traffic (%)					50%						10%	
Lane Group Flow (vph)	0	0	1447	437	277	1066	0	0	0	0	157	518
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left
Median Width(ft)			20			20			12			12
Link Offset(ft)			0			0			-20			24
Crosswalk Width(ft)			16			16			16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15		9	15		9	15		9	15	
Turn Type	Perm		NA	Perm	pm+pt	NA					Split	NA
Protected Phases			2		3 11	2 3 11					4	4
Permitted Phases	2			2	11 2 3							
Minimum Split (s)	23.2		23.2	23.2							40.1	40.1
Total Split (s)	44.0		44.0	44.0							44.0	44.0
Total Split (%)	33.8%		33.8%	33.8%							33.8%	33.8%
Maximum Green (s)	38.8		38.8	38.8							37.9	37.9
Yellow Time (s)	5.2		5.2	5.2							6.1	6.1
All-Red Time (s)	0.0		0.0	0.0							0.0	0.0
Lost Time Adjust (s)			0.0	0.0							0.0	0.0
Total Lost Time (s)			5.2	5.2							6.1	6.1
Lead/Lag											Lag	Lag
Lead-Lag Optimize?											Yes	Yes
Walk Time (s)	4.0		4.0	4.0							4.0	4.0
Flash Dont Walk (s)	14.0		14.0	14.0							29.0	29.0
Pedestrian Calls (#/hr)	0		0	0							0	0
Act Effect Green (s)			38.8	38.8	78.0	75.6					37.9	37.9

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour

11: Field /Field #11 #12 & Woodall WBFR

Lane Group	SBR	Ø3	Ø5	Ø6	Ø8	Ø11
Lane Configurations						
Traffic Volume (vph)	334					
Future Volume (vph)	334					
Ideal Flow (vphpl)	1900					
Storage Length (ft)	0					
Storage Lanes	1					
Taper Length (ft)						
Lane Util. Factor	0.95					
Ped Bike Factor	0.94					
Frt	0.850					
Flt Protected						
Satd. Flow (prot)	1504					
Flt Permitted						
Satd. Flow (perm)	1416					
Right Turn on Red	Yes					
Satd. Flow (RTOR)	193					
Link Speed (mph)						
Link Distance (ft)						
Travel Time (s)						
Confl. Peds. (#/hr)	40					
Peak Hour Factor	0.95					
Adj. Flow (vph)	352					
Shared Lane Traffic (%)	10%					
Lane Group Flow (vph)	317					
Enter Blocked Intersection	No					
Lane Alignment	Right					
Median Width(ft)						
Link Offset(ft)						
Crosswalk Width(ft)						
Two way Left Turn Lane						
Headway Factor	1.00					
Turning Speed (mph)	9					
Turn Type	Perm					
Protected Phases		3	5	6	8	11
Permitted Phases	4					
Minimum Split (s)	40.1	8.0	8.0	21.9	31.0	8.0
Total Split (s)	44.0	9.0	35.0	42.0	53.0	33.0
Total Split (%)	33.8%	7%	27%	32%	41%	25%
Maximum Green (s)	37.9	5.0	30.0	36.6	47.0	29.0
Yellow Time (s)	6.1	3.5	5.0	5.4	6.0	3.5
All-Red Time (s)	0.0	0.5	0.0	0.0	0.0	0.5
Lost Time Adjust (s)	0.0					
Total Lost Time (s)	6.1					
Lead/Lag	Lag	Lead	Lead	Lag		
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		
Walk Time (s)	4.0			4.0	4.0	
Flash Dont Walk (s)	29.0			12.0	20.0	
Pedestrian Calls (#/hr)	0			0	0	
Act Effect Green (s)	37.9					

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour

11: Field /Field #11 #12 & Woodall WBFR

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Actuated g/C Ratio			0.30	0.30	0.60	0.58					0.29	0.29
v/c Ratio			0.81	0.84	0.56	0.46					0.32	1.06
Control Delay			34.9	33.7	6.2	3.4					38.2	101.9
Queue Delay			0.4	0.0	5.0	0.4					0.0	0.0
Total Delay			35.2	33.7	11.1	3.8					38.2	101.9
LOS			D	C	B	A					D	F
Approach Delay			34.9			5.3						65.5
Approach LOS			C			A						E
Queue Length 50th (ft)			350	280	16	22					109	~525
Queue Length 95th (ft)			378	#399	m20	23					175	#771
Internal Link Dist (ft)			595			154			158			107
Turn Bay Length (ft)				200								
Base Capacity (vph)			1780	522	495	2320					490	488
Starvation Cap Reductn			0	0	154	702					0	0
Spillback Cap Reductn			66	0	0	0					0	0
Storage Cap Reductn			0	0	0	0					0	0
Reduced v/c Ratio			0.84	0.84	0.81	0.66					0.32	1.06

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 72 (55%), Referenced to phase 2:EBWB, Start of Yellow

Natural Cycle: 90

Control Type: Pretimed

Maximum v/c Ratio: 1.06

Intersection Signal Delay: 32.7

Intersection LOS: C

Intersection Capacity Utilization 84.1%

ICU Level of Service E

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: Field /Field #11 #12 & Woodall WBFR

#11  Ø2 (R)	#11  Ø11	#11  Ø3	#11  Ø4
44 s	33 s	9 s	44 s
#12  Ø5	#12  Ø6	#12  Ø8	
35 s	42 s	53 s	

Lane Group	SBR	Ø3	Ø5	Ø6	Ø8	Ø11
Actuated g/C Ratio	0.29					
v/c Ratio	0.58					
Control Delay	19.4					
Queue Delay	0.0					
Total Delay	19.4					
LOS	B					
Approach Delay						
Approach LOS						
Queue Length 50th (ft)	89					
Queue Length 95th (ft)	195					
Internal Link Dist (ft)						
Turn Bay Length (ft)						
Base Capacity (vph)	549					
Starvation Cap Reductn	0					
Spillback Cap Reductn	0					
Storage Cap Reductn	0					
Reduced v/c Ratio	0.58					
Intersection Summary						

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour
12: Woodall EBFR & Field #11 #12 & Field EB On-Ramp

												
Lane Group	EBU	EBL2	EBL	EBT	WBU	WBT	WBR	WBR2	NBU	NBL	NBT	NBR
Lane Configurations				  		  					  	
Traffic Volume (vph)	1	0	365	1071	3	1022	200	207	143	97	884	100
Future Volume (vph)	1	0	365	1071	3	1022	200	207	143	97	884	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)			0				0			0		0
Storage Lanes			1				1			1		0
Taper Length (ft)			25							25		
Lane Util. Factor	0.91	1.00	0.91	0.91	0.91	0.91	1.00	0.91	0.91	0.86	0.86	0.91
Frt							0.850				0.985	
Flt Protected		0.950		0.987						0.950	0.999	
Satd. Flow (prot)	0	1770	0	5019	0	5085	1583	0	0	1522	4729	0
Flt Permitted		0.056		0.675		0.934				0.950	0.999	
Satd. Flow (perm)	0	104	0	3433	0	4750	1583	0	0	1522	4729	0
Right Turn on Red								Yes				Yes
Satd. Flow (RTOR)							102				15	
Link Speed (mph)				30		30					30	
Link Distance (ft)				234		419					191	
Travel Time (s)				5.3		9.5					4.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	0	397	1164	3	1111	217	225	155	105	961	109
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	0	1	0	1561	0	1114	442	0	0	249	1081	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Left	R NA	Left	Right	Right	R NA	Left	Left	Right
Median Width(ft)				20		12					12	
Link Offset(ft)				0		12					-24	
Crosswalk Width(ft)				16		16					16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15	15		9		9	9	9	15		9
Turn Type	custom	pm+pt	pm+pt	NA	Perm	NA	Perm		Perm	Split	NA	
Protected Phases		5	5	5 6		6				8	8	
Permitted Phases	5	5 6	5 6		6		6		8			
Minimum Split (s)	8.0	8.0	8.0		21.9	21.9	21.9		31.0	31.0	31.0	
Total Split (s)	35.0	35.0	35.0		42.0	42.0	42.0		53.0	53.0	53.0	
Total Split (%)	26.9%	26.9%	26.9%		32.3%	32.3%	32.3%		40.8%	40.8%	40.8%	
Maximum Green (s)	30.0	30.0	30.0		36.6	36.6	36.6		47.0	47.0	47.0	
Yellow Time (s)	5.0	5.0	5.0		5.4	5.4	5.4		6.0	6.0	6.0	
All-Red Time (s)	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	
Lost Time Adjust (s)		0.0				0.0	0.0			0.0	0.0	
Total Lost Time (s)		5.0				5.4	5.4			6.0	6.0	
Lead/Lag	Lead	Lead	Lead		Lag	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes	Yes					
Walk Time (s)					4.0	4.0	4.0		4.0	4.0	4.0	
Flash Dont Walk (s)					12.0	12.0	12.0		20.0	20.0	20.0	
Pedestrian Calls (#/hr)					0	0	0		0	0	0	
Act Effect Green (s)		72.0		67.0		36.6	36.6			47.0	47.0	
Actuated g/C Ratio		0.55		0.52		0.28	0.28			0.36	0.36	
v/c Ratio		0.02		0.85dl		0.83	0.85			0.45	0.63	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour
12: Woodall EBFR & Field #11 #12 & Field EB On-Ramp

Lane Group	Ø2	Ø3	Ø4	Ø11
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Ideal Flow (vphpl)				
Storage Length (ft)				
Storage Lanes				
Taper Length (ft)				
Lane Util. Factor				
Frt				
Flt Protected				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (mph)				
Link Distance (ft)				
Travel Time (s)				
Peak Hour Factor				
Adj. Flow (vph)				
Shared Lane Traffic (%)				
Lane Group Flow (vph)				
Enter Blocked Intersection				
Lane Alignment				
Median Width(ft)				
Link Offset(ft)				
Crosswalk Width(ft)				
Two way Left Turn Lane				
Headway Factor				
Turning Speed (mph)				
Turn Type				
Protected Phases	2	3	4	11
Permitted Phases				
Minimum Split (s)	23.2	8.0	40.1	8.0
Total Split (s)	44.0	9.0	44.0	33.0
Total Split (%)	34%	7%	34%	25%
Maximum Green (s)	38.8	5.0	37.9	29.0
Yellow Time (s)	5.2	3.5	6.1	3.5
All-Red Time (s)	0.0	0.5	0.0	0.5
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag		Lead	Lag	
Lead-Lag Optimize?		Yes	Yes	
Walk Time (s)	4.0		4.0	
Flash Dont Walk (s)	14.0		29.0	
Pedestrian Calls (#/hr)	0		0	
Act Effect Green (s)				
Actuated g/C Ratio				
v/c Ratio				

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour
12: Woodall EBFR & Field #11 #12 & Field EB On-Ramp

												
Lane Group	EBU	EBL2	EBL	EBT	WBU	WBT	WBR	WBR2	NBU	NBL	NBT	NBR
Control Delay		3.0		8.9		45.5	45.1			35.0	35.8	
Queue Delay		0.0		3.8		2.2	4.0			0.0	0.0	
Total Delay		3.0		12.7		47.7	49.1			35.0	35.8	
LOS		A		B		D	D			C	D	
Approach Delay				12.7		48.1					35.6	
Approach LOS				B		D					D	
Queue Length 50th (ft)		0		134		343	126			184	286	
Queue Length 95th (ft)		m0		m188		398	#384			280	339	
Internal Link Dist (ft)				154		339					111	
Turn Bay Length (ft)												
Base Capacity (vph)		57		2135		1337	518			550	1719	
Starvation Cap Reductn		0		478		116	35			0	0	
Spillback Cap Reductn		0		109		31	0			0	0	
Storage Cap Reductn		0		0		0	0			0	0	
Reduced v/c Ratio		0.02		0.94		0.91	0.92			0.45	0.63	

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 72 (55%), Referenced to phase 2:EBWB, Start of Yellow

Natural Cycle: 90

Control Type: Pretimed

Maximum v/c Ratio: 1.06

Intersection Signal Delay: 31.9

Intersection LOS: C

Intersection Capacity Utilization 85.1%

ICU Level of Service E

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 12: Woodall EBFR & Field #11 #12 & Field EB On-Ramp

#11  Ø2 (R)	#11  Ø11	#11  Ø3	#11  Ø4
44 s	33 s	9 s	44 s
#12  Ø5	#12  Ø6	#12  Ø8	
35 s	42 s	53 s	

Lane Group	Ø2	Ø3	Ø4	Ø11
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				
Queue Length 50th (ft)				
Queue Length 95th (ft)				
Internal Link Dist (ft)				
Turn Bay Length (ft)				
Base Capacity (vph)				
Starvation Cap Reductn				
Spillback Cap Reductn				
Storage Cap Reductn				
Reduced v/c Ratio				
Intersection Summary				

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour

13: Woodall WBFR & Harwood

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↑↑			↑↑↑	
Traffic Volume (vph)	0	247	0	0	749	63
Future Volume (vph)	0	247	0	0	749	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.88	1.00	1.00	0.91	0.91
Ped Bike Factor		0.91			1.00	
Frt		0.850			0.988	
Flt Protected						
Satd. Flow (prot)	0	2787	0	0	5005	0
Flt Permitted						
Satd. Flow (perm)	0	2543	0	0	5005	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		134			35	
Link Speed (mph)	30			30	24	
Link Distance (ft)	246			202	260	
Travel Time (s)	5.6			4.6	7.4	
Confl. Peds. (#/hr)		82				41
Peak Hour Factor	0.82	0.82	0.92	0.92	0.94	0.94
Adj. Flow (vph)	0	301	0	0	797	67
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	301	0	0	864	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			12	-12	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Turn Type		Perm			NA	
Protected Phases					8	
Permitted Phases		6				
Minimum Split (s)		20.0			20.0	
Total Split (s)		24.0			26.0	
Total Split (%)		48.0%			52.0%	
Maximum Green (s)		20.0			22.0	
Yellow Time (s)		3.5			3.5	
All-Red Time (s)		0.5			0.5	
Lost Time Adjust (s)		0.0			0.0	
Total Lost Time (s)		4.0			4.0	
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)		5.0			5.0	
Flash Dont Walk (s)		11.0			11.0	
Pedestrian Calls (#/hr)		0			0	
Act Effct Green (s)		20.0			22.0	
Actuated g/C Ratio		0.40			0.44	
v/c Ratio		0.27			0.39	
Control Delay		4.1			9.3	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour

13: Woodall WBFR & Harwood

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Queue Delay		0.0			0.0	
Total Delay		4.1			9.3	
LOS		A			A	
Approach Delay	4.1				9.3	
Approach LOS	A				A	
Queue Length 50th (ft)		13			72	
Queue Length 95th (ft)		28			83	
Internal Link Dist (ft)	166			122	180	
Turn Bay Length (ft)						
Base Capacity (vph)		1097			2221	
Starvation Cap Reductn		0			0	
Spillback Cap Reductn		0			0	
Storage Cap Reductn		0			0	
Reduced v/c Ratio		0.27			0.39	

Intersection Summary

Area Type: Other

Cycle Length: 50

Actuated Cycle Length: 50

Offset: 1 (2%), Referenced to phase 6:EBR, Start of Yellow

Natural Cycle: 40

Control Type: Pretimed

Maximum v/c Ratio: 0.39

Intersection Signal Delay: 8.0

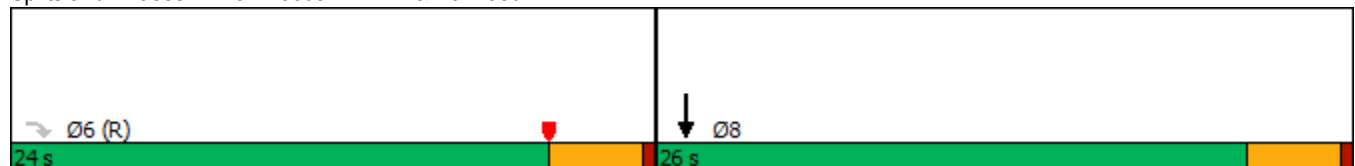
Intersection LOS: A

Intersection Capacity Utilization 36.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 13: Woodall WBFR & Harwood



North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour

14: Woodall EBFR & Harwood

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø2
Lane Configurations			↑↑↑				
Traffic Volume (vph)	0	0	869	150	0	0	
Future Volume (vph)	0	0	869	150	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	0.91	0.91	1.00	1.00	
Ped Bike Factor			0.99				
Frt			0.978				
Flt Protected							
Satd. Flow (prot)	0	0	4907	0	0	0	
Flt Permitted							
Satd. Flow (perm)	0	0	4907	0	0	0	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)			81				
Link Speed (mph)	30		26			30	
Link Distance (ft)	974		416			261	
Travel Time (s)	22.1		10.9			5.9	
Confl. Peds. (#/hr)				32			
Peak Hour Factor	0.92	0.92	0.96	0.96	0.92	0.92	
Adj. Flow (vph)	0	0	905	156	0	0	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	0	1061	0	0	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Right	Left	Left	
Median Width(ft)	0		0			0	
Link Offset(ft)	24		0			0	
Crosswalk Width(ft)	16		16			16	
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9		9	15		
Turn Type			NA				
Protected Phases			4			2	
Permitted Phases							
Minimum Split (s)			20.9			21.0	
Total Split (s)			75.0			25.0	
Total Split (%)			75.0%			25%	
Maximum Green (s)			70.1			20.0	
Yellow Time (s)			3.6			3.6	
All-Red Time (s)			1.3			1.4	
Lost Time Adjust (s)			0.0				
Total Lost Time (s)			4.9				
Lead/Lag							
Lead-Lag Optimize?							
Walk Time (s)			4.0			4.0	
Flash Dont Walk (s)			8.0			8.0	
Pedestrian Calls (#/hr)			0			0	
Act Effect Green (s)			70.1				
Actuated g/C Ratio			0.70				
v/c Ratio			0.31				
Control Delay			3.0				

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour

14: Woodall EBFR & Harwood

							
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø2
Queue Delay			0.2				
Total Delay			3.1				
LOS			A				
Approach Delay			3.1				
Approach LOS			A				
Queue Length 50th (ft)			34				
Queue Length 95th (ft)			46				
Internal Link Dist (ft)	894		336			181	
Turn Bay Length (ft)							
Base Capacity (vph)			3464				
Starvation Cap Reductn			1346				
Spillback Cap Reductn			913				
Storage Cap Reductn			0				
Reduced v/c Ratio			0.50				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 30 (30%), Referenced to phase 2:Ped, Start of Yellow

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.31

Intersection Signal Delay: 3.1

Intersection LOS: A

Intersection Capacity Utilization 24.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 14: Woodall EBFR & Harwood



North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour

15: Woodall WBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑						↑↑↑	
Traffic Volume (vph)	0	0	0	318	635	0	0	0	0	0	527	129
Future Volume (vph)	0	0	0	318	635	0	0	0	0	0	527	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	0.91	0.91
Ped Bike Factor					0.92						0.96	
Frt											0.971	
Flt Protected					0.984							
Satd. Flow (prot)	0	0	0	0	5004	0	0	0	0	0	4717	0
Flt Permitted					0.984							
Satd. Flow (perm)	0	0	0	0	4612	0	0	0	0	0	4717	0
Right Turn on Red			Yes	Yes		Yes			Yes			Yes
Satd. Flow (RTOR)					137						70	
Link Speed (mph)		30			30			30			24	
Link Distance (ft)		836			267			260			433	
Travel Time (s)		19.0			6.1			5.9			12.3	
Confl. Peds. (#/hr)				94								88
Peak Hour Factor	0.92	0.92	0.92	0.97	0.97	0.97	0.92	0.92	0.92	0.82	0.82	0.82
Adj. Flow (vph)	0	0	0	328	655	0	0	0	0	0	643	157
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	983	0	0	0	0	0	800	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		20			-20			12			-12	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type				Perm	NA						NA	
Protected Phases					2						4	
Permitted Phases				2								
Minimum Split (s)				21.2	21.2						21.2	
Total Split (s)				54.0	54.0						46.0	
Total Split (%)				54.0%	54.0%						46.0%	
Maximum Green (s)				48.8	48.8						40.8	
Yellow Time (s)				3.6	3.6						3.6	
All-Red Time (s)				1.6	1.6						1.6	
Lost Time Adjust (s)					0.0						0.0	
Total Lost Time (s)					5.2						5.2	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)				4.0	4.0						4.0	
Flash Dont Walk (s)				8.0	8.0						8.0	
Pedestrian Calls (#/hr)				0	0						0	
Act Effect Green (s)					48.8						40.8	
Actuated g/C Ratio					0.49						0.41	
v/c Ratio					0.42						0.41	
Control Delay					3.0						18.6	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour

15: Woodall WBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay					0.1						0.0	
Total Delay					3.1						18.6	
LOS					A						B	
Approach Delay					3.1						18.6	
Approach LOS					A						B	
Queue Length 50th (ft)					10						105	
Queue Length 95th (ft)					15						m101	
Internal Link Dist (ft)		756			187			180			353	
Turn Bay Length (ft)												
Base Capacity (vph)					2320						1965	
Starvation Cap Reductn					364						0	
Spillback Cap Reductn					0						0	
Storage Cap Reductn					0						0	
Reduced v/c Ratio					0.50						0.41	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 87 (87%), Referenced to phase 2:WBTL and 6:, Start of Yellow

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.42

Intersection Signal Delay: 10.1

Intersection LOS: B

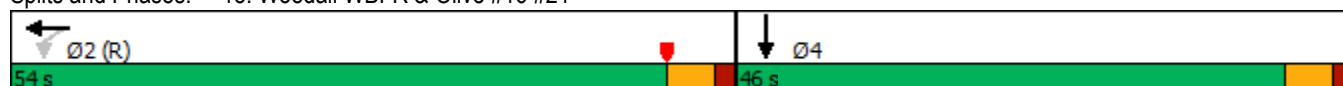
Intersection Capacity Utilization 41.6%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 15: Woodall WBFR & Olive #16 #21



North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour

16: Woodall EBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑	↑		↑↑↑				
Traffic Volume (vph)	0	0	0	0	907	404	62	781	0	0	0	0
Future Volume (vph)	0	0	0	0	907	404	62	781	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00
Ped Bike Factor						0.96		1.00				
Frt						0.850						
Flt Protected								0.996				
Satd. Flow (prot)	0	0	0	0	5085	1583	0	5065	0	0	0	0
Flt Permitted								0.996				
Satd. Flow (perm)	0	0	0	0	5085	1522	0	5043	0	0	0	0
Right Turn on Red			Yes			Yes	Yes		Yes			Yes
Satd. Flow (RTOR)						46		34				
Link Speed (mph)		30			30			26			30	
Link Distance (ft)		267			231			261			427	
Travel Time (s)		6.1			5.3			6.8			9.7	
Confl. Peds. (#/hr)						11	24					
Peak Hour Factor	0.92	0.92	0.92	0.96	0.96	0.96	0.90	0.90	0.90	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	945	421	69	868	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	945	421	0	937	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		20			-20			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type					NA	Perm	Perm	NA				
Protected Phases					2			4				
Permitted Phases						2	4					
Minimum Split (s)					22.1	22.1	21.1	21.1				
Total Split (s)					58.0	58.0	42.0	42.0				
Total Split (%)					58.0%	58.0%	42.0%	42.0%				
Maximum Green (s)					51.9	51.9	36.9	36.9				
Yellow Time (s)					3.6	3.6	3.6	3.6				
All-Red Time (s)					2.5	2.5	1.5	1.5				
Lost Time Adjust (s)					0.0	0.0		0.0				
Total Lost Time (s)					6.1	6.1		5.1				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)					4.0	4.0	4.0	4.0				
Flash Dont Walk (s)					8.0	8.0	8.0	8.0				
Pedestrian Calls (#/hr)					0	0	0	0				
Act Effct Green (s)					51.9	51.9		36.9				
Actuated g/C Ratio					0.52	0.52		0.37				
v/c Ratio					0.36	0.52		0.50				
Control Delay					14.7	16.7		34.4				

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour

16: Woodall EBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay					0.0	0.0		14.6				
Total Delay					14.7	16.7		49.0				
LOS					B	B		D				
Approach Delay					15.3			49.0				
Approach LOS					B			D				
Queue Length 50th (ft)					124	149		204				
Queue Length 95th (ft)					154	236		255				
Internal Link Dist (ft)		187			151			181			347	
Turn Bay Length (ft)												
Base Capacity (vph)					2639	812		1882				
Starvation Cap Reductn					0	0		940				
Spillback Cap Reductn					0	1		127				
Storage Cap Reductn					0	0		0				
Reduced v/c Ratio					0.36	0.52		0.99				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 85 (85%), Referenced to phase 2:WBT and 6:, Start of Yellow

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.52

Intersection Signal Delay: 29.0

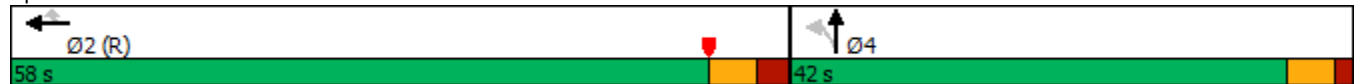
Intersection LOS: C

Intersection Capacity Utilization 51.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 16: Woodall EBFR & Olive #16 #21



North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour

17: Woodall WBFR & Pearl #17 #18

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations			↑↑↑	↑	↑	↑↑↑						↑↑↑
Traffic Volume (vph)	1	0	1718	196	176	978	0	0	0	0	98	304
Future Volume (vph)	1	0	1718	196	176	978	0	0	0	0	98	304
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		250		0	0		0	0		0	0	
Storage Lanes		1		1	1		0	0		0	0	
Taper Length (ft)		25			25			25			25	
Lane Util. Factor	0.91	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	0.91	0.91
Ped Bike Factor				0.95								0.90
Frt				0.850								0.936
Flt Protected					0.950							0.993
Satd. Flow (prot)	0	0	5085	1583	1770	5085	0	0	0	0	0	4243
Flt Permitted			0.940		0.089							0.993
Satd. Flow (perm)	0	0	4780	1504	166	5085	0	0	0	0	0	4243
Right Turn on Red				Yes			Yes			Yes		
Satd. Flow (RTOR)				189								156
Link Speed (mph)			30			30			30			30
Link Distance (ft)			1034			257			433			138
Travel Time (s)			23.5			5.8			9.8			3.1
Confl. Peds. (#/hr)				13	13							
Peak Hour Factor	0.98	0.98	0.98	0.98	0.92	0.92	0.92	0.92	0.92	0.92	0.78	0.78
Adj. Flow (vph)	1	0	1753	200	191	1063	0	0	0	0	126	390
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	1754	200	191	1063	0	0	0	0	0	904
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left
Median Width(ft)			12			12			0			0
Link Offset(ft)			0			0			0			0
Crosswalk Width(ft)			16			16			16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15		9	15		9	15		9	15	
Turn Type	Perm		NA	Perm	pm+pt	NA					Split	NA
Protected Phases			2		1 11	6					4	4
Permitted Phases	2			2	6							
Minimum Split (s)	21.1		21.1	21.1		28.1					22.0	22.0
Total Split (s)	40.0		40.0	40.0		77.0					23.0	23.0
Total Split (%)	40.0%		40.0%	40.0%		77.0%					23.0%	23.0%
Maximum Green (s)	34.9		34.9	34.9		71.9					17.0	17.0
Yellow Time (s)	3.6		3.6	3.6		3.6					3.9	3.9
All-Red Time (s)	1.5		1.5	1.5		1.5					2.1	2.1
Lost Time Adjust (s)			0.0	0.0		0.0						0.0
Total Lost Time (s)			5.1	5.1		5.1						6.0
Lead/Lag	Lag		Lag	Lag								
Lead-Lag Optimize?	Yes		Yes	Yes								
Walk Time (s)	4.0		4.0	4.0		4.0					4.0	4.0
Flash Dont Walk (s)	6.0		6.0	6.0		19.0					6.0	6.0
Pedestrian Calls (#/hr)	0		0	0		0					0	0
Act Effect Green (s)			34.9	34.9	72.0	71.9						17.0

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour

17: Woodall WBFR & Pearl #17 #18

Lane Group	SBR	Ø1	Ø11
Lane Configurations			
Traffic Volume (vph)	303		
Future Volume (vph)	303		
Ideal Flow (vphpl)	1900		
Storage Length (ft)	0		
Storage Lanes	0		
Taper Length (ft)			
Lane Util. Factor	0.91		
Ped Bike Factor			
Frt			
Flt Protected			
Satd. Flow (prot)	0		
Flt Permitted			
Satd. Flow (perm)	0		
Right Turn on Red	Yes		
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Peds. (#/hr)	77		
Peak Hour Factor	0.78		
Adj. Flow (vph)	388		
Shared Lane Traffic (%)			
Lane Group Flow (vph)	0		
Enter Blocked Intersection	No		
Lane Alignment	Right		
Median Width(ft)			
Link Offset(ft)			
Crosswalk Width(ft)			
Two way Left Turn Lane			
Headway Factor	1.00		
Turning Speed (mph)	9		
Turn Type			
Protected Phases	1	11	
Permitted Phases			
Minimum Split (s)	8.0	8.0	
Total Split (s)	20.0	17.0	
Total Split (%)	20%	17%	
Maximum Green (s)	15.0	13.0	
Yellow Time (s)	3.0	3.5	
All-Red Time (s)	2.0	0.5	
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead		
Lead-Lag Optimize?	Yes		
Walk Time (s)			
Flash Dont Walk (s)			
Pedestrian Calls (#/hr)			
Act Effect Green (s)			

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour

17: Woodall WBFR & Pearl #17 #18

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Actuated g/C Ratio			0.35	0.35	0.72	0.72						0.17
v/c Ratio			1.05	0.31	0.35	0.29						1.06
Control Delay			52.3	1.3	19.9	2.0						83.0
Queue Delay			10.1	0.0	2.8	0.4						0.0
Total Delay			62.4	1.3	22.7	2.5						83.0
LOS			E	A	C	A						F
Approach Delay			56.2			5.6						83.0
Approach LOS			E			A						F
Queue Length 50th (ft)			~458	2	66	31						~201
Queue Length 95th (ft)			#558	m2	m94	30						#217
Internal Link Dist (ft)			954			177			353			58
Turn Bay Length (ft)												
Base Capacity (vph)			1668	647	552	3656						850
Starvation Cap Reductn			0	0	257	1925						0
Spillback Cap Reductn			39	0	0	0						0
Storage Cap Reductn			0	0	0	0						0
Reduced v/c Ratio			1.08	0.31	0.65	0.61						1.06

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 88 (88%), Referenced to phase 2:EBTU and 6:WBTL, Start of Yellow

Natural Cycle: 70

Control Type: Pretimed

Maximum v/c Ratio: 1.06

Intersection Signal Delay: 46.6

Intersection LOS: D

Intersection Capacity Utilization 77.2%

ICU Level of Service D

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

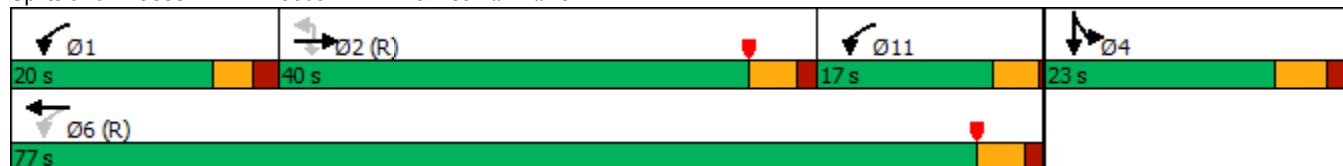
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 17: Woodall WBFR & Pearl #17 #18





Lane Group	SBR	Ø1	Ø11
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)			
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			
Intersection Summary			

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour

18: Woodall EBFR & Pearl #17 #18

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 			  			  				
Traffic Volume (vph)	728	1170	0	0	1011	155	156	907	129	0	0	0
Future Volume (vph)	728	1170	0	0	1011	155	156	907	129	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	250		0	0		0	0		0
Storage Lanes	2		0	1		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	1.00	0.91	1.00	0.91	0.91	0.91	1.00	1.00	1.00
Frt						0.850		0.984				
Flt Protected	0.950							0.993				
Satd. Flow (prot)	3433	3539	0	0	5085	1583	0	4969	0	0	0	0
Flt Permitted	0.125							0.993				
Satd. Flow (perm)	452	3539	0	0	5085	1583	0	4969	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						92		22				
Link Speed (mph)		30			30			26			30	
Link Distance (ft)		257			1016			427			143	
Travel Time (s)		5.8			23.1			11.2			3.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	791	1272	0	0	1099	168	170	986	140	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	791	1272	0	0	1099	168	0	1296	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			0			0	
Link Offset(ft)		0			0			-12			12	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA			NA	Perm	Perm	NA				
Protected Phases	15	2			6			4				
Permitted Phases	2					6	4					
Minimum Split (s)	8.0	21.4			27.0	27.0	23.1	23.1				
Total Split (s)	31.0	63.0			32.0	32.0	37.0	37.0				
Total Split (%)	31.0%	63.0%			32.0%	32.0%	37.0%	37.0%				
Maximum Green (s)	26.0	57.6			27.0	27.0	31.0	31.0				
Yellow Time (s)	3.0	3.6			3.6	3.6	3.6	3.6				
All-Red Time (s)	2.0	1.8			1.4	1.4	2.4	2.4				
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0				
Total Lost Time (s)	5.0	5.4			5.0	5.0		6.0				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		4.0			4.0	4.0	4.0	4.0				
Flash Dont Walk (s)		8.0			18.0	18.0	8.0	8.0				
Pedestrian Calls (#/hr)		0			0	0	0	0				
Act Effct Green (s)	58.0	57.6			27.0	27.0		31.0				
Actuated g/C Ratio	0.58	0.58			0.27	0.27		0.31				
v/c Ratio	0.76	0.62			0.80	0.34		0.83				

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background Conditions - PM Peak Hour

18: Woodall EBFR & Pearl #17 #18

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	7.4	3.1			39.3	15.9		23.4				
Queue Delay	52.0	0.9			0.0	0.0		0.1				
Total Delay	59.4	4.0			39.3	15.9		23.4				
LOS	E	A			D	B		C				
Approach Delay		25.2			36.2			23.4				
Approach LOS		C			D			C				
Queue Length 50th (ft)	52	41			238	37		314				
Queue Length 95th (ft)	m49	m40			292	93		339				
Internal Link Dist (ft)		177			936			347			63	
Turn Bay Length (ft)												
Base Capacity (vph)	1037	2038			1372	494		1555				
Starvation Cap Reductn	458	440			0	0		8				
Spillback Cap Reductn	0	0			0	0		0				
Storage Cap Reductn	0	0			0	0		0				
Reduced v/c Ratio	1.37	0.80			0.80	0.34		0.84				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 65 (65%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 75

Control Type: Pretimed

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 27.7

Intersection LOS: C

Intersection Capacity Utilization 77.2%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Woodall EBFR & Pearl #17 #18



Intersection												
Int Delay, s/veh	1.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑↑								↑	↑		
Traffic Vol, veh/h	0	822	3	0	0	0	0	0	107	0	0	0
Future Vol, veh/h	0	822	3	0	0	0	0	0	107	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	0	-	-
Veh in Median Storage, #	-	0	-	-	16979	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	893	3	0	0	0	0	0	116	0	0	0

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	0	0	0	-	-	-	448	357	-
Stage 1	-	-	-	-	-	-	-	0	-
Stage 2	-	-	-	-	-	-	-	357	-
Critical Hdwy	5.34	-	-	-	-	-	7.14	6.44	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	6.74	-
Follow-up Hdwy	3.12	-	-	-	-	-	3.92	3.82	-
Pot Cap-1 Maneuver	-	-	-	0	0	0	477	598	0
Stage 1	-	-	-	0	0	-	-	0	0
Stage 2	-	-	-	0	0	-	-	580	0
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	-	-	477	452	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	452	-
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	439	-

Approach	EB	NB	SB
HCM Control Delay, s	0	15	0
HCM LOS		C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	477	-	-	-	-
HCM Lane V/C Ratio	0.244	-	-	-	-
HCM Control Delay (s)	15	0	-	-	0
HCM Lane LOS	C	A	-	-	A
HCM 95th %tile Q(veh)	0.9	-	-	-	-

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗			↑↑↑	
Traffic Vol, veh/h	0	0	0	0	990	0
Future Vol, veh/h	0	0	0	0	990	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	16974	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	1042	0
Major/Minor	Minor2		Major2			
Conflicting Flow All	-	521	-	-	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.14	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.92	-	-	-	-
Pot Cap-1 Maneuver	0	428	-	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	428	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		SB			
HCM Control Delay, s	0		0			
HCM LOS	A					
Minor Lane/Major Mvmt	EBLn1	SBT	SBR			
Capacity (veh/h)	-	-	-			
HCM Lane V/C Ratio	-	-	-			
HCM Control Delay (s)	0	-	-			
HCM Lane LOS	A	-	-			
HCM 95th %tile Q(veh)	-	-	-			

Intersection												
Int Delay, s/veh	1.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔			↔			↔	
Traffic Vol, veh/h	5	210	0	0	62	2	0	0	0	31	0	10
Future Vol, veh/h	5	210	0	0	62	2	0	0	0	31	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	228	0	0	67	2	0	0	0	34	0	11
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	69	0	0	228	0	0	272	307	114	192	306	35
Stage 1	-	-	-	-	-	-	238	238	-	68	68	-
Stage 2	-	-	-	-	-	-	34	69	-	124	238	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1530	-	-	1337	-	-	659	606	917	750	606	1030
Stage 1	-	-	-	-	-	-	744	707	-	934	838	-
Stage 2	-	-	-	-	-	-	978	837	-	867	707	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1530	-	-	1337	-	-	650	604	917	748	604	1030
Mov Cap-2 Maneuver	-	-	-	-	-	-	650	604	-	748	604	-
Stage 1	-	-	-	-	-	-	741	704	-	930	838	-
Stage 2	-	-	-	-	-	-	968	837	-	864	704	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.2			0			0			9.8		
HCM LOS							A			A		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	-	1530	-	-	1337	-	-	802				
HCM Lane V/C Ratio	-	0.004	-	-	-	-	-	0.056				
HCM Control Delay (s)	0	7.4	0	-	0	-	-	9.8				
HCM Lane LOS	A	A	A	-	A	-	-	A				
HCM 95th %tile Q(veh)	-	0	-	-	0	-	-	0.2				

North Harwood Tower
HCM 6th TWSC

Phase 2 Background Conditions - PM Peak Hour
22: Adjacent North Drive/Adjacent South Drive & Harwood

Intersection													
Int Delay, s/veh	2.6												
Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↕↕			↕↕			↕↕			↕↕	
Traffic Vol, veh/h	2	16	203	1	1	58	14	52	0	20	0	0	0
Future Vol, veh/h	2	16	203	1	1	58	14	52	0	20	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	17	221	1	1	63	15	57	0	22	0	0	0
Major/Minor	Major1			Major2			Minor1			Minor2			
Conflicting Flow All	78	78	0	0	222	0	0	294	340	111	222	333	39
Stage 1	-	-	-	-	-	-	-	260	260	-	73	73	-
Stage 2	-	-	-	-	-	-	-	34	80	-	149	260	-
Critical Hdwy	6.44	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.52	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1277	1518	-	-	1344	-	-	636	580	921	715	586	1024
Stage 1	-	-	-	-	-	-	-	722	692	-	928	833	-
Stage 2	-	-	-	-	-	-	-	978	828	-	838	692	-
Platoon blocked, %			-	-		-	-						
Mov Cap-1 Maneuver	1487	1487	-	-	1344	-	-	628	571	921	689	577	1024
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	628	571	-	689	577	-
Stage 1	-	-	-	-	-	-	-	711	682	-	914	832	-
Stage 2	-	-	-	-	-	-	-	977	827	-	806	682	-
Approach	EB			WB			NB			SB			
HCM Control Delay, s	0.7			0.1			10.9			0			
HCM LOS							B			A			
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1					
Capacity (veh/h)	689	1487	-	-	1344	-	-	-					
HCM Lane V/C Ratio	0.114	0.012	-	-	0.001	-	-	-					
HCM Control Delay (s)	10.9	7.5	0.1	-	7.7	0	-	0					
HCM Lane LOS	B	A	A	-	A	A	-	A					
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	-					



Synchro™ Output - 2027 Background Plus Site Traffic

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

1: McKinney & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	91	242	38	12	123	11	1	34	182	78	7	122
Future Volume (vph)	91	242	38	12	123	11	1	34	182	78	7	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor	0.92	0.99			0.99				0.95			
Frt		0.979			0.989				0.960			
Flt Protected	0.950				0.996				0.994			
Satd. Flow (prot)	1770	1805	0	0	3459	0	0	0	3234	0	0	0
Flt Permitted	0.950				0.925				0.837			
Satd. Flow (perm)	1634	1805	0	0	3203	0	0	0	2711	0	0	0
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)		10			10				73			
Link Speed (mph)		30			30				30			
Link Distance (ft)		424			278				526			
Travel Time (s)		9.6			6.3				12.0			
Confl. Peds. (#/hr)	54		37	37		54		60		86		86
Peak Hour Factor	0.96	0.96	0.96	0.92	0.92	0.92	0.86	0.86	0.86	0.86	0.93	0.93
Adj. Flow (vph)	95	252	40	13	134	12	1	40	212	91	8	131
Shared Lane Traffic (%)												
Lane Group Flow (vph)	95	292	0	0	159	0	0	0	344	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	R NA	Left
Median Width(ft)		12			12				0			
Link Offset(ft)		0			0				0			
Crosswalk Width(ft)		16			16				16			
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	9	15		9	9	15
Turn Type	Prot	NA		Perm	NA		Perm	Perm	NA		Perm	Perm
Protected Phases	8!				4!				2			
Permitted Phases		8		4			2	2			6	6
Minimum Split (s)	23.4	23.4		23.4	23.4		23.4	23.4	23.4		23.4	23.4
Total Split (s)	46.0	46.0		46.0	46.0		54.0	54.0	54.0		54.0	54.0
Total Split (%)	46.0%	46.0%		46.0%	46.0%		54.0%	54.0%	54.0%		54.0%	54.0%
Maximum Green (s)	40.6	40.6		40.6	40.6		48.6	48.6	48.6		48.6	48.6
Yellow Time (s)	3.6	3.6		3.6	3.6		3.2	3.2	3.2		3.2	3.2
All-Red Time (s)	1.8	1.8		1.8	1.8		2.2	2.2	2.2		2.2	2.2
Lost Time Adjust (s)	-1.4	0.0			-1.4				-1.4			
Total Lost Time (s)	4.0	5.4			4.0				4.0			
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0		4.0	4.0
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		13.0	13.0	13.0		13.0	13.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0		0	0
Act Effect Green (s)	42.0	40.6			42.0				50.0			
Actuated g/C Ratio	0.42	0.41			0.42				0.50			
v/c Ratio	0.13	0.40			0.12				0.25			
Control Delay	11.8	14.1			15.4				3.2			

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

1: McKinney & Harwood

	↓	↙
Lane Group	SBT	SBR
Lane Configurations	4T	
Traffic Volume (vph)	280	157
Future Volume (vph)	280	157
Ideal Flow (vphpl)	1900	1900
Lane Util. Factor	0.95	0.95
Ped Bike Factor	0.95	
Frt	0.958	
Flt Protected	0.989	
Satd. Flow (prot)	3246	0
Flt Permitted	0.761	
Satd. Flow (perm)	2446	0
Right Turn on Red		Yes
Satd. Flow (RTOR)	80	
Link Speed (mph)	30	
Link Distance (ft)	348	
Travel Time (s)	7.9	
Confl. Peds. (#/hr)		60
Peak Hour Factor	0.93	0.93
Adj. Flow (vph)	301	169
Shared Lane Traffic (%)		
Lane Group Flow (vph)	609	0
Enter Blocked Intersection	No	No
Lane Alignment	Left	Right
Median Width(ft)	0	
Link Offset(ft)	0	
Crosswalk Width(ft)	16	
Two way Left Turn Lane		
Headway Factor	1.00	1.00
Turning Speed (mph)		9
Turn Type	NA	
Protected Phases	6	
Permitted Phases		
Minimum Split (s)	23.4	
Total Split (s)	54.0	
Total Split (%)	54.0%	
Maximum Green (s)	48.6	
Yellow Time (s)	3.2	
All-Red Time (s)	2.2	
Lost Time Adjust (s)	-1.4	
Total Lost Time (s)	4.0	
Lead/Lag		
Lead-Lag Optimize?		
Walk Time (s)	4.0	
Flash Dont Walk (s)	13.0	
Pedestrian Calls (#/hr)	0	
Act Effct Green (s)	50.0	
Actuated g/C Ratio	0.50	
v/c Ratio	0.48	
Control Delay	7.5	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

1: McKinney & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Queue Delay	0.0	0.0			0.0				0.0			
Total Delay	11.8	14.1			15.4				3.2			
LOS	B	B			B				A			
Approach Delay		13.5			15.4				3.2			
Approach LOS		B			B				A			
Queue Length 50th (ft)	16	51			37				4			
Queue Length 95th (ft)	32	80			63				15			
Internal Link Dist (ft)		344			198				446			
Turn Bay Length (ft)												
Base Capacity (vph)	743	738			1351				1392			
Starvation Cap Reductn	0	0			0				0			
Spillback Cap Reductn	0	0			0				0			
Storage Cap Reductn	0	0			0				0			
Reduced v/c Ratio	0.13	0.40			0.12				0.25			

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 38 (38%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.48

Intersection Signal Delay: 9.1

Intersection LOS: A

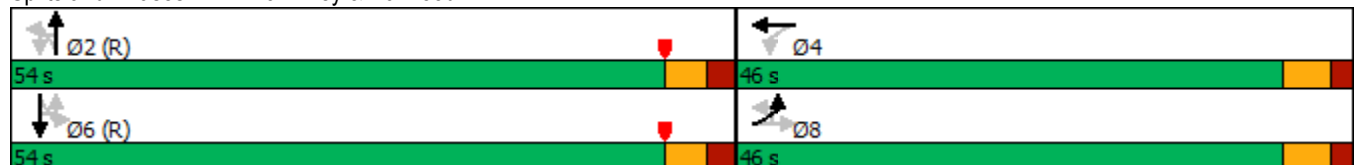
Intersection Capacity Utilization 76.9%

ICU Level of Service D

Analysis Period (min) 15

! Phase conflict between lane groups.

Splits and Phases: 1: McKinney & Harwood





Lane Group	SBT	SBR
Queue Delay	0.4	
Total Delay	8.0	
LOS	A	
Approach Delay	8.0	
Approach LOS	A	
Queue Length 50th (ft)	35	
Queue Length 95th (ft)	151	
Internal Link Dist (ft)	268	
Turn Bay Length (ft)		
Base Capacity (vph)	1263	
Starvation Cap Reductn	256	
Spillback Cap Reductn	0	
Storage Cap Reductn	0	
Reduced v/c Ratio	0.60	
Intersection Summary		

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

2: Cedar Springs & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	457	0	0	0	89	0	632	33	0	0	0
Future Volume (vph)	42	457	0	0	0	89	0	632	33	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	0.88	1.00	0.81	0.81	1.00	1.00	1.00
Ped Bike Factor		1.00				0.96		1.00				
Frt						0.850		0.993				
Flt Protected		0.996										
Satd. Flow (prot)	0	3525	0	0	0	2787	0	7473	0	0	0	0
Flt Permitted		0.996										
Satd. Flow (perm)	0	3516	0	0	0	2671	0	7473	0	0	0	0
Right Turn on Red	Yes		Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25				275		18				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		269			424			493			445	
Travel Time (s)		6.1			9.6			11.2			10.1	
Confl. Peds. (#/hr)	16		21	21		16	16		18	18		16
Peak Hour Factor	0.93	0.93	0.93	0.77	0.77	0.77	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	45	491	0	0	0	116	0	687	36	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	536	0	0	0	116	0	723	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			-24			24	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA				Perm		NA				
Protected Phases		4						2				
Permitted Phases	4					4						
Minimum Split (s)	21.4	21.4				21.4		21.3				
Total Split (s)	47.0	47.0				47.0		53.0				
Total Split (%)	47.0%	47.0%				47.0%		53.0%				
Maximum Green (s)	41.6	41.6				41.6		47.7				
Yellow Time (s)	3.6	3.6				3.6		3.6				
All-Red Time (s)	1.8	1.8				1.8		1.7				
Lost Time Adjust (s)		-1.4				-1.4		-1.3				
Total Lost Time (s)		4.0				4.0		4.0				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0	4.0				4.0		4.0				
Flash Dont Walk (s)	12.0	12.0				12.0		10.0				
Pedestrian Calls (#/hr)	0	0				0		0				
Act Effct Green (s)		43.0				43.0		49.0				
Actuated g/C Ratio		0.43				0.43		0.49				
v/c Ratio		0.35				0.09		0.20				
Control Delay		15.5				0.7		3.0				

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

2: Cedar Springs & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0				0.0		0.0				
Total Delay		15.5				0.7		3.0				
LOS		B				A		A				
Approach Delay		15.5			0.7			3.0				
Approach LOS		B			A			A				
Queue Length 50th (ft)		81				0		15				
Queue Length 95th (ft)		120				0		14				
Internal Link Dist (ft)		189			344			413			365	
Turn Bay Length (ft)												
Base Capacity (vph)		1526				1305		3670				
Starvation Cap Reductn		0				0		0				
Spillback Cap Reductn		0				0		0				
Storage Cap Reductn		0				0		0				
Reduced v/c Ratio		0.35				0.09		0.20				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 40 (40%), Referenced to phase 2:NBT, Start of Yellow

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.35

Intersection Signal Delay: 7.7

Intersection LOS: A

Intersection Capacity Utilization 43.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: Cedar Springs & Harwood



North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

3: McKinney & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	96	700	270	28	209	0	0	343	94
Future Volume (vph)	0	0	0	96	700	270	28	209	0	0	343	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor					0.98	0.94		0.99			0.96	
Frt						0.850					0.968	
Flt Protected					0.994			0.994				
Satd. Flow (prot)	0	0	0	0	3518	1583	0	3518	0	0	3297	0
Flt Permitted					0.994			0.858				
Satd. Flow (perm)	0	0	0	0	3461	1487	0	3013	0	0	3297	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						287					41	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		536			836			348			457	
Travel Time (s)		12.2			19.0			7.9			10.4	
Confl. Peds. (#/hr)				81		30	100					100
Peak Hour Factor	0.92	0.92	0.92	0.94	0.94	0.94	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	0	0	0	102	745	287	33	249	0	0	408	112
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	847	287	0	282	0	0	520	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		16			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					4			2			2	
Permitted Phases				4		4	2					
Minimum Split (s)				23.3	23.3	23.3	23.4	23.4			23.4	
Total Split (s)				57.0	57.0	57.0	43.0	43.0			43.0	
Total Split (%)				57.0%	57.0%	57.0%	43.0%	43.0%			43.0%	
Maximum Green (s)				51.7	51.7	51.7	37.6	37.6			37.6	
Yellow Time (s)				3.2	3.2	3.2	3.2	3.2			3.2	
All-Red Time (s)				2.1	2.1	2.1	2.2	2.2			2.2	
Lost Time Adjust (s)					-1.3	-1.3		-1.4			-1.4	
Total Lost Time (s)					4.0	4.0		4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)				4.0	4.0	4.0	4.0	4.0			4.0	
Flash Dont Walk (s)				14.0	14.0	14.0	14.0	14.0			14.0	
Pedestrian Calls (#/hr)				0	0	0	0	0			0	
Act Effect Green (s)					53.0	53.0		39.0			39.0	
Actuated g/C Ratio					0.53	0.53		0.39			0.39	
v/c Ratio					0.46	0.31		0.24			0.40	
Control Delay					9.9	1.2		28.4			10.0	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

3: McKinney & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay					0.0	0.0		0.0			0.0	
Total Delay					9.9	1.2		28.4			10.0	
LOS					A	A		C			B	
Approach Delay					7.7			28.4			10.0	
Approach LOS					A			C			B	
Queue Length 50th (ft)					104	0		75			43	
Queue Length 95th (ft)					146	m2		101			67	
Internal Link Dist (ft)		456			756			268			377	
Turn Bay Length (ft)												
Base Capacity (vph)					1834	923		1175			1310	
Starvation Cap Reductn					0	0		0			0	
Spillback Cap Reductn					0	0		0			0	
Storage Cap Reductn					0	0		0			0	
Reduced v/c Ratio					0.46	0.31		0.24			0.40	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 19 (19%), Referenced to phase 2:NBSB and 6:, Start of Yellow

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.46

Intersection Signal Delay: 11.3

Intersection LOS: B

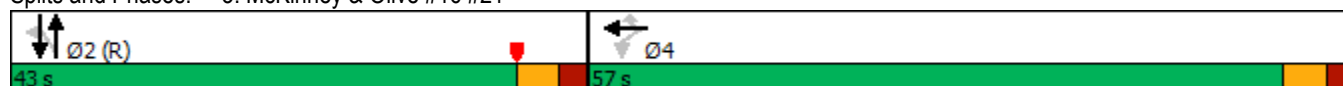
Intersection Capacity Utilization 55.5%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: McKinney & Olive #16 #21



North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

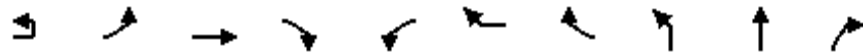
4: Cedar Springs & Akard & St Paul

										
Lane Group	EBU	EBL	EBT	EBR	WBL	WBR	WBR2	NBL	NBT	NBR
Lane Configurations										
Traffic Volume (vph)	6	706	1175	97	19	428	17	230	16	70
Future Volume (vph)	6	706	1175	97	19	428	17	230	16	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.97	0.91	0.91	1.00	0.88	1.00	0.97	1.00	1.00
Ped Bike Factor		0.99	1.00			0.95		0.98	0.97	
Frt			0.989			0.850			0.878	
Flt Protected		0.950			0.950			0.950		
Satd. Flow (prot)	0	3433	5013	0	1770	2787	0	3433	1581	0
Flt Permitted		0.950			0.950			0.950		
Satd. Flow (perm)	0	3404	5013	0	1770	2637	0	3376	1581	0
Right Turn on Red				Yes			Yes			Yes
Satd. Flow (RTOR)			20			140			77	
Link Speed (mph)			30						30	
Link Distance (ft)			345						581	
Travel Time (s)			7.8						13.2	
Confl. Peds. (#/hr)		5		18			17	10		18
Peak Hour Factor	0.98	0.98	0.98	0.98	0.82	0.82	0.82	0.91	0.91	0.91
Adj. Flow (vph)	6	720	1199	99	23	522	21	253	18	77
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	726	1298	0	23	543	0	253	95	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	Left	Right	Right	Left	Left	Right
Median Width(ft)			0						24	
Link Offset(ft)			24						0	
Crosswalk Width(ft)			16						16	
Two way Left Turn Lane										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15		9	15	9	9	15		9
Turn Type	custom	Prot	NA		Prot	Perm		Prot	NA	
Protected Phases		5			1			4		
Permitted Phases	5		2			6			4	
Minimum Split (s)	23.9	23.9	23.0		8.0	21.5		23.9	23.9	
Total Split (s)	41.0	41.0	57.0		15.0	31.0		28.0	28.0	
Total Split (%)	41.0%	41.0%	57.0%		15.0%	31.0%		28.0%	28.0%	
Maximum Green (s)	35.1	35.1	52.0		11.0	25.5		22.1	22.1	
Yellow Time (s)	3.6	3.6	3.6		3.5	3.6		3.6	3.6	
All-Red Time (s)	2.3	2.3	1.4		0.5	1.9		2.3	2.3	
Lost Time Adjust (s)		-1.9	-1.0		0.0	-1.5		-1.9	-1.9	
Total Lost Time (s)		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lead	Lag		Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes				
Walk Time (s)	4.0	4.0	4.0			4.0		4.0	4.0	
Flash Dont Walk (s)	14.0	14.0	14.0			8.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0	0			0		0	0	
Act Effect Green (s)		37.0	53.0		11.0	27.0		24.0	24.0	
Actuated g/C Ratio		0.37	0.53		0.11	0.27		0.24	0.24	
v/c Ratio		0.58	0.49		0.12	0.67		0.31	0.22	
Control Delay		45.2	8.8		39.7	18.4		32.4	11.3	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

4: Cedar Springs & Akard & St Paul



Lane Group	EBU	EBL	EBT	EBR	WBL	WBR	WBR2	NBL	NBT	NBR
Queue Delay		3.4	0.0		0.0	1.4		0.0	0.0	
Total Delay		48.6	8.8		39.7	19.8		32.4	11.4	
LOS		D	A		D	B		C	B	
Approach Delay			23.1						26.7	
Approach LOS			C						C	
Queue Length 50th (ft)		225	82		14	57		68	9	
Queue Length 95th (ft)		287	105		36	70		103	49	
Internal Link Dist (ft)			265						501	
Turn Bay Length (ft)										
Base Capacity (vph)		1259	2666		194	814		823	437	
Starvation Cap Reductn		0	0		0	0		0	0	
Spillback Cap Reductn		422	80		0	119		0	15	
Storage Cap Reductn		0	0		0	0		0	0	
Reduced v/c Ratio		0.87	0.50		0.12	0.78		0.31	0.23	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBR, Start of Yellow

Natural Cycle: 70

Control Type: Pretimed

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 23.0

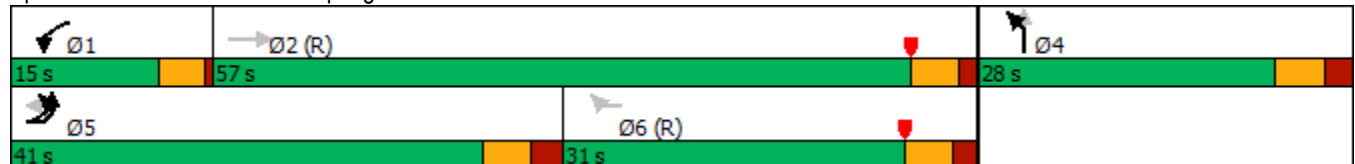
Intersection LOS: C

Intersection Capacity Utilization 60.9%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 4: Cedar Springs & Akard & St Paul



North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

5: McKinney & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	711	2	0	0	0	0	237	84	90	190	2
Future Volume (vph)	62	711	2	0	0	0	0	237	84	90	190	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor	0.98	1.00						0.98			0.99	
Frt								0.961			0.999	
Flt Protected	0.950										0.984	
Satd. Flow (prot)	1770	3539	0	0	0	0	0	3345	0	0	3477	0
Flt Permitted	0.950										0.730	
Satd. Flow (perm)	1734	3539	0	0	0	0	0	3345	0	0	2554	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)								57			1	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		323			197			264			526	
Travel Time (s)		7.3			4.5			6.0			12.0	
Confl. Peds. (#/hr)	10		10				33		33	33		33
Peak Hour Factor	0.89	0.89	0.89	0.92	0.92	0.92	0.96	0.96	0.96	0.89	0.89	0.89
Adj. Flow (vph)	70	799	2	0	0	0	0	247	88	101	213	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	70	801	0	0	0	0	0	335	0	0	316	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			24			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA						NA		Perm	NA	
Protected Phases	4							2			2	
Permitted Phases		4					2			2		
Minimum Split (s)	21.2	21.2					24.6	24.6		24.6	24.6	
Total Split (s)	38.0	38.0					41.0	41.0		41.0	41.0	
Total Split (%)	38.0%	38.0%					41.0%	41.0%		41.0%	41.0%	
Maximum Green (s)	33.1	33.1					35.6	35.6		35.6	35.6	
Yellow Time (s)	3.2	3.2					3.2	3.2		3.2	3.2	
All-Red Time (s)	1.7	1.7					2.2	2.2		2.2	2.2	
Lost Time Adjust (s)	-0.9	-0.9						-1.4			-1.4	
Total Lost Time (s)	4.0	4.0						4.0			4.0	
Lead/Lag	Lag	Lag										
Lead-Lag Optimize?	Yes	Yes										
Walk Time (s)	4.0	4.0					4.0	4.0		4.0	4.0	
Flash Dont Walk (s)	11.0	11.0					15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0					0	0		0	0	
Act Effct Green (s)	34.0	34.0						37.0			37.0	
Actuated g/C Ratio	0.34	0.34						0.37			0.37	
v/c Ratio	0.12	0.67						0.26			0.33	
Control Delay	21.5	32.5						17.4			14.5	

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Minimum Split (s)	9.5
Total Split (s)	21.0
Total Split (%)	21%
Maximum Green (s)	17.0
Yellow Time (s)	3.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

5: McKinney & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	51.6						0.7			0.0	
Total Delay	21.5	84.1						18.1			14.5	
LOS	C	F						B			B	
Approach Delay		79.1						18.1			14.5	
Approach LOS		E						B			B	
Queue Length 50th (ft)	43	281						80			61	
Queue Length 95th (ft)	m79	341						121			78	
Internal Link Dist (ft)		243			117			184			446	
Turn Bay Length (ft)												
Base Capacity (vph)	601	1203						1273			945	
Starvation Cap Reductn	0	522						622			0	
Spillback Cap Reductn	0	0						0			0	
Storage Cap Reductn	0	0						0			0	
Reduced v/c Ratio	0.12	1.18						0.51			0.33	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 45 (45%), Referenced to phase 2:NBSB and 6:, Start of Yellow

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 52.2

Intersection LOS: D

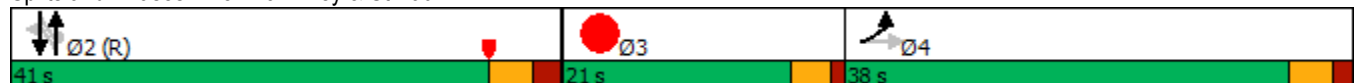
Intersection Capacity Utilization 61.4%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: McKinney & St Paul



Lane Group	Ø3
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

6: McKinney & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	  			  			  			  		
Traffic Volume (vph)	19	1100	38	9	480	293	6	10	10	96	57	37
Future Volume (vph)	19	1100	38	9	480	293	6	10	10	96	57	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor		1.00			0.98			0.98			0.98	
Frt		0.995			0.944			0.942			0.971	
Flt Protected		0.999			0.999			0.989			0.975	
Satd. Flow (prot)	0	5041	0	0	4707	0	0	3256	0	0	3312	0
Flt Permitted		0.914			0.920			0.906			0.798	
Satd. Flow (perm)	0	4611	0	0	4335	0	0	2960	0	0	2684	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			231			12			35	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		383			222			432			264	
Travel Time (s)		8.7			5.0			9.8			6.0	
Confl. Peds. (#/hr)	19		37	37		19	30		13	13		30
Peak Hour Factor	0.92	0.92	0.92	0.89	0.89	0.89	0.82	0.82	0.82	0.83	0.83	0.83
Adj. Flow (vph)	21	1196	41	10	539	329	7	12	12	116	69	45
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1258	0	0	878	0	0	31	0	0	230	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			6			2	
Permitted Phases	4			4			6			2		
Minimum Split (s)	21.2	21.2		21.2	21.2		24.4	24.4		24.4	24.4	
Total Split (s)	57.0	57.0		57.0	57.0		43.0	43.0		43.0	43.0	
Total Split (%)	57.0%	57.0%		57.0%	57.0%		43.0%	43.0%		43.0%	43.0%	
Maximum Green (s)	51.8	51.8		51.8	51.8		37.6	37.6		37.6	37.6	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.6	1.6		1.6	1.6		2.4	2.4		2.4	2.4	
Lost Time Adjust (s)		-1.2			-1.2			-1.4			-1.4	
Total Lost Time (s)		4.0			4.0			4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)		53.0			53.0			39.0			39.0	
Actuated g/C Ratio		0.53			0.53			0.39			0.39	
v/c Ratio		0.51			0.36			0.03			0.22	
Control Delay		8.4			12.1			13.5			10.8	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

6: McKinney & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.5			2.7			0.0			0.0	
Total Delay		8.9			14.8			13.5			10.8	
LOS		A			B			B			B	
Approach Delay		8.9			14.8			13.5			10.8	
Approach LOS		A			B			B			B	
Queue Length 50th (ft)		120			93			3			67	
Queue Length 95th (ft)		138			121			12			92	
Internal Link Dist (ft)		303			142			352			184	
Turn Bay Length (ft)												
Base Capacity (vph)		2447			2406			1161			1068	
Starvation Cap Reductn		695			1373			0			0	
Spillback Cap Reductn		506			0			0			1	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.72			0.85			0.03			0.22	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 68 (68%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.51

Intersection Signal Delay: 11.3

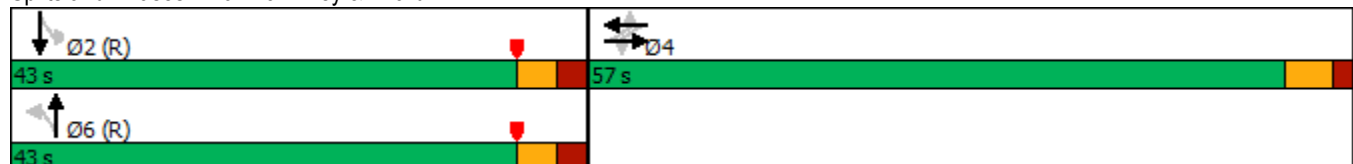
Intersection LOS: B

Intersection Capacity Utilization 58.1%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 6: McKinney & Akard



North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

7: Woodall WBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑									↑↑↑	
Traffic Volume (vph)	0	776	10	0	0	0	0	0	0	259	645	0
Future Volume (vph)	0	776	10	0	0	0	0	0	0	259	645	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00
Ped Bike Factor		1.00										
Frt		0.998										
Flt Protected											0.986	
Satd. Flow (prot)	0	5069	0	0	0	0	0	0	0	0	5014	0
Flt Permitted											0.986	
Satd. Flow (perm)	0	5069	0	0	0	0	0	0	0	0	5014	0
Right Turn on Red			Yes			Yes				Yes	No	No
Satd. Flow (RTOR)		2										
Link Speed (mph)		30			30			24			26	
Link Distance (ft)		183			58			216			216	
Travel Time (s)		4.2			1.3			6.1			5.7	
Confl. Peds. (#/hr)			34									
Peak Hour Factor	0.86	0.86	0.86	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	902	12	0	0	0	0	0	0	282	701	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	914	0	0	0	0	0	0	0	0	983	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		-24			24			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type		NA								Split	NA	
Protected Phases		2								4	4	
Permitted Phases												
Minimum Split (s)		21.6								21.3	21.3	
Total Split (s)		32.0								38.0	38.0	
Total Split (%)		32.0%								38.0%	38.0%	
Maximum Green (s)		26.4								32.7	32.7	
Yellow Time (s)		3.6								3.6	3.6	
All-Red Time (s)		2.0								1.7	1.7	
Lost Time Adjust (s)		-1.6									-1.3	
Total Lost Time (s)		4.0									4.0	
Lead/Lag		Lag										
Lead-Lag Optimize?		Yes										
Walk Time (s)		4.0								4.0	4.0	
Flash Dont Walk (s)		8.0								9.0	9.0	
Pedestrian Calls (#/hr)		0								0	0	
Act Effct Green (s)		28.0									34.0	
Actuated g/C Ratio		0.28									0.34	
v/c Ratio		0.64									0.58	
Control Delay		21.3									15.4	

Lane Group	Ø1
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	1
Permitted Phases	
Minimum Split (s)	21.3
Total Split (s)	30.0
Total Split (%)	30%
Maximum Green (s)	24.7
Yellow Time (s)	3.6
All-Red Time (s)	1.7
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

7: Woodall WBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.1									0.9	
Total Delay		21.4									16.3	
LOS		C									B	
Approach Delay		21.4									16.3	
Approach LOS		C									B	
Queue Length 50th (ft)		165									153	
Queue Length 95th (ft)		164									175	
Internal Link Dist (ft)		103			1			136			136	
Turn Bay Length (ft)												
Base Capacity (vph)		1420									1704	
Starvation Cap Reductn		0									0	
Spillback Cap Reductn		41									416	
Storage Cap Reductn		0									0	
Reduced v/c Ratio		0.66									0.76	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 14 (14%), Referenced to phase 2:EBT and 6:, Start of Yellow

Natural Cycle: 65

Control Type: Pretimed

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 18.8

Intersection LOS: B

Intersection Capacity Utilization 39.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 7: Woodall WBFR & St Paul



Lane Group	Ø1
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

8: Woodall EBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑						↑↑↑				
Traffic Volume (vph)	323	1137	1	0	0	0	0	683	178	0	0	0
Future Volume (vph)	323	1137	1	0	0	0	0	683	178	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	0.91	1.00	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00
Ped Bike Factor		0.96						0.96				
Frt								0.969				
Flt Protected		0.989										
Satd. Flow (prot)	0	5029	0	0	0	0	0	4745	0	0	0	0
Flt Permitted		0.989										
Satd. Flow (perm)	0	4813	0	0	0	0	0	4745	0	0	0	0
Right Turn on Red	Yes		Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		94						53				
Link Speed (mph)		30			30			26			30	
Link Distance (ft)		204			1246			248			416	
Travel Time (s)		4.6			28.3			6.5			9.5	
Confl. Peds. (#/hr)	78								91			
Peak Hour Factor	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95	0.92	0.92	0.92
Adj. Flow (vph)	340	1197	1	0	0	0	0	719	187	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1538	0	0	0	0	0	906	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		-24			24			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA						NA				
Protected Phases		2						4				
Permitted Phases	2											
Minimum Split (s)	21.0	21.0						21.8				
Total Split (s)	57.0	57.0						43.0				
Total Split (%)	57.0%	57.0%						43.0%				
Maximum Green (s)	52.0	52.0						37.2				
Yellow Time (s)	3.6	3.6						3.6				
All-Red Time (s)	1.4	1.4						2.2				
Lost Time Adjust (s)		-1.0						-1.8				
Total Lost Time (s)		4.0						4.0				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0	4.0						4.0				
Flash Dont Walk (s)	8.0	8.0						12.0				
Pedestrian Calls (#/hr)	0	0						0				
Act Effct Green (s)		53.0						39.0				
Actuated g/C Ratio		0.53						0.39				
v/c Ratio		0.59						0.48				
Control Delay		6.9						14.2				

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

8: Woodall EBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		2.2						1.2				
Total Delay		9.0						15.5				
LOS		A						B				
Approach Delay		9.0						15.5				
Approach LOS		A						B				
Queue Length 50th (ft)		56						70				
Queue Length 95th (ft)		66						85				
Internal Link Dist (ft)		124			1166			168			336	
Turn Bay Length (ft)												
Base Capacity (vph)		2595						1882				
Starvation Cap Reductn		871						700				
Spillback Cap Reductn		0						0				
Storage Cap Reductn		0						0				
Reduced v/c Ratio		0.89						0.77				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 40 (40%), Referenced to phase 2:EBTL and 6:, Start of Yellow

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.59

Intersection Signal Delay: 11.4

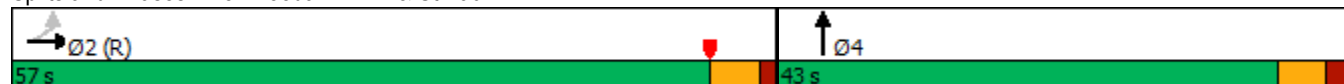
Intersection LOS: B

Intersection Capacity Utilization 53.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: Woodall EBFR & St Paul



North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

9: Woodall WBFR & Akard WB On-Ramp & Akard

									
Lane Group	EBT	EBR	WBL	WBT	WBR	SBU	SBL	SBT	SBR
Lane Configurations	↑↑↑			↑↑↑			↑	↑↑	
Traffic Volume (vph)	1113	79	38	49	663	168	142	261	100
Future Volume (vph)	1113	79	38	49	663	168	142	261	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.95	1.00	0.95	0.95
Ped Bike Factor	0.99			0.92			1.00		
Frt	0.990			0.867				0.959	
Flt Protected				0.997			0.950		
Satd. Flow (prot)	4991	0	0	4025	0	0	1770	3394	0
Flt Permitted				0.848			0.950		
Satd. Flow (perm)	4991	0	0	3423	0	0	1764	3394	0
Right Turn on Red					Yes				Yes
Satd. Flow (RTOR)				453				54	
Link Speed (mph)	30			30				30	
Link Distance (ft)	222			279				216	
Travel Time (s)	5.0			6.3				4.9	
Confl. Peds. (#/hr)		34	34		20		1		
Peak Hour Factor	0.93	0.93	0.86	0.86	0.86	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1197	85	44	57	771	177	149	275	105
Shared Lane Traffic (%)									
Lane Group Flow (vph)	1282	0	0	872	0	0	326	380	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Right	R NA	Left	Left	Right
Median Width(ft)	0			0				12	
Link Offset(ft)	0			0				0	
Crosswalk Width(ft)	16			16				16	
Two way Left Turn Lane									
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)		9	15		9	9	15		9
Turn Type	NA		pm+pt	NA		Perm	Split	NA	
Protected Phases	2		1	6			4	4	
Permitted Phases			6			4			
Minimum Split (s)	21.3		8.0	21.3		22.5	22.5	22.5	
Total Split (s)	46.0		24.0	70.0		30.0	30.0	30.0	
Total Split (%)	46.0%		24.0%	70.0%		30.0%	30.0%	30.0%	
Maximum Green (s)	40.7		20.0	64.7		24.5	24.5	24.5	
Yellow Time (s)	3.6		3.5	3.6		3.6	3.6	3.6	
All-Red Time (s)	1.7		0.5	1.7		1.9	1.9	1.9	
Lost Time Adjust (s)	-1.3			-1.3			-1.5	-1.5	
Total Lost Time (s)	4.0			4.0			4.0	4.0	
Lead/Lag	Lag		Lead						
Lead-Lag Optimize?	Yes		Yes						
Walk Time (s)	4.0			4.0		4.0	4.0	4.0	
Flash Dont Walk (s)	11.0			9.0		13.0	13.0	13.0	
Pedestrian Calls (#/hr)	0			0		0	0	0	
Act Effect Green (s)	42.0			66.0			26.0	26.0	
Actuated g/C Ratio	0.42			0.66			0.26	0.26	
v/c Ratio	0.61			0.34			0.71	0.41	
Control Delay	14.2			2.9			16.5	5.9	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

9: Woodall WBFR & Akard WB On-Ramp & Akard

	→	↗	↘	←	↖	↗	↘	↓	↙
Lane Group	EBT	EBR	WBL	WBT	WBR	SBU	SBL	SBT	SBR
Queue Delay	0.2			0.2			1.8	0.8	
Total Delay	14.4			3.0			18.3	6.6	
LOS	B			A			B	A	
Approach Delay	14.4			3.0				12.0	
Approach LOS	B			A				B	
Queue Length 50th (ft)	293			27			184	57	
Queue Length 95th (ft)	344			35			292	70	
Internal Link Dist (ft)	142			199				136	
Turn Bay Length (ft)									
Base Capacity (vph)	2096			2533			458	922	
Starvation Cap Reductn	228			697			44	277	
Spillback Cap Reductn	79			68			0	0	
Storage Cap Reductn	0			0			0	0	
Reduced v/c Ratio	0.69			0.47			0.79	0.59	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 29 (29%), Referenced to phase 2:EBT and 6:WBTL, Start of Yellow

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 10.3

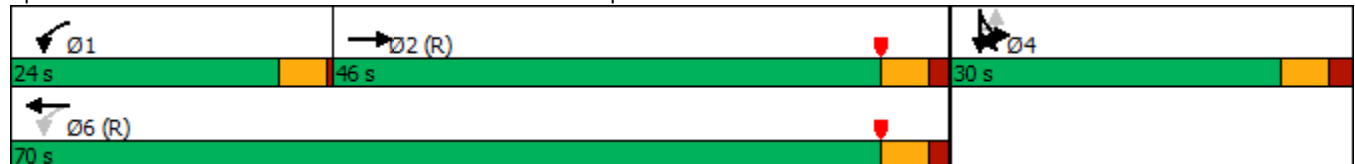
Intersection LOS: B

Intersection Capacity Utilization 69.1%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 9: Woodall WBFR & Akard WB On-Ramp & Akard



North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

10: Woodall EBFR & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↑↑↑			↑↑↑				↑↑↑			
Traffic Volume (vph)	249	1062	0	0	520	84	7	214	526	51	0	0
Future Volume (vph)	249	1062	0	0	520	84	7	214	526	51	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	1.00	1.00	0.91	0.91	0.91	0.91	0.91	0.91	1.00	1.00
Ped Bike Factor		1.00			0.99				0.98			
Frt					0.979				0.990			
Flt Protected		0.991							0.986			
Satd. Flow (prot)	0	5040	0	0	4936	0	0	0	4869	0	0	0
Flt Permitted		0.696							0.986			
Satd. Flow (perm)	0	3529	0	0	4936	0	0	0	4869	0	0	0
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)					37				11			
Link Speed (mph)		30			30				26			30
Link Distance (ft)		279			374				181			248
Travel Time (s)		6.3			8.5				4.7			5.6
Confl. Peds. (#/hr)	27		44	44		27				117		
Peak Hour Factor	0.91	0.91	0.91	0.88	0.88	0.88	0.95	0.95	0.95	0.95	0.92	0.92
Adj. Flow (vph)	274	1167	0	0	591	95	7	225	554	54	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1441	0	0	686	0	0	0	840	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	Left	Left
Median Width(ft)		0			0				0			0
Link Offset(ft)		0			0				-24			24
Crosswalk Width(ft)		16			16				16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	9	15		9	15	
Turn Type	pm+pt	NA			NA		Perm	Perm	NA			
Protected Phases	15	2			6				4			
Permitted Phases	2						4	4				
Minimum Split (s)	8.2	21.1			21.1		21.6	21.6	21.6			
Total Split (s)	23.0	67.0			44.0		33.0	33.0	33.0			
Total Split (%)	23.0%	67.0%			44.0%		33.0%	33.0%	33.0%			
Maximum Green (s)	17.8	61.9			38.9		27.4	27.4	27.4			
Yellow Time (s)	3.2	3.6			3.6		3.6	3.6	3.6			
All-Red Time (s)	2.0	1.5			1.5		2.0	2.0	2.0			
Lost Time Adjust (s)		-1.1			-1.1				-1.6			
Total Lost Time (s)		4.0			4.0				4.0			
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		4.0			4.0		4.0	4.0	4.0			
Flash Dont Walk (s)		8.0			12.0		8.0	8.0	8.0			
Pedestrian Calls (#/hr)		0			0		0	0	0			
Act Effect Green (s)		63.0			40.0				29.0			
Actuated g/C Ratio		0.63			0.40				0.29			
v/c Ratio		0.57			0.34				0.59			
Control Delay		5.4			16.5				32.1			

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	0
Future Volume (vph)	0
Ideal Flow (vphpl)	1900
Lane Util. Factor	1.00
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	0.92
Adj. Flow (vph)	0
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Enter Blocked Intersection	No
Lane Alignment	Right
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	1.00
Turning Speed (mph)	9
Turn Type	
Protected Phases	
Permitted Phases	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Maximum Green (s)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

10: Woodall EBFR & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Queue Delay		0.1			0.0				0.0			
Total Delay		5.5			16.5				32.1			
LOS		A			B				C			
Approach Delay		5.5			16.5				32.1			
Approach LOS		A			B				C			
Queue Length 50th (ft)		60			68				165			
Queue Length 95th (ft)		45			83				208			
Internal Link Dist (ft)		199			294				101			168
Turn Bay Length (ft)												
Base Capacity (vph)		2510			1996				1419			
Starvation Cap Reductn		160			0				0			
Spillback Cap Reductn		0			0				0			
Storage Cap Reductn		0			0				0			
Reduced v/c Ratio		0.61			0.34				0.59			

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 8 (8%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.59

Intersection Signal Delay: 15.6

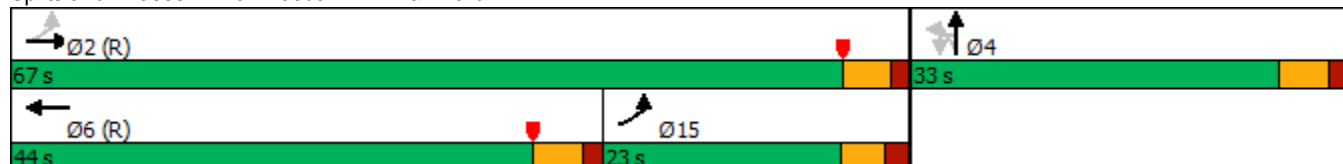
Intersection LOS: B

Intersection Capacity Utilization 65.1%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 10: Woodall EBFR & Akard





Lane Group	SBR
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

11: Field/Field #11 #12 & Woodall WBFR

												
Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↑↑↑	↗		↖	↗↑↑					↖	↗
Traffic Volume (vph)	0	795	188	2	119	838	0	0	0	0	235	452
Future Volume (vph)	0	795	188	2	119	838	0	0	0	0	235	452
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		200		0		0	0		0	0	
Storage Lanes	1		3		1		0	0		0	1	
Taper Length (ft)	25				25			25			25	
Lane Util. Factor	1.00	0.86	1.00	0.91	0.86	0.86	1.00	1.00	1.00	1.00	0.95	0.91
Ped Bike Factor			0.93		0.99	1.00						1.00
Frt			0.850									0.990
Flt Protected					0.950	0.999					0.950	0.998
Satd. Flow (prot)	0	6408	1583	0	1522	4801	0	0	0	0	1681	1671
Flt Permitted					0.165	0.940					0.950	0.998
Satd. Flow (perm)	0	6408	1477	0	261	4517	0	0	0	0	1681	1671
Right Turn on Red			Yes				Yes			Yes		
Satd. Flow (RTOR)			204									3
Link Speed (mph)		30				30			30			26
Link Distance (ft)		675				234			238			187
Travel Time (s)		15.3				5.3			5.4			4.9
Confl. Peds. (#/hr)			26		26							
Peak Hour Factor	0.92	0.92	0.92	0.91	0.91	0.91	0.91	0.92	0.92	0.92	0.96	0.96
Adj. Flow (vph)	0	864	204	2	131	921	0	0	0	0	245	471
Shared Lane Traffic (%)					10%						10%	
Lane Group Flow (vph)	0	864	204	0	120	934	0	0	0	0	220	533
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	R NA	Left	Left	Right	Left	Left	Right	Left	Left
Median Width(ft)		20				20			12			12
Link Offset(ft)		0				0			-20			24
Crosswalk Width(ft)		16				16			16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	9	15		9	15		9	15	
Turn Type		NA	Perm	custom	pm+pt	NA					Split	NA
Protected Phases		2			1	2 1					4 12	4 12
Permitted Phases			2	1	2 1							
Minimum Split (s)		23.2	23.2	8.0	8.0							
Total Split (s)		32.0	32.0	56.0	56.0							
Total Split (%)		24.6%	24.6%	43.1%	43.1%							
Maximum Green (s)		26.8	26.8	52.0	52.0							
Yellow Time (s)		5.2	5.2	3.5	3.5							
All-Red Time (s)		0.0	0.0	0.5	0.5							
Lost Time Adjust (s)		-1.2	-1.2		-1.0							
Total Lost Time (s)		4.0	4.0		3.0							
Lead/Lag		Lead	Lead	Lag	Lag							
Lead-Lag Optimize?		Yes	Yes	Yes	Yes							
Walk Time (s)		4.0	4.0									
Flash Dont Walk (s)		14.0	14.0									
Pedestrian Calls (#/hr)		0	0									
Act Effect Green (s)		28.0	28.0		82.0	79.6					38.0	38.0

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

11: Field/Field #11 #12 & Woodall WBFR

Lane Group	SBR	Ø4	Ø5	Ø6	Ø8	Ø12	Ø16
Lane Configurations							
Traffic Volume (vph)	359						
Future Volume (vph)	359						
Ideal Flow (vphpl)	1900						
Storage Length (ft)	0						
Storage Lanes	1						
Taper Length (ft)							
Lane Util. Factor	0.95						
Ped Bike Factor	0.97						
Frt	0.850						
Flt Protected							
Satd. Flow (prot)	1504						
Flt Permitted							
Satd. Flow (perm)	1460						
Right Turn on Red	Yes						
Satd. Flow (RTOR)	156						
Link Speed (mph)							
Link Distance (ft)							
Travel Time (s)							
Confl. Peds. (#/hr)	15						
Peak Hour Factor	0.96						
Adj. Flow (vph)	374						
Shared Lane Traffic (%)	10%						
Lane Group Flow (vph)	337						
Enter Blocked Intersection	No						
Lane Alignment	Right						
Median Width(ft)							
Link Offset(ft)							
Crosswalk Width(ft)							
Two way Left Turn Lane							
Headway Factor	1.00						
Turning Speed (mph)	9						
Turn Type	Perm						
Protected Phases		4	5	6	8	12	16
Permitted Phases	4 12						
Minimum Split (s)		40.1	8.0	21.9	31.0	6.0	6.0
Total Split (s)		36.0	62.0	34.0	28.0	6.0	6.0
Total Split (%)		28%	48%	26%	22%	5%	5%
Maximum Green (s)		29.9	57.0	28.6	22.0	1.0	1.0
Yellow Time (s)		6.1	5.0	5.4	6.0	5.0	5.0
All-Red Time (s)		0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)							
Total Lost Time (s)							
Lead/Lag		Lag	Lag	Lead	Lag	Lead	Lead
Lead-Lag Optimize?		Yes	Yes	Yes	Yes	Yes	Yes
Walk Time (s)		4.0		4.0	4.0		
Flash Dont Walk (s)		29.0		12.0	20.0		
Pedestrian Calls (#/hr)		0		0	0		
Act Effect Green (s)	38.0						

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

11: Field/Field #11 #12 & Woodall WBFR

												
Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Actuated g/C Ratio		0.22	0.22		0.63	0.61					0.29	0.29
v/c Ratio		0.63	0.43		0.18	0.32					0.45	1.09
Control Delay		27.5	9.9		2.0	3.0					41.0	109.6
Queue Delay		0.1	0.0		1.0	0.4					0.0	0.0
Total Delay		27.6	9.9		3.0	3.4					41.0	109.6
LOS		C	A		A	A					D	F
Approach Delay		24.2				3.4						70.1
Approach LOS		C				A						E
Queue Length 50th (ft)		197	84		6	19					158	~552
Queue Length 95th (ft)		237	155		m9	22					242	#801
Internal Link Dist (ft)		595				154			158			107
Turn Bay Length (ft)			200									
Base Capacity (vph)		1380	478		678	2878					491	490
Starvation Cap Reductn		0	0		377	1297					0	0
Spillback Cap Reductn		70	0		0	0					0	0
Storage Cap Reductn		0	0		0	0					0	0
Reduced v/c Ratio		0.66	0.43		0.40	0.59					0.45	1.09

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 58 (45%), Referenced to phase 2:EBWB, Start of Yellow

Natural Cycle: 120

Control Type: Pretimed

Maximum v/c Ratio: 1.09

Intersection Signal Delay: 32.9

Intersection LOS: C

Intersection Capacity Utilization 68.9%

ICU Level of Service C

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

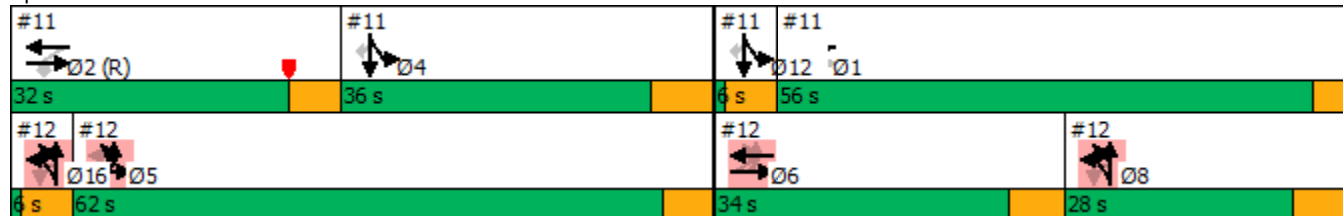
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: Field/Field #11 #12 & Woodall WBFR



Lane Group	SBR	Ø4	Ø5	Ø6	Ø8	Ø12	Ø16
Actuated g/C Ratio	0.29						
v/c Ratio	0.63						
Control Delay	26.6						
Queue Delay	0.0						
Total Delay	26.6						
LOS	C						
Approach Delay							
Approach LOS							
Queue Length 50th (ft)	138						
Queue Length 95th (ft)	252						
Internal Link Dist (ft)							
Turn Bay Length (ft)							
Base Capacity (vph)	537						
Starvation Cap Reductn	0						
Spillback Cap Reductn	0						
Storage Cap Reductn	0						
Reduced v/c Ratio	0.63						
Intersection Summary							

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour
12: Woodall EBFR & Field #11 #12 & Field EB On-Ramp

												
Lane Group	EBU	EBL2	EBL	EBT	WBU	WBT	WBR	WBR2	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Volume (vph)	1	148	0	906	2	763	90	109	61	184	646	247
Future Volume (vph)	1	148	0	906	2	763	90	109	61	184	646	247
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)			0				0			0		0
Storage Lanes			1				1			1		0
Taper Length (ft)			25							25		
Lane Util. Factor	0.91	0.91	1.00	0.91	0.91	0.91	1.00	0.91	0.91	0.86	0.86	0.91
Ped Bike Factor							0.97					
Frt							0.850				0.959	
Flt Protected			0.950							0.950	0.999	
Satd. Flow (prot)	0	0	1770	5085	0	5085	1583	0	0	1522	4604	0
Flt Permitted			0.135			0.938				0.950	0.999	
Satd. Flow (perm)	0	0	251	5085	0	4770	1530	0	0	1522	4604	0
Right Turn on Red								Yes				Yes
Satd. Flow (RTOR)							162				67	
Link Speed (mph)				30		30					30	
Link Distance (ft)				234		419					191	
Travel Time (s)				5.3		9.5					4.3	
Confl. Peds. (#/hr)		9					9					
Peak Hour Factor	0.92	0.92	0.92	0.92	0.89	0.89	0.89	0.89	0.87	0.87	0.87	0.87
Adj. Flow (vph)	1	161	0	985	2	857	101	122	70	211	743	284
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	0	0	162	985	0	859	223	0	0	260	1048	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Left	R NA	Left	Right	Right	R NA	Left	Left	Right
Median Width(ft)				20		12					12	
Link Offset(ft)				0		12					-24	
Crosswalk Width(ft)				16		16					16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15	15		9		9	9	9	15		9
Turn Type	custom	pm+pt	pm+pt	NA	Perm	NA	Perm		Perm	Split	NA	
Protected Phases		5	5	5 6		6				8 16	8 16	
Permitted Phases	5	5 6	5 6		6		6		8 16			
Minimum Split (s)	8.0	8.0	8.0		21.9	21.9	21.9					
Total Split (s)	62.0	62.0	62.0		34.0	34.0	34.0					
Total Split (%)	47.7%	47.7%	47.7%		26.2%	26.2%	26.2%					
Maximum Green (s)	57.0	57.0	57.0		28.6	28.6	28.6					
Yellow Time (s)	5.0	5.0	5.0		5.4	5.4	5.4					
All-Red Time (s)	0.0	0.0	0.0		0.0	0.0	0.0					
Lost Time Adjust (s)			-1.0			-1.4	-1.4					
Total Lost Time (s)			4.0			4.0	4.0					
Lead/Lag	Lag	Lag	Lag		Lead	Lead	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes	Yes					
Walk Time (s)					4.0	4.0	4.0					
Flash Dont Walk (s)					12.0	12.0	12.0					
Pedestrian Calls (#/hr)					0	0	0					
Act Effect Green (s)			88.0	92.0		30.0	30.0			30.0	30.0	

Lane Group	Ø1	Ø2	Ø4	Ø8	Ø12	Ø16
Lane Configurations						
Traffic Volume (vph)						
Future Volume (vph)						
Ideal Flow (vphpl)						
Storage Length (ft)						
Storage Lanes						
Taper Length (ft)						
Lane Util. Factor						
Ped Bike Factor						
Frt						
Flt Protected						
Satd. Flow (prot)						
Flt Permitted						
Satd. Flow (perm)						
Right Turn on Red						
Satd. Flow (RTOR)						
Link Speed (mph)						
Link Distance (ft)						
Travel Time (s)						
Confl. Peds. (#/hr)						
Peak Hour Factor						
Adj. Flow (vph)						
Shared Lane Traffic (%)						
Lane Group Flow (vph)						
Enter Blocked Intersection						
Lane Alignment						
Median Width(ft)						
Link Offset(ft)						
Crosswalk Width(ft)						
Two way Left Turn Lane						
Headway Factor						
Turning Speed (mph)						
Turn Type						
Protected Phases	1	2	4	8	12	16
Permitted Phases						
Minimum Split (s)	8.0	23.2	40.1	31.0	6.0	6.0
Total Split (s)	56.0	32.0	36.0	28.0	6.0	6.0
Total Split (%)	43%	25%	28%	22%	5%	5%
Maximum Green (s)	52.0	26.8	29.9	22.0	1.0	1.0
Yellow Time (s)	3.5	5.2	6.1	6.0	5.0	5.0
All-Red Time (s)	0.5	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)						
Total Lost Time (s)						
Lead/Lag	Lag	Lead	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes
Walk Time (s)		4.0	4.0	4.0		
Flash Dont Walk (s)		14.0	29.0	20.0		
Pedestrian Calls (#/hr)		0	0	0		
Act Effect Green (s)						

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour
12: Woodall EBFR & Field #11 #12 & Field EB On-Ramp

												
Lane Group	EBU	EBL2	EBL	EBT	WBU	WBT	WBR	WBR2	NBU	NBL	NBT	NBR
Actuated g/C Ratio			0.68	0.71		0.23	0.23			0.23	0.23	
v/c Ratio			0.19	0.27		0.78	0.47			0.74	0.94	
Control Delay			0.7	1.5		46.2	12.2			60.4	62.1	
Queue Delay			0.6	0.7		0.4	0.0			0.0	9.2	
Total Delay			1.3	2.2		46.5	12.2			60.4	71.3	
LOS			A	A		D	B			E	E	
Approach Delay				2.1		39.5					69.1	
Approach LOS				A		D					E	
Queue Length 50th (ft)			1	2		264	35			238	320	
Queue Length 95th (ft)			m2	m2		310	103			343	#388	
Internal Link Dist (ft)				154		339					111	
Turn Bay Length (ft)												
Base Capacity (vph)			847	3598		1100	477			351	1114	
Starvation Cap Reductn			425	2136		13	0			0	0	
Spillback Cap Reductn			0	308		38	0			0	67	
Storage Cap Reductn			0	0		0	0			0	0	
Reduced v/c Ratio			0.38	0.67		0.81	0.47			0.74	1.00	

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 58 (45%), Referenced to phase 2:EBWB, Start of Yellow

Natural Cycle: 120

Control Type: Pretimed

Maximum v/c Ratio: 1.09

Intersection Signal Delay: 38.3

Intersection LOS: D

Intersection Capacity Utilization 59.5%

ICU Level of Service B

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: Woodall EBFR & Field #11 #12 & Field EB On-Ramp

 #11  Ø2 (R) 32 s		 #11  Ø4 36 s	 #11  Ø12 Ø1 6 s 56 s	
 #12  Ø16 Ø5 6 s 62 s	 #12  Ø6 34 s		 #12  Ø8 28 s	

Lane Group	Ø1	Ø2	Ø4	Ø8	Ø12	Ø16
Actuated g/C Ratio						
v/c Ratio						
Control Delay						
Queue Delay						
Total Delay						
LOS						
Approach Delay						
Approach LOS						
Queue Length 50th (ft)						
Queue Length 95th (ft)						
Internal Link Dist (ft)						
Turn Bay Length (ft)						
Base Capacity (vph)						
Starvation Cap Reductn						
Spillback Cap Reductn						
Storage Cap Reductn						
Reduced v/c Ratio						
Intersection Summary						

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

13: Woodall WBFR & Harwood

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↑↑			↑↑↑	
Traffic Volume (vph)	0	62	0	0	943	346
Future Volume (vph)	0	62	0	0	943	346
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.88	1.00	1.00	0.91	0.91
Ped Bike Factor		0.90			0.99	
Frt		0.850			0.960	
Flt Protected						
Satd. Flow (prot)	0	2787	0	0	4830	0
Flt Permitted						
Satd. Flow (perm)	0	2513	0	0	4830	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		132			157	
Link Speed (mph)	30			30	24	
Link Distance (ft)	242			217	260	
Travel Time (s)	5.5			4.9	7.4	
Confl. Peds. (#/hr)		47				15
Peak Hour Factor	0.77	0.77	0.92	0.92	0.83	0.83
Adj. Flow (vph)	0	81	0	0	1136	417
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	81	0	0	1553	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			12	-12	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Turn Type		Perm			NA	
Protected Phases					4	
Permitted Phases		2				
Minimum Split (s)		20.0			20.0	
Total Split (s)		38.0			62.0	
Total Split (%)		38.0%			62.0%	
Maximum Green (s)		34.0			58.0	
Yellow Time (s)		3.5			3.5	
All-Red Time (s)		0.5			0.5	
Lost Time Adjust (s)		0.0			0.0	
Total Lost Time (s)		4.0			4.0	
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)		5.0			5.0	
Flash Dont Walk (s)		11.0			11.0	
Pedestrian Calls (#/hr)		0			0	
Act Effct Green (s)		34.0			58.0	
Actuated g/C Ratio		0.34			0.58	
v/c Ratio		0.09			0.54	
Control Delay		1.0			4.8	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

13: Woodall WBFR & Harwood

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Queue Delay		0.0			0.7	
Total Delay		1.0			5.5	
LOS		A			A	
Approach Delay	1.0				5.5	
Approach LOS	A				A	
Queue Length 50th (ft)		0			53	
Queue Length 95th (ft)		0			60	
Internal Link Dist (ft)	162			137	180	
Turn Bay Length (ft)						
Base Capacity (vph)		941			2867	
Starvation Cap Reductn		0			845	
Spillback Cap Reductn		0			0	
Storage Cap Reductn		0			0	
Reduced v/c Ratio		0.09			0.77	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 91 (91%), Referenced to phase 2:EBR, Start of Yellow

Natural Cycle: 40

Control Type: Pretimed

Maximum v/c Ratio: 0.54

Intersection Signal Delay: 5.2

Intersection LOS: A

Intersection Capacity Utilization 46.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 13: Woodall WBFR & Harwood



North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

14: Woodall EBFR & Harwood

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø2
Lane Configurations			↑↑↑				
Traffic Volume (vph)	0	0	616	259	0	0	
Future Volume (vph)	0	0	616	259	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	0.91	0.91	1.00	1.00	
Ped Bike Factor			0.99				
Frt			0.956				
Flt Protected							
Satd. Flow (prot)	0	0	4814	0	0	0	
Flt Permitted							
Satd. Flow (perm)	0	0	4814	0	0	0	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)			281				
Link Speed (mph)	30		26			30	
Link Distance (ft)	974		416			261	
Travel Time (s)	22.1		10.9			5.9	
Confl. Peds. (#/hr)				17			
Peak Hour Factor	0.92	0.92	0.89	0.89	0.92	0.92	
Adj. Flow (vph)	0	0	692	291	0	0	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	0	983	0	0	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Right	Left	Left	
Median Width(ft)	0		0			0	
Link Offset(ft)	24		0			0	
Crosswalk Width(ft)	16		16			16	
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9		9	15		
Turn Type			NA				
Protected Phases			4			2	
Permitted Phases							
Minimum Split (s)			20.9			21.0	
Total Split (s)			27.0			23.0	
Total Split (%)			54.0%			46%	
Maximum Green (s)			22.1			18.0	
Yellow Time (s)			3.6			3.6	
All-Red Time (s)			1.3			1.4	
Lost Time Adjust (s)			-0.9				
Total Lost Time (s)			4.0				
Lead/Lag							
Lead-Lag Optimize?							
Walk Time (s)			4.0			4.0	
Flash Dont Walk (s)			8.0			8.0	
Pedestrian Calls (#/hr)			0			0	
Act Effect Green (s)			23.0				
Actuated g/C Ratio			0.46				
v/c Ratio			0.42				
Control Delay			12.9				

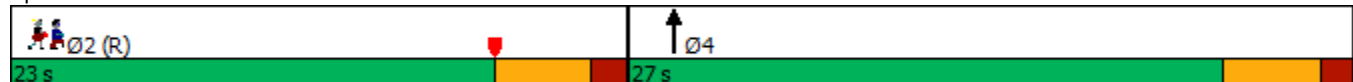
North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

14: Woodall EBFR & Harwood

							
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø2
Queue Delay			0.0				
Total Delay			12.9				
LOS			B				
Approach Delay			12.9				
Approach LOS			B				
Queue Length 50th (ft)			99				
Queue Length 95th (ft)			131				
Internal Link Dist (ft)	894		336			181	
Turn Bay Length (ft)							
Base Capacity (vph)			2366				
Starvation Cap Reductn			0				
Spillback Cap Reductn			8				
Storage Cap Reductn			0				
Reduced v/c Ratio			0.42				
Intersection Summary							
Area Type:	Other						
Cycle Length: 50							
Actuated Cycle Length: 50							
Offset: 32 (64%), Referenced to phase 2:Ped, Start of Yellow							
Natural Cycle: 45							
Control Type: Pretimed							
Maximum v/c Ratio: 0.42							
Intersection Signal Delay: 12.9				Intersection LOS: B			
Intersection Capacity Utilization 21.5%				ICU Level of Service A			
Analysis Period (min) 15							

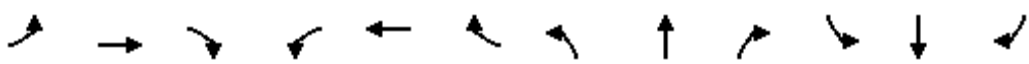
Splits and Phases: 14: Woodall EBFR & Harwood



North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

15: Woodall WBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑						↑↑↑	
Traffic Volume (vph)	0	0	0	301	829	0	0	0	0	0	996	368
Future Volume (vph)	0	0	0	301	829	0	0	0	0	0	996	368
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	0.91	0.91
Ped Bike Factor					0.96						0.97	
Frt											0.960	
Flt Protected					0.987							
Satd. Flow (prot)	0	0	0	0	5019	0	0	0	0	0	4740	0
Flt Permitted					0.987							
Satd. Flow (perm)	0	0	0	0	4832	0	0	0	0	0	4740	0
Right Turn on Red			Yes	Yes		Yes				Yes		Yes
Satd. Flow (RTOR)					25						97	
Link Speed (mph)		30			30			30			24	
Link Distance (ft)		836			267			260			433	
Travel Time (s)		19.0			6.1			5.9			12.3	
Confl. Peds. (#/hr)				56								39
Peak Hour Factor	0.92	0.92	0.92	0.91	0.91	0.91	0.92	0.92	0.92	0.85	0.85	0.85
Adj. Flow (vph)	0	0	0	331	911	0	0	0	0	0	1172	433
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	1242	0	0	0	0	0	1605	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		20			-20			12			-12	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type				Perm	NA						NA	
Protected Phases					2						4	
Permitted Phases				2								
Minimum Split (s)				21.2	21.2						21.2	
Total Split (s)				54.0	54.0						46.0	
Total Split (%)				54.0%	54.0%						46.0%	
Maximum Green (s)				48.8	48.8						40.8	
Yellow Time (s)				3.6	3.6						3.6	
All-Red Time (s)				1.6	1.6						1.6	
Lost Time Adjust (s)					-1.2						-1.2	
Total Lost Time (s)					4.0						4.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)				4.0	4.0						4.0	
Flash Dont Walk (s)				8.0	8.0						8.0	
Pedestrian Calls (#/hr)				0	0						0	
Act Effect Green (s)					50.0						42.0	
Actuated g/C Ratio					0.50						0.42	
v/c Ratio					0.51						0.78	
Control Delay					7.8						24.8	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

15: Woodall WBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay					0.1						1.0	
Total Delay					7.9						25.8	
LOS					A						C	
Approach Delay					7.9						25.8	
Approach LOS					A						C	
Queue Length 50th (ft)					45						219	
Queue Length 95th (ft)					53						m207	
Internal Link Dist (ft)		756			187			180			353	
Turn Bay Length (ft)												
Base Capacity (vph)					2428						2047	
Starvation Cap Reductn					253						213	
Spillback Cap Reductn					0						0	
Storage Cap Reductn					0						0	
Reduced v/c Ratio					0.57						0.88	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 87 (87%), Referenced to phase 2:WBTL and 6:, Start of Yellow

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 18.0

Intersection LOS: B

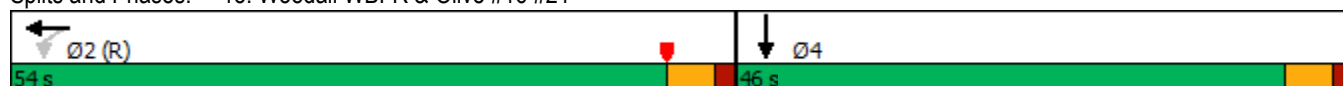
Intersection Capacity Utilization 57.2%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 15: Woodall WBFR & Olive #16 #21



North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

16: Woodall EBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑	↑		↑↑↑				
Traffic Volume (vph)	0	0	0	0	1039	924	108	501	0	0	0	0
Future Volume (vph)	0	0	0	0	1039	924	108	501	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00
Ped Bike Factor						0.95		0.99				
Frt						0.850						
Flt Protected								0.991				
Satd. Flow (prot)	0	0	0	0	5085	1583	0	5040	0	0	0	0
Flt Permitted								0.991				
Satd. Flow (perm)	0	0	0	0	5085	1510	0	4995	0	0	0	0
Right Turn on Red			Yes			Yes	Yes		Yes			Yes
Satd. Flow (RTOR)						128		55				
Link Speed (mph)		30			30			26			30	
Link Distance (ft)		267			231			261			427	
Travel Time (s)		6.1			5.3			6.8			9.7	
Confl. Peds. (#/hr)						14	20					
Peak Hour Factor	0.92	0.92	0.92	0.95	0.95	0.95	0.80	0.80	0.80	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	1094	973	135	626	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	1094	973	0	761	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		20			-20			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type					NA	Perm	Perm	NA				
Protected Phases					2			4				
Permitted Phases						2	4					
Minimum Split (s)					22.1	22.1	21.1	21.1				
Total Split (s)					57.5	57.5	42.5	42.5				
Total Split (%)					57.5%	57.5%	42.5%	42.5%				
Maximum Green (s)					51.4	51.4	37.4	37.4				
Yellow Time (s)					3.6	3.6	3.6	3.6				
All-Red Time (s)					2.5	2.5	1.5	1.5				
Lost Time Adjust (s)					-2.1	-2.1		-1.1				
Total Lost Time (s)					4.0	4.0		4.0				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)					4.0	4.0	4.0	4.0				
Flash Dont Walk (s)					8.0	8.0	8.0	8.0				
Pedestrian Calls (#/hr)					0	0	0	0				
Act Effct Green (s)					53.5	53.5		38.5				
Actuated g/C Ratio					0.54	0.54		0.38				
v/c Ratio					0.40	1.12		0.39				
Control Delay					14.3	92.0		14.8				

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

16: Woodall EBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay					0.0	0.1		0.8				
Total Delay					14.3	92.1		15.7				
LOS					B	F		B				
Approach Delay					50.9			15.7				
Approach LOS					D			B				
Queue Length 50th (ft)					143	~681		72				
Queue Length 95th (ft)					176	#926		75				
Internal Link Dist (ft)		187			151			181			347	
Turn Bay Length (ft)												
Base Capacity (vph)					2720	867		1956				
Starvation Cap Reductn					0	0		828				
Spillback Cap Reductn					61	16		672				
Storage Cap Reductn					0	0		0				
Reduced v/c Ratio					0.41	1.14		0.67				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 85 (85%), Referenced to phase 2:WBT and 6:, Start of Yellow

Natural Cycle: 90

Control Type: Pretimed

Maximum v/c Ratio: 1.12

Intersection Signal Delay: 41.4

Intersection LOS: D

Intersection Capacity Utilization 77.2%

ICU Level of Service D

Analysis Period (min) 15

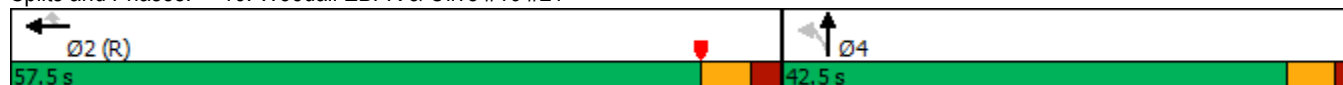
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 16: Woodall EBFR & Olive #16 #21



North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

17: Woodall WBFR & Pearl #17 #18

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations			↑↑↑	↑	↑	↑↑↑						↑↑↑
Traffic Volume (vph)	1	0	993	114	157	1021	0	0	0	0	163	1117
Future Volume (vph)	1	0	993	114	157	1021	0	0	0	0	163	1117
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		250		0	0		0	0		0	0	
Storage Lanes		1		1	1		0	0		0	0	
Taper Length (ft)		25			25			25			25	
Lane Util. Factor	0.91	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	0.91	0.91
Ped Bike Factor				0.98								0.94
Frt				0.850								0.945
Flt Protected					0.950							0.996
Satd. Flow (prot)	0	0	5085	1583	1770	5085	0	0	0	0	0	4476
Flt Permitted			0.939		0.122							0.996
Satd. Flow (perm)	0	0	4775	1546	227	5085	0	0	0	0	0	4476
Right Turn on Red				Yes			Yes			Yes		
Satd. Flow (RTOR)				88								49
Link Speed (mph)			30			30			30			30
Link Distance (ft)			1034			257			433			138
Travel Time (s)			23.5			5.8			9.8			3.1
Confl. Peds. (#/hr)				4	4							
Peak Hour Factor	0.87	0.87	0.87	0.87	0.94	0.94	0.94	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	0	1141	131	167	1086	0	0	0	0	177	1214
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	1142	131	167	1086	0	0	0	0	0	2198
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left
Median Width(ft)			12			12			0			0
Link Offset(ft)			0			0			0			0
Crosswalk Width(ft)			16			16			16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15		9	15		9	15		9	15	
Turn Type	Perm		NA	Perm	pm+pt	NA					Split	NA
Protected Phases			2		11	6 11					4	4
Permitted Phases	2			2	6 11							
Minimum Split (s)	21.1		21.1	21.1	8.0						22.0	22.0
Total Split (s)	35.0		35.0	35.0	16.0						49.0	49.0
Total Split (%)	35.0%		35.0%	35.0%	16.0%						49.0%	49.0%
Maximum Green (s)	29.9		29.9	29.9	12.0						43.0	43.0
Yellow Time (s)	3.6		3.6	3.6	3.5						3.9	3.9
All-Red Time (s)	1.5		1.5	1.5	0.5						2.1	2.1
Lost Time Adjust (s)			-1.1	-1.1	-1.0							-2.0
Total Lost Time (s)			4.0	4.0	3.0							4.0
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0		4.0	4.0							4.0	4.0
Flash Dont Walk (s)	6.0		6.0	6.0							6.0	6.0
Pedestrian Calls (#/hr)	0		0	0							0	0
Act Effect Green (s)			31.0	31.0	48.0	46.9						45.0

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

17: Woodall WBFR & Pearl #17 #18

Lane Group	SBR	Ø6
Lane Configurations		
Traffic Volume (vph)	742	
Future Volume (vph)	742	
Ideal Flow (vphpl)	1900	
Storage Length (ft)	0	
Storage Lanes	0	
Taper Length (ft)		
Lane Util. Factor	0.91	
Ped Bike Factor		
Frt		
Flt Protected		
Satd. Flow (prot)	0	
Flt Permitted		
Satd. Flow (perm)	0	
Right Turn on Red	Yes	
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Confl. Peds. (#/hr)	56	
Peak Hour Factor	0.92	
Adj. Flow (vph)	807	
Shared Lane Traffic (%)		
Lane Group Flow (vph)	0	
Enter Blocked Intersection	No	
Lane Alignment	Right	
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor	1.00	
Turning Speed (mph)	9	
Turn Type		
Protected Phases	6	
Permitted Phases		
Minimum Split (s)	21.1	
Total Split (s)	51.0	
Total Split (%)	51%	
Maximum Green (s)	45.9	
Yellow Time (s)	3.6	
All-Red Time (s)	1.5	
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Walk Time (s)	4.0	
Flash Dont Walk (s)	6.0	
Pedestrian Calls (#/hr)	0	
Act Effect Green (s)		

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

17: Woodall WBFR & Pearl #17 #18

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Actuated g/C Ratio			0.31	0.31	0.48	0.47						0.45
v/c Ratio			0.77	0.24	0.54	0.46						1.14dr
Control Delay			15.9	1.1	20.4	9.0						71.6
Queue Delay			0.0	0.0	48.8	0.1						0.4
Total Delay			15.9	1.1	69.3	9.1						72.1
LOS			B	A	E	A						E
Approach Delay			14.4			17.1						72.1
Approach LOS			B			B						E
Queue Length 50th (ft)			58	0	42	66						~569
Queue Length 95th (ft)			70	m1	m86	m75						#668
Internal Link Dist (ft)			954			177			353			58
Turn Bay Length (ft)												
Base Capacity (vph)			1480	539	309	2384						2041
Starvation Cap Reductn			0	0	149	355						0
Spillback Cap Reductn			0	0	0	0						2
Storage Cap Reductn			0	0	0	0						0
Reduced v/c Ratio			0.77	0.24	1.04	0.54						1.08

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 77 (77%), Referenced to phase 2:EBTU and 6:WBTL, Start of Yellow

Natural Cycle: 80

Control Type: Pretimed

Maximum v/c Ratio: 1.08

Intersection Signal Delay: 42.0

Intersection LOS: D

Intersection Capacity Utilization 81.0%

ICU Level of Service D

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

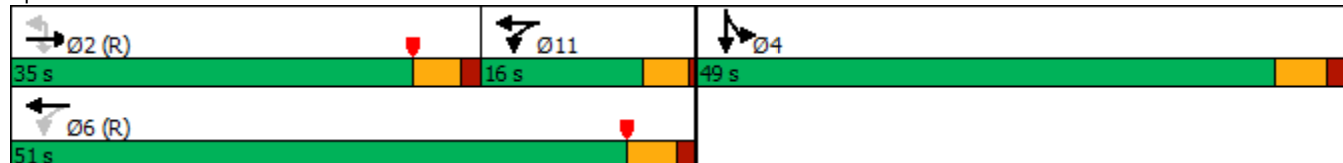
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 17: Woodall WBFR & Pearl #17 #18





Lane Group	SBR	Ø6
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

18: Woodall EBFR & Pearl #17 #18

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 			  			  				
Traffic Volume (vph)	327	840	0	0	986	59	204	802	407	0	0	0
Future Volume (vph)	327	840	0	0	986	59	204	802	407	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	250		0	0		0	0		0
Storage Lanes	2		0	1		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	1.00	0.91	1.00	0.91	0.91	0.91	1.00	1.00	1.00
Ped Bike Factor	0.98					0.87		0.98				
Frt						0.850		0.957				
Flt Protected	0.950							0.993				
Satd. Flow (prot)	3433	3539	0	0	5085	1583	0	4751	0	0	0	0
Flt Permitted	0.157							0.993				
Satd. Flow (perm)	557	3539	0	0	5085	1376	0	4751	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						87		104				
Link Speed (mph)		30			30			26			30	
Link Distance (ft)		257			1016			427			143	
Travel Time (s)		5.8			23.1			11.2			3.3	
Confl. Peds. (#/hr)	89					89			19			
Peak Hour Factor	0.89	0.89	0.89	0.96	0.96	0.96	0.91	0.91	0.91	0.92	0.92	0.92
Adj. Flow (vph)	367	944	0	0	1027	61	224	881	447	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	367	944	0	0	1027	61	0	1552	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			0			0	
Link Offset(ft)		0			0			-12			12	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA			NA	Perm	Perm	NA				
Protected Phases	5	2			6			4				
Permitted Phases	2					6	4					
Minimum Split (s)	8.0	21.4			27.0	27.0	23.1	23.1				
Total Split (s)	25.0	66.0			41.0	41.0	34.0	34.0				
Total Split (%)	25.0%	66.0%			41.0%	41.0%	34.0%	34.0%				
Maximum Green (s)	20.0	60.6			36.0	36.0	28.0	28.0				
Yellow Time (s)	3.0	3.6			3.6	3.6	3.6	3.6				
All-Red Time (s)	2.0	1.8			1.4	1.4	2.4	2.4				
Lost Time Adjust (s)	-1.0	-1.4			-1.0	-1.0		-2.0				
Total Lost Time (s)	4.0	4.0			4.0	4.0		4.0				
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Walk Time (s)		4.0			4.0	4.0	4.0	4.0				
Flash Dont Walk (s)		8.0			18.0	18.0	8.0	8.0				
Pedestrian Calls (#/hr)		0			0	0	0	0				
Act Effect Green (s)	62.0	62.0			37.0	37.0		30.0				

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - AM Peak Hour

18: Woodall EBFR & Pearl #17 #18

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.62	0.62			0.37	0.37		0.30				
v/c Ratio	0.39	0.43			0.55	0.11		1.04				
Control Delay	20.5	1.9			26.2	2.7		55.4				
Queue Delay	0.5	0.3			0.0	0.0		1.5				
Total Delay	21.0	2.2			26.2	2.7		56.9				
LOS	C	A			C	A		E				
Approach Delay		7.5			24.9			56.9				
Approach LOS		A			C			E				
Queue Length 50th (ft)	51	27			186	0		~385				
Queue Length 95th (ft)	m75	m31			230	15		m#372				
Internal Link Dist (ft)		177			936			347				63
Turn Bay Length (ft)												
Base Capacity (vph)	949	2194			1881	563		1498				
Starvation Cap Reductn	250	623			0	0		6				
Spillback Cap Reductn	0	0			0	0		0				
Storage Cap Reductn	0	0			0	0		0				
Reduced v/c Ratio	0.53	0.60			0.55	0.11		1.04				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 95 (95%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 1.04

Intersection Signal Delay: 31.7

Intersection LOS: C

Intersection Capacity Utilization 81.0%

ICU Level of Service D

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Woodall EBFR & Pearl #17 #18



Intersection												
Int Delay, s/veh	0.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑↑								↑↑	↑		
Traffic Vol, veh/h	86	708	104	0	0	0	0	0	1	35	0	0
Future Vol, veh/h	86	708	104	0	0	0	0	0	1	35	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	0	-	-
Veh in Median Storage, #	-	0	-	-	16979	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	93	770	113	0	0	0	0	0	1	38	0	0

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	0	0	0	-	-	-	442	494	-
Stage 1	-	-	-	-	-	-	-	0	-
Stage 2	-	-	-	-	-	-	-	494	-
Critical Hdwy	5.34	-	-	-	-	-	7.14	6.44	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	6.74	-
Follow-up Hdwy	3.12	-	-	-	-	-	3.92	3.82	-
Pot Cap-1 Maneuver	-	-	-	0	0	0	482	500	0
Stage 1	-	-	-	0	0	-	-	0	0
Stage 2	-	-	-	0	0	-	-	480	0
Platoon blocked, %	-	-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	-	482	499	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	499	-
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	479	-

Approach	EB	NB	SB
HCM Control Delay, s		12.5	12.8
HCM LOS		B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	482	-	-	-	499
HCM Lane V/C Ratio	0.002	-	-	-	0.076
HCM Control Delay (s)	12.5	-	-	-	12.8
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗			↑↑↑	
Traffic Vol, veh/h	0	60	0	0	821	285
Future Vol, veh/h	0	60	0	0	821	285
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	16974	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	65	0	0	883	306

Major/Minor	Minor2		Major2	
Conflicting Flow All	-	595	-	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	7.14	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	3.92	-	-
Pot Cap-1 Maneuver	0	383	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-
Platoon blocked, %			-	-
Mov Cap-1 Maneuver	-	383	-	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	SB
HCM Control Delay, s	16.3	0
HCM LOS	C	

Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	383	-	-
HCM Lane V/C Ratio	0.168	-	-
HCM Control Delay (s)	16.3	-	-
HCM Lane LOS	C	-	-
HCM 95th %tile Q(veh)	0.6	-	-

Intersection												
Int Delay, s/veh	1.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔			↔			↔	
Traffic Vol, veh/h	6	62	115	33	302	8	17	0	8	2	0	6
Future Vol, veh/h	6	62	115	33	302	8	17	0	8	2	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	67	125	36	328	9	18	0	9	2	0	7
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	337	0	0	192	0	0	380	553	96	453	611	169
Stage 1	-	-	-	-	-	-	144	144	-	405	405	-
Stage 2	-	-	-	-	-	-	236	409	-	48	206	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1219	-	-	1379	-	-	552	440	942	490	407	845
Stage 1	-	-	-	-	-	-	844	777	-	593	597	-
Stage 2	-	-	-	-	-	-	746	594	-	959	730	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1219	-	-	1379	-	-	532	423	942	471	391	845
Mov Cap-2 Maneuver	-	-	-	-	-	-	532	423	-	471	391	-
Stage 1	-	-	-	-	-	-	838	772	-	589	578	-
Stage 2	-	-	-	-	-	-	717	575	-	943	725	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.3			0.8			11.1			10.2		
HCM LOS							B			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	618	1219	-	-	1379	-	-	705				
HCM Lane V/C Ratio	0.044	0.005	-	-	0.026	-	-	0.012				
HCM Control Delay (s)	11.1	8	0	-	7.7	0.1	-	10.2				
HCM Lane LOS	B	A	A	-	A	A	-	B				
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	0				

Intersection														
Int Delay, s/veh	2.3													
Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↕↕			↕↕				↕			↕	
Traffic Vol, veh/h	2	148	188	43	30	138	154	1	1	1	0	0	0	0
Future Vol, veh/h	2	148	188	43	30	138	154	1	1	1	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	-	None	-	-	None	-	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	-	0	-	-	0	-	-	-	0	-	-	0	-
Grade, %	-	-	0	-	-	0	-	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	161	204	47	33	150	167	1	1	1	0	0	0	0
Major/Minor	Major1			Major2			Minor1			Minor2				
Conflicting Flow All	317	317	0	0	251	0	0	0	695	937	126	729	877	159
Stage 1	-	-	-	-	-	-	-	0	554	554	-	300	300	-
Stage 2	-	-	-	-	-	-	-	0	141	383	-	429	577	-
Critical Hdwy	6.44	4.14	-	-	4.14	-	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.52	2.22	-	-	2.22	-	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	903	1240	-	-	1311	-	-	0	329	263	901	311	285	858
Stage 1	-	-	-	-	-	-	-	0	484	512	-	684	664	-
Stage 2	-	-	-	-	-	-	-	0	847	610	-	574	500	-
Platoon blocked, %			-	-		-	-	-						
Mov Cap-1 Maneuver	1234	1234	-	-	1311	-	-	0	283	216	901	267	234	858
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	0	283	216	-	267	234	-
Stage 1	-	-	-	-	-	-	-	0	409	433	-	579	643	-
Stage 2	-	-	-	-	-	-	-	0	821	591	-	484	423	-
Approach	EB			WB			NB			SB				
HCM Control Delay, s	3.5			0.8			19.8			0				
HCM LOS							C			A				
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1						
Capacity (veh/h)	245	1234	-	-	1311	-	-	-						
HCM Lane V/C Ratio	0.009	0.13	-	-	0.025	-	-	-						
HCM Control Delay (s)	19.8	8.4	0.5	-	7.8	0.1	-	0						
HCM Lane LOS	C	A	A	-	A	A	-	A						
HCM 95th %tile Q(veh)	0	0.4	-	-	0.1	-	-	-						

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour

1: McKinney & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	174	123	108	15	107	92	23	273	20	10	74	350
Future Volume (vph)	174	123	108	15	107	92	23	273	20	10	74	350
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor	0.95	0.95			0.96			0.99				0.97
Frt		0.930			0.935			0.990				0.979
Flt Protected	0.950				0.997			0.996				0.992
Satd. Flow (prot)	1770	1640	0	0	3169	0	0	3459	0	0	0	3376
Flt Permitted	0.950				0.921			0.911				0.804
Satd. Flow (perm)	1675	1640	0	0	2916	0	0	3157	0	0	0	2701
Right Turn on Red			Yes			Yes			Yes			
Satd. Flow (RTOR)		51			130			10				19
Link Speed (mph)		30			30			30				30
Link Distance (ft)		424			269			526				348
Travel Time (s)		9.6			6.1			12.0				7.9
Confl. Peds. (#/hr)	46		59	59		46	67		72		72	
Peak Hour Factor	0.80	0.80	0.80	0.71	0.71	0.71	0.92	0.92	0.92	0.84	0.84	0.84
Adj. Flow (vph)	218	154	135	21	151	130	25	297	22	12	88	417
Shared Lane Traffic (%)												
Lane Group Flow (vph)	218	289	0	0	302	0	0	344	0	0	0	600
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	R NA	Left	Left
Median Width(ft)		12			12			0				0
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	9	15	
Turn Type	Prot	NA		Perm	NA		pm+pt	NA		Perm	Perm	NA
Protected Phases	8!				4!		5	2				6
Permitted Phases		8		4			2			6	6	
Minimum Split (s)	23.4	23.4		23.4	23.4		8.0	23.4		23.4	23.4	23.4
Total Split (s)	44.0	44.0		44.0	44.0		19.0	56.0		37.0	37.0	37.0
Total Split (%)	44.0%	44.0%		44.0%	44.0%		19.0%	56.0%		37.0%	37.0%	37.0%
Maximum Green (s)	38.6	38.6		38.6	38.6		15.0	50.6		31.6	31.6	31.6
Yellow Time (s)	3.6	3.6		3.6	3.6		3.5	3.2		3.2	3.2	3.2
All-Red Time (s)	1.8	1.8		1.8	1.8		0.5	2.2		2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0			0.0			0.0				0.0
Total Lost Time (s)	5.4	5.4			5.4			5.4				5.4
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Walk Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	4.0
Flash Dont Walk (s)	13.0	13.0		13.0	13.0			13.0		13.0	13.0	13.0
Pedestrian Calls (#/hr)	0	0		0	0			0		0	0	0
Act Effct Green (s)	38.6	38.6			38.6			50.6				31.6
Actuated g/C Ratio	0.39	0.39			0.39			0.51				0.32
v/c Ratio	0.32	0.44			0.25			0.21				0.69
Control Delay	15.8	13.1			11.2			23.8				25.9

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	70
Future Volume (vph)	70
Ideal Flow (vphpl)	1900
Lane Util. Factor	0.95
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	67
Peak Hour Factor	0.84
Adj. Flow (vph)	83
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Enter Blocked Intersection	No
Lane Alignment	Right
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	1.00
Turning Speed (mph)	9
Turn Type	
Protected Phases	
Permitted Phases	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Maximum Green (s)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour

1: McKinney & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Queue Delay	0.0	0.0			0.0			0.0				0.3
Total Delay	15.8	13.1			11.2			23.8				26.2
LOS	B	B			B			C				C
Approach Delay		14.3			11.2			23.8				26.2
Approach LOS		B			B			C				C
Queue Length 50th (ft)	54	51			35			106				193
Queue Length 95th (ft)	76	74			43			151				233
Internal Link Dist (ft)		344			189			446				268
Turn Bay Length (ft)												
Base Capacity (vph)	683	664			1205			1643				866
Starvation Cap Reductn	0	0			0			0				40
Spillback Cap Reductn	0	0			0			0				0
Storage Cap Reductn	0	0			0			0				0
Reduced v/c Ratio	0.32	0.44			0.25			0.21				0.73

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 48 (48%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 19.7

Intersection LOS: B

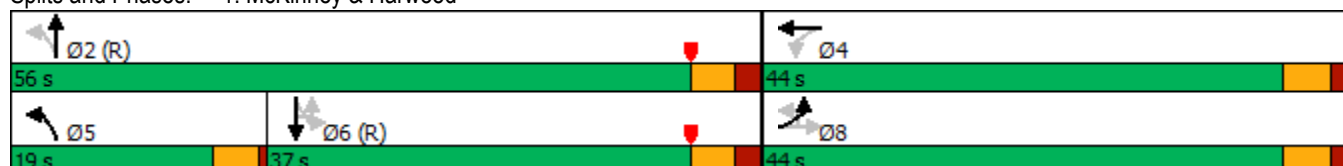
Intersection Capacity Utilization 77.3%

ICU Level of Service D

Analysis Period (min) 15

! Phase conflict between lane groups.

Splits and Phases: 1: McKinney & Harwood





Lane Group	SBR
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour

2: Cedar Springs & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	244	0	0	0	304	1	1172	26	0	0	0
Future Volume (vph)	75	244	0	0	0	304	1	1172	26	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	0.88	0.81	0.81	0.81	1.00	1.00	1.00
Ped Bike Factor		0.98				0.91		1.00				
Frt						0.850		0.997				
Flt Protected		0.988										
Satd. Flow (prot)	0	3497	0	0	0	2787	0	7505	0	0	0	0
Flt Permitted		0.988										
Satd. Flow (perm)	0	3433	0	0	0	2543	0	7504	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						45		7				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		269			424			493			445	
Travel Time (s)		6.1			9.6			11.2			10.1	
Confl. Peds. (#/hr)	41		44	44		41	34		44			
Peak Hour Factor	0.80	0.80	0.80	0.94	0.94	0.94	0.95	0.95	0.95	0.92	0.92	0.92
Adj. Flow (vph)	94	305	0	0	0	323	1	1234	27	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	399	0	0	0	323	0	1262	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			-24			24	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA				Perm	Perm	NA				
Protected Phases		4						2				
Permitted Phases	4					4	2					
Minimum Split (s)	21.4	21.4				21.4	21.3	21.3				
Total Split (s)	47.0	47.0				47.0	53.0	53.0				
Total Split (%)	47.0%	47.0%				47.0%	53.0%	53.0%				
Maximum Green (s)	41.6	41.6				41.6	47.7	47.7				
Yellow Time (s)	3.6	3.6				3.6	3.6	3.6				
All-Red Time (s)	1.8	1.8				1.8	1.7	1.7				
Lost Time Adjust (s)		0.0				0.0		0.0				
Total Lost Time (s)		5.4				5.4		5.3				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0	4.0				4.0	4.0	4.0				
Flash Dont Walk (s)	12.0	12.0				12.0	10.0	10.0				
Pedestrian Calls (#/hr)	0	0				0	0	0				
Act Effct Green (s)		41.6				41.6		47.7				
Actuated g/C Ratio		0.42				0.42		0.48				
v/c Ratio		0.28				0.30		0.35				
Control Delay		7.1				15.5		28.4				

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour
2: Cedar Springs & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0				0.0		0.0				
Total Delay		7.1				15.5		28.4				
LOS		A				B		C				
Approach Delay		7.1			15.5			28.4				
Approach LOS		A			B			C				
Queue Length 50th (ft)		15				62		209				
Queue Length 95th (ft)		28				86		m207				
Internal Link Dist (ft)		189			344			413			365	
Turn Bay Length (ft)												
Base Capacity (vph)		1428				1084		3583				
Starvation Cap Reductn		0				0		0				
Spillback Cap Reductn		0				0		42				
Storage Cap Reductn		0				0		0				
Reduced v/c Ratio		0.28				0.30		0.36				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 52 (52%), Referenced to phase 2:NBTL, Start of Yellow

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.35

Intersection Signal Delay: 22.0

Intersection LOS: C

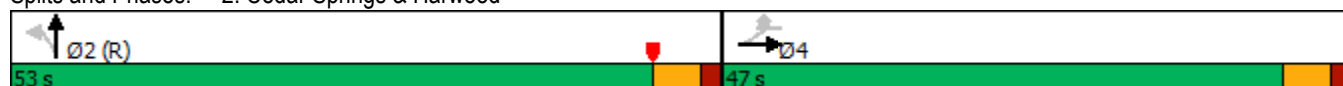
Intersection Capacity Utilization 54.9%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Cedar Springs & Harwood



North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour

3: McKinney & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	0	0	0	79	752	361	1	40	462	0	0	301
Future Volume (vph)	0	0	0	79	752	361	1	40	462	0	0	301
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	0.95	1.00	1.00	0.95
Ped Bike Factor					0.99	0.95			0.99			0.96
Frt						0.850						0.961
Flt Protected					0.995				0.996			
Satd. Flow (prot)	0	0	0	0	3522	1583	0	0	3525	0	0	3265
Flt Permitted					0.995				0.878			
Satd. Flow (perm)	0	0	0	0	3472	1507	0	0	3090	0	0	3265
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)						115						58
Link Speed (mph)		30			30				30			30
Link Distance (ft)		536			836				348			457
Travel Time (s)		12.2			19.0				7.9			10.4
Confl. Peds. (#/hr)				88		22		86		69		
Peak Hour Factor	0.92	0.92	0.92	0.88	0.88	0.88	0.92	0.92	0.92	0.92	0.91	0.91
Adj. Flow (vph)	0	0	0	90	855	410	1	43	502	0	0	331
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	945	410	0	0	546	0	0	449
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	Left	Left
Median Width(ft)		0			0				0			0
Link Offset(ft)		16			0				0			0
Crosswalk Width(ft)		16			16				16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	9	15		9	15	
Turn Type				Perm	NA	Perm	Perm	Perm	NA			NA
Protected Phases					4				2			2
Permitted Phases				4		4	2	2				
Minimum Split (s)				23.3	23.3	23.3	23.4	23.4	23.4			23.4
Total Split (s)				57.0	57.0	57.0	43.0	43.0	43.0			43.0
Total Split (%)				57.0%	57.0%	57.0%	43.0%	43.0%	43.0%			43.0%
Maximum Green (s)				51.7	51.7	51.7	37.6	37.6	37.6			37.6
Yellow Time (s)				3.2	3.2	3.2	3.2	3.2	3.2			3.2
All-Red Time (s)				2.1	2.1	2.1	2.2	2.2	2.2			2.2
Lost Time Adjust (s)					0.0	0.0			0.0			0.0
Total Lost Time (s)					5.3	5.3			5.4			5.4
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)				4.0	4.0	4.0	4.0	4.0	4.0			4.0
Flash Dont Walk (s)				14.0	14.0	14.0	14.0	14.0	14.0			14.0
Pedestrian Calls (#/hr)				0	0	0	0	0	0			0
Act Effect Green (s)					51.7	51.7			37.6			37.6
Actuated g/C Ratio					0.52	0.52			0.38			0.38
v/c Ratio					0.53	0.49			0.47			0.36
Control Delay					12.5	8.4			27.3			19.3

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	107
Future Volume (vph)	107
Ideal Flow (vphpl)	1900
Lane Util. Factor	0.95
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	86
Peak Hour Factor	0.91
Adj. Flow (vph)	118
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Enter Blocked Intersection	No
Lane Alignment	Right
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	1.00
Turning Speed (mph)	9
Turn Type	
Protected Phases	
Permitted Phases	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Maximum Green (s)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour

3: McKinney & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Queue Delay					0.0	0.0			0.7			0.0
Total Delay					12.5	8.4			28.0			19.3
LOS					B	A			C			B
Approach Delay					11.3				28.0			19.3
Approach LOS					B				C			B
Queue Length 50th (ft)					122	57			183			114
Queue Length 95th (ft)					154	90			240			m151
Internal Link Dist (ft)		456			756				268			377
Turn Bay Length (ft)												
Base Capacity (vph)					1795	834			1161			1263
Starvation Cap Reductn					0	0			299			0
Spillback Cap Reductn					0	0			0			71
Storage Cap Reductn					0	0			0			0
Reduced v/c Ratio					0.53	0.49			0.63			0.38

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 47 (47%), Referenced to phase 2:NBSB and 6:, Start of Yellow

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.53

Intersection Signal Delay: 16.7

Intersection LOS: B

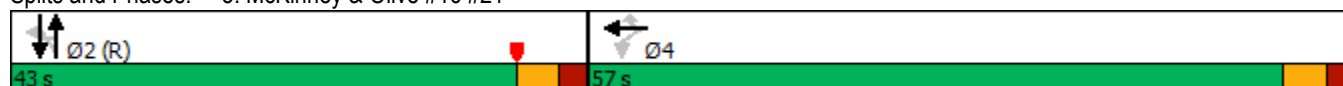
Intersection Capacity Utilization 66.5%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: McKinney & Olive #16 #21





Lane Group	SBR
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour

4: Cedar Springs & Akard /Akard & St Paul

										
Lane Group	EBU	EBL	EBT	EBR	WBL	WBR	WBR2	NBL	NBT	NBR
Lane Configurations										
Traffic Volume (vph)	17	801	907	134	25	868	7	343	45	94
Future Volume (vph)	17	801	907	134	25	868	7	343	45	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.97	0.91	0.91	1.00	0.88	1.00	0.97	1.00	1.00
Ped Bike Factor		0.99	0.98			0.89		0.95	0.97	
Frt			0.981			0.850			0.899	
Flt Protected		0.950			0.950			0.950		
Satd. Flow (prot)	0	3433	4913	0	1770	2787	0	3433	1620	0
Flt Permitted		0.950			0.950			0.950		
Satd. Flow (perm)	0	3385	4913	0	1770	2480	0	3250	1620	0
Right Turn on Red				Yes			Yes			Yes
Satd. Flow (RTOR)			49			96			94	
Link Speed (mph)			30						30	
Link Distance (ft)			385						581	
Travel Time (s)			8.8						13.2	
Confl. Peds. (#/hr)		14		58		14	26	32		22
Peak Hour Factor	0.97	0.97	0.97	0.97	0.93	0.93	0.93	0.92	0.92	0.92
Adj. Flow (vph)	18	826	935	138	27	933	8	373	49	102
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	844	1073	0	27	941	0	373	151	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	Left	Right	Right	Left	Left	Right
Median Width(ft)			0						24	
Link Offset(ft)			24						0	
Crosswalk Width(ft)			16						16	
Two way Left Turn Lane										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15		9	15	9	9	15		9
Turn Type	custom	Prot	NA		Prot	Perm		Prot	NA	
Protected Phases		5			1			4		
Permitted Phases	5		2			6			4	
Minimum Split (s)	11.9	11.9	20.0		8.0	21.5		23.9	23.9	
Total Split (s)	36.0	36.0	64.0		10.0	38.0		26.0	26.0	
Total Split (%)	36.0%	36.0%	64.0%		10.0%	38.0%		26.0%	26.0%	
Maximum Green (s)	30.1	30.1	60.0		6.0	32.5		20.1	20.1	
Yellow Time (s)	3.6	3.6	3.5		3.5	3.6		3.6	3.6	
All-Red Time (s)	2.3	2.3	0.5		0.5	1.9		2.3	2.3	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.9	4.0		4.0	5.5		5.9	5.9	
Lead/Lag	Lag	Lag	Lag		Lead	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes				
Walk Time (s)			5.0			4.0		4.0	4.0	
Flash Dont Walk (s)			11.0			8.0		14.0	14.0	
Pedestrian Calls (#/hr)			0			0		0	0	
Act Effect Green (s)		30.1	60.0		6.0	32.5		20.1	20.1	
Actuated g/C Ratio		0.30	0.60		0.06	0.32		0.20	0.20	
v/c Ratio		0.83	0.36		0.25	1.08		0.54	0.38	
Control Delay		41.2	6.9		71.3	75.4		39.2	17.4	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour

4: Cedar Springs & Akard /Akard & St Paul



Lane Group	EBU	EBL	EBT	EBR	WBL	WBR	WBR2	NBL	NBT	NBR
Queue Delay		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay		41.2	6.9		71.3	75.4		39.2	17.4	
LOS		D	A		E	E		D	B	
Approach Delay			22.0						32.9	
Approach LOS			C						C	
Queue Length 50th (ft)		294	124		17	~361		110	30	
Queue Length 95th (ft)		359	146		m40	#500		157	87	
Internal Link Dist (ft)			305						501	
Turn Bay Length (ft)										
Base Capacity (vph)		1018	2967		106	870		690	400	
Starvation Cap Reductn		0	0		0	0		0	0	
Spillback Cap Reductn		1	0		0	0		0	0	
Storage Cap Reductn		0	0		0	0		0	0	
Reduced v/c Ratio		0.83	0.36		0.25	1.08		0.54	0.38	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBR, Start of Yellow

Natural Cycle: 90

Control Type: Pretimed

Maximum v/c Ratio: 1.08

Intersection Signal Delay: 38.8

Intersection LOS: D

Intersection Capacity Utilization 83.2%

ICU Level of Service E

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

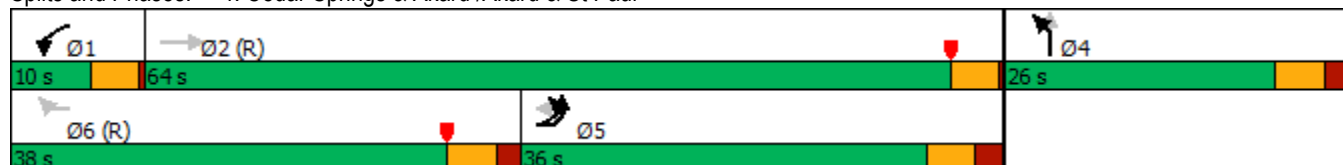
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Cedar Springs & Akard /Akard & St Paul



North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour

5: McKinney & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	825	6	0	0	0	0	259	24	177	261	0
Future Volume (vph)	52	825	6	0	0	0	0	259	24	177	261	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	1.00
Ped Bike Factor	0.98	1.00						0.99			0.98	
Frt		0.999						0.987				
Flt Protected	0.950										0.980	
Satd. Flow (prot)	1770	3534	0	0	0	0	0	3467	0	0	3468	0
Flt Permitted	0.950										0.657	
Satd. Flow (perm)	1727	3534	0	0	0	0	0	3467	0	0	2287	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1						10				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		323			182			264			526	
Travel Time (s)		7.3			4.1			6.0			12.0	
Confl. Peds. (#/hr)	12		22	22		12	44		49	49		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.72	0.72	0.72	0.77	0.77	0.77
Adj. Flow (vph)	57	897	7	0	0	0	0	360	33	230	339	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	57	904	0	0	0	0	0	393	0	0	569	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			24			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA						NA		Perm	NA	
Protected Phases	4							2			2	
Permitted Phases		4					2			2		
Minimum Split (s)	21.2	21.2					24.6	24.6		24.6	24.6	
Total Split (s)	40.0	40.0					40.0	40.0		40.0	40.0	
Total Split (%)	40.0%	40.0%					40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	35.1	35.1					34.6	34.6		34.6	34.6	
Yellow Time (s)	3.2	3.2					3.2	3.2		3.2	3.2	
All-Red Time (s)	1.7	1.7					2.2	2.2		2.2	2.2	
Lost Time Adjust (s)	0.0	0.0						0.0			0.0	
Total Lost Time (s)	4.9	4.9						5.4			5.4	
Lead/Lag	Lag	Lag										
Lead-Lag Optimize?	Yes	Yes										
Walk Time (s)	4.0	4.0					4.0	4.0		4.0	4.0	
Flash Dont Walk (s)	11.0	11.0					15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0					0	0		0	0	
Act Effct Green (s)	35.1	35.1						34.6			34.6	
Actuated g/C Ratio	0.35	0.35						0.35			0.35	
v/c Ratio	0.09	0.73						0.33			0.72	
Control Delay	4.1	6.4						22.3			28.0	

Lane Group	Ø3
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	3
Permitted Phases	
Minimum Split (s)	9.5
Total Split (s)	20.0
Total Split (%)	20%
Maximum Green (s)	16.0
Yellow Time (s)	3.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour

5: McKinney & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	1.0						0.8			4.0	
Total Delay	4.1	7.3						23.1			32.0	
LOS	A	A						C			C	
Approach Delay		7.1						23.1			32.0	
Approach LOS		A						C			C	
Queue Length 50th (ft)	4	31						71			178	
Queue Length 95th (ft)	m5	38						83			198	
Internal Link Dist (ft)		243			102			184			446	
Turn Bay Length (ft)												
Base Capacity (vph)	621	1241						1206			791	
Starvation Cap Reductn	0	134						514			0	
Spillback Cap Reductn	0	0						223			147	
Storage Cap Reductn	0	0						0			0	
Reduced v/c Ratio	0.09	0.82						0.57			0.88	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 85 (85%), Referenced to phase 2:NBSB and 6:, Start of Yellow

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 17.8

Intersection LOS: B

Intersection Capacity Utilization 64.3%

ICU Level of Service C

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: McKinney & St Paul



Lane Group	Ø3
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour

6: McKinney & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	835	58	12	861	227	3	16	26	105	115	43
Future Volume (vph)	27	835	58	12	861	227	3	16	26	105	115	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor		0.99			0.98			0.97			0.97	
Frt		0.991			0.969			0.912			0.976	
Flt Protected		0.999			0.999			0.997			0.980	
Satd. Flow (prot)	0	5005	0	0	4843	0	0	3123	0	0	3338	0
Flt Permitted		0.873			0.925			0.935			0.807	
Satd. Flow (perm)	0	4372	0	0	4483	0	0	2920	0	0	2709	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			108			35			24	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		383			222			432			264	
Travel Time (s)		8.7			5.0			9.8			6.0	
Confl. Peds. (#/hr)	34		42	42		34	47		25	25		47
Peak Hour Factor	0.93	0.93	0.93	0.98	0.98	0.98	0.75	0.75	0.75	0.78	0.78	0.78
Adj. Flow (vph)	29	898	62	12	879	232	4	21	35	135	147	55
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	989	0	0	1123	0	0	60	0	0	337	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			6			2	
Permitted Phases	4			4			6			2		
Minimum Split (s)	21.2	21.2		21.2	21.2		24.4	24.4		24.4	24.4	
Total Split (s)	62.0	62.0		62.0	62.0		38.0	38.0		38.0	38.0	
Total Split (%)	62.0%	62.0%		62.0%	62.0%		38.0%	38.0%		38.0%	38.0%	
Maximum Green (s)	56.8	56.8		56.8	56.8		32.6	32.6		32.6	32.6	
Yellow Time (s)	3.6	3.6		3.6	3.6		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.6	1.6		1.6	1.6		2.4	2.4		2.4	2.4	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.2			5.2			5.4			5.4	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)		56.8			56.8			32.6			32.6	
Actuated g/C Ratio		0.57			0.57			0.33			0.33	
v/c Ratio		0.40			0.43			0.06			0.37	
Control Delay		4.5			13.8			12.5			56.8	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour

6: McKinney & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.1			26.5			0.0			1.5	
Total Delay		4.6			40.3			12.5			58.2	
LOS		A			D			B			E	
Approach Delay		4.6			40.3			12.5			58.2	
Approach LOS		A			D			B			E	
Queue Length 50th (ft)		36			142			5			114	
Queue Length 95th (ft)		47			182			15			138	
Internal Link Dist (ft)		303			142			352			184	
Turn Bay Length (ft)												
Base Capacity (vph)		2490			2593			975			899	
Starvation Cap Reductn		372			1513			0			374	
Spillback Cap Reductn		34			227			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.47			1.04			0.06			0.64	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 57 (57%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.43

Intersection Signal Delay: 28.0

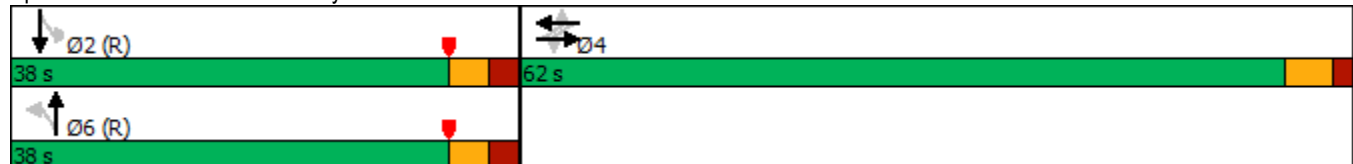
Intersection LOS: C

Intersection Capacity Utilization 62.1%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 6: McKinney & Akard



North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour

7: Woodall WBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑									↑↑↑	
Traffic Volume (vph)	0	1081	145	0	0	0	0	0	0	340	923	0
Future Volume (vph)	0	1081	145	0	0	0	0	0	0	340	923	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00
Ped Bike Factor		1.00									1.00	
Frt		0.982										
Flt Protected											0.987	
Satd. Flow (prot)	0	4981	0	0	0	0	0	0	0	0	5019	0
Flt Permitted											0.987	
Satd. Flow (perm)	0	4981	0	0	0	0	0	0	0	0	5016	0
Right Turn on Red			Yes			Yes				Yes	No	No
Satd. Flow (RTOR)		26										
Link Speed (mph)		30			30			24			26	
Link Distance (ft)		196			58			216			231	
Travel Time (s)		4.5			1.3			6.1			6.1	
Confl. Peds. (#/hr)			4							1		
Peak Hour Factor	0.95	0.95	0.95	0.92	0.92	0.92	0.92	0.92	0.92	0.89	0.89	0.89
Adj. Flow (vph)	0	1138	153	0	0	0	0	0	0	382	1037	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1291	0	0	0	0	0	0	0	0	1419	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		-24			24			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type		NA								Split	NA	
Protected Phases		2								4	4	
Permitted Phases												
Minimum Split (s)		21.6								21.3	21.3	
Total Split (s)		39.0								40.0	40.0	
Total Split (%)		39.0%								40.0%	40.0%	
Maximum Green (s)		33.4								34.7	34.7	
Yellow Time (s)		3.6								3.6	3.6	
All-Red Time (s)		2.0								1.7	1.7	
Lost Time Adjust (s)		0.0									0.0	
Total Lost Time (s)		5.6									5.3	
Lead/Lag		Lag										
Lead-Lag Optimize?		Yes										
Walk Time (s)		4.0								4.0	4.0	
Flash Dont Walk (s)		8.0								9.0	9.0	
Pedestrian Calls (#/hr)		0								0	0	
Act Effct Green (s)		33.4									34.7	
Actuated g/C Ratio		0.33									0.35	
v/c Ratio		0.77									0.82	
Control Delay		41.3									33.1	

Lane Group	Ø1
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	1
Permitted Phases	
Minimum Split (s)	21.3
Total Split (s)	21.0
Total Split (%)	21%
Maximum Green (s)	15.7
Yellow Time (s)	3.6
All-Red Time (s)	1.7
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lead
Lead-Lag Optimize?	Yes
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour

7: Woodall WBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		22.9									7.3	
Total Delay		64.2									40.5	
LOS		E									D	
Approach Delay		64.2									40.5	
Approach LOS		E									D	
Queue Length 50th (ft)		307									329	
Queue Length 95th (ft)		359									380	
Internal Link Dist (ft)		116			1			136			151	
Turn Bay Length (ft)												
Base Capacity (vph)		1680									1741	
Starvation Cap Reductn		432									170	
Spillback Cap Reductn		51									289	
Storage Cap Reductn		0									0	
Reduced v/c Ratio		1.03									0.98	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 5 (5%), Referenced to phase 2:EBT and 6:, Start of Yellow

Natural Cycle: 80

Control Type: Pretimed

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 51.8

Intersection LOS: D

Intersection Capacity Utilization 58.0%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 7: Woodall WBFR & St Paul



Lane Group	Ø1
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour

8: Woodall EBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑						↑↑↑				
Traffic Volume (vph)	476	1178	0	0	0	0	0	474	188	0	0	0
Future Volume (vph)	476	1178	0	0	0	0	0	474	188	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00
Ped Bike Factor		0.95						0.97				
Frt								0.957				
Flt Protected		0.986										
Satd. Flow (prot)	0	5014	0	0	0	0	0	4710	0	0	0	0
Flt Permitted		0.986										
Satd. Flow (perm)	0	4783	0	0	0	0	0	4710	0	0	0	0
Right Turn on Red	Yes		Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		137						37				
Link Speed (mph)		30			30			26			30	
Link Distance (ft)		204			1246			248			416	
Travel Time (s)		4.6			28.3			6.5			9.5	
Confl. Peds. (#/hr)	64								55			
Peak Hour Factor	0.90	0.90	0.90	0.92	0.92	0.92	0.81	0.81	0.81	0.92	0.92	0.92
Adj. Flow (vph)	529	1309	0	0	0	0	0	585	232	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1838	0	0	0	0	0	817	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		-24			24			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA						NA				
Protected Phases		2						4				
Permitted Phases	2											
Minimum Split (s)	21.0	21.0						21.8				
Total Split (s)	57.0	57.0						43.0				
Total Split (%)	57.0%	57.0%						43.0%				
Maximum Green (s)	52.0	52.0						37.2				
Yellow Time (s)	3.6	3.6						3.6				
All-Red Time (s)	1.4	1.4						2.2				
Lost Time Adjust (s)		0.0						0.0				
Total Lost Time (s)		5.0						5.8				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0	4.0						4.0				
Flash Dont Walk (s)	8.0	8.0						12.0				
Pedestrian Calls (#/hr)	0	0						0				
Act Effct Green (s)		52.0						37.2				
Actuated g/C Ratio		0.52						0.37				
v/c Ratio		0.72						0.46				
Control Delay		13.0						19.6				

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour

8: Woodall EBFR & St Paul

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		1.2						1.0				
Total Delay		14.2						20.6				
LOS		B						C				
Approach Delay		14.2						20.6				
Approach LOS		B						C				
Queue Length 50th (ft)		263						101				
Queue Length 95th (ft)		321						112				
Internal Link Dist (ft)		124			1166			168			336	
Turn Bay Length (ft)												
Base Capacity (vph)		2552						1775				
Starvation Cap Reductn		456						655				
Spillback Cap Reductn		0						0				
Storage Cap Reductn		0						0				
Reduced v/c Ratio		0.88						0.73				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 23 (23%), Referenced to phase 2:EBTL and 6:, Start of Yellow

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 16.2

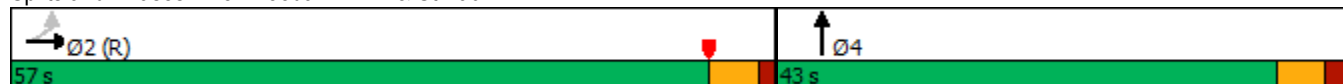
Intersection LOS: B

Intersection Capacity Utilization 56.0%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 8: Woodall EBFR & St Paul



North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour

9: Woodall WBFR & Akard WB On-Ramp & Akard

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBU	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑			↑	↑↑	
Traffic Volume (vph)	1	811	225	261	91	902	36	492	376	161
Future Volume (vph)	1	811	225	261	91	902	36	492	376	161
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.95	1.00	0.95	0.95
Ped Bike Factor		0.97			0.88				0.98	
Frt		0.967			0.892				0.955	
Flt Protected					0.990			0.950		
Satd. Flow (prot)	0	4746	0	0	3939	0	0	1770	3308	0
Flt Permitted		0.939			0.654			0.950		
Satd. Flow (perm)	0	4457	0	0	2602	0	0	1770	3308	0
Right Turn on Red						Yes				Yes
Satd. Flow (RTOR)					868				83	
Link Speed (mph)		30			30				30	
Link Distance (ft)		222			279				216	
Travel Time (s)		5.0			6.3				4.9	
Confl. Peds. (#/hr)			43	43		40				34
Peak Hour Factor	0.93	0.93	0.93	0.90	0.90	0.90	0.88	0.88	0.88	0.88
Adj. Flow (vph)	1	872	242	290	101	1002	41	559	427	183
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	1115	0	0	1393	0	0	600	610	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right
Median Width(ft)		0			0				12	
Link Offset(ft)		0			0				0	
Crosswalk Width(ft)		16			16				16	
Two way Left Turn Lane										
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	9	15		9
Turn Type	Perm	NA		pm+pt	NA		Perm	Split	NA	
Protected Phases		2		1	6			4	4	
Permitted Phases	2			6			4			
Minimum Split (s)	21.3	21.3		8.0	21.3		22.5	22.5	22.5	
Total Split (s)	44.0	44.0		8.0	52.0		48.0	48.0	48.0	
Total Split (%)	44.0%	44.0%		8.0%	52.0%		48.0%	48.0%	48.0%	
Maximum Green (s)	38.7	38.7		4.0	46.7		42.5	42.5	42.5	
Yellow Time (s)	3.6	3.6		3.5	3.6		3.6	3.6	3.6	
All-Red Time (s)	1.7	1.7		0.5	1.7		1.9	1.9	1.9	
Lost Time Adjust (s)		0.0			0.0			0.0	0.0	
Total Lost Time (s)		5.3			5.3			5.5	5.5	
Lead/Lag	Lag	Lag		Lead						
Lead-Lag Optimize?	Yes	Yes		Yes						
Walk Time (s)	4.0	4.0			4.0		4.0	4.0	4.0	
Flash Dont Walk (s)	11.0	11.0			9.0		13.0	13.0	13.0	
Pedestrian Calls (#/hr)	0	0			0		0	0	0	
Act Effct Green (s)		38.7			46.7			42.5	42.5	
Actuated g/C Ratio		0.39			0.47			0.42	0.42	
v/c Ratio		0.65			0.89dr			0.80	0.42	
Control Delay		14.2			15.3			24.4	8.7	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour

9: Woodall WBFR & Akard WB On-Ramp & Akard

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBU	SBL	SBT	SBR
Queue Delay		1.0			48.3			53.4	9.2	
Total Delay		15.2			63.6			77.8	17.9	
LOS		B			E			E	B	
Approach Delay		15.2			63.6				47.6	
Approach LOS		B			E				D	
Queue Length 50th (ft)		100			241			416	107	
Queue Length 95th (ft)		120			299			m511	m127	
Internal Link Dist (ft)		142			199				136	
Turn Bay Length (ft)										
Base Capacity (vph)		1724			1713			752	1453	
Starvation Cap Reductn		334			548			326	803	
Spillback Cap Reductn		0			117			0	215	
Storage Cap Reductn		0			0			0	0	
Reduced v/c Ratio		0.80			1.20			1.41	0.94	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 21 (21%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 60

Control Type: Pretimed

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 43.9

Intersection LOS: D

Intersection Capacity Utilization 94.0%

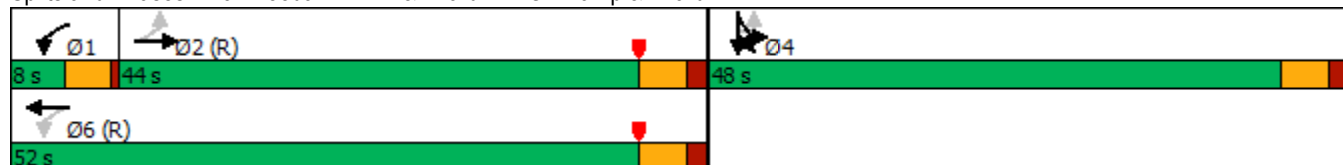
ICU Level of Service F

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 9: Woodall WBFR & Akard WB On-Ramp & Akard



North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour

10: Woodall EBFR & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↑↑↑			↑↑↑				↑↑↑			
Traffic Volume (vph)	195	659	0	0	1072	148	33	143	296	61	0	0
Future Volume (vph)	195	659	0	0	1072	148	33	143	296	61	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	1.00	1.00	0.91	0.91	0.91	0.91	0.91	0.91	1.00	1.00
Ped Bike Factor					0.99				0.98			
Frt					0.982				0.983			0.850
Flt Protected		0.989							0.984			
Satd. Flow (prot)	0	5029	0	0	4948	0	0	0	4835	0	0	0
Flt Permitted		0.657							0.984			
Satd. Flow (perm)	0	3341	0	0	4948	0	0	0	4831	0	0	0
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)					31				22			141
Link Speed (mph)		30			30				26			30
Link Distance (ft)		279			374				181			248
Travel Time (s)		6.3			8.5				4.7			5.6
Confl. Peds. (#/hr)	35					35		1		56		
Peak Hour Factor	0.94	0.94	0.94	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.92
Adj. Flow (vph)	207	701	0	0	1191	164	37	159	329	68	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	908	0	0	1355	0	0	0	593	0	0	1
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	Left	Left
Median Width(ft)		0			0				0			0
Link Offset(ft)		0			0				-24			24
Crosswalk Width(ft)		16			16				16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	9	15		9	15	
Turn Type	pm+pt	NA			NA		Perm	Perm	NA			
Protected Phases	15	2			6				4			
Permitted Phases	2						4	4				
Minimum Split (s)	8.2	21.1			21.1		21.6	21.6	21.6			
Total Split (s)	22.0	69.0			47.0		31.0	31.0	31.0			
Total Split (%)	22.0%	69.0%			47.0%		31.0%	31.0%	31.0%			
Maximum Green (s)	16.8	63.9			41.9		25.4	25.4	25.4			
Yellow Time (s)	3.2	3.6			3.6		3.6	3.6	3.6			
All-Red Time (s)	2.0	1.5			1.5		2.0	2.0	2.0			
Lost Time Adjust (s)		0.0			0.0				0.0			
Total Lost Time (s)		5.1			5.1				5.6			
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		4.0			4.0		4.0	4.0	4.0			
Flash Dont Walk (s)		8.0			12.0		8.0	8.0	8.0			
Pedestrian Calls (#/hr)		0			0		0	0	0			
Act Effct Green (s)		63.9			41.9				25.4			0.0
Actuated g/C Ratio		0.64			0.42				0.25			0.00
v/c Ratio		0.38			0.65				0.48			0.01
Control Delay		2.8			19.4				31.9			0.0

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	1
Future Volume (vph)	1
Ideal Flow (vphpl)	1900
Lane Util. Factor	1.00
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	0.92
Adj. Flow (vph)	1
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Enter Blocked Intersection	No
Lane Alignment	Right
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	1.00
Turning Speed (mph)	9
Turn Type	
Protected Phases	
Permitted Phases	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Maximum Green (s)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour

10: Woodall EBFR & Akard

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Queue Delay		0.1			0.9				0.2			0.0
Total Delay		2.9			20.3				32.1			0.0
LOS		A			C				C			A
Approach Delay		2.9			20.3				32.1			
Approach LOS		A			C				C			
Queue Length 50th (ft)		16			152				113			0
Queue Length 95th (ft)		19			177				150			0
Internal Link Dist (ft)		199			294				101			168
Turn Bay Length (ft)												
Base Capacity (vph)		2420			2091				1243			141
Starvation Cap Reductn		577			235				0			0
Spillback Cap Reductn		0			418				128			0
Storage Cap Reductn		0			0				0			0
Reduced v/c Ratio		0.49			0.81				0.53			0.01

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 98 (98%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 17.2

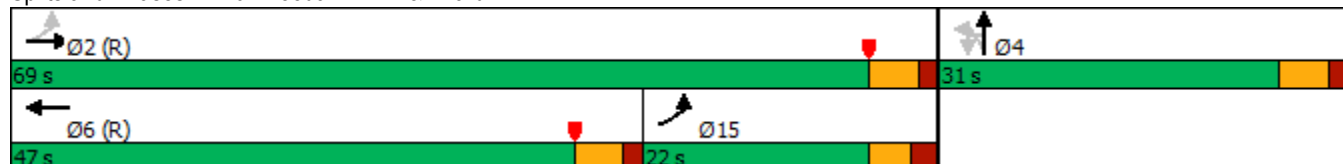
Intersection LOS: B

Intersection Capacity Utilization Err%

ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 10: Woodall EBFR & Akard





Lane Group	SBR
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour

11: Field /Field #11 #12 & Woodall WBFR

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations			↑↑↑↑	↑	↑	↑↑↑↑					↑	↑
Traffic Volume (vph)	2	0	1243	376	466	667	0	0	0	0	183	443
Future Volume (vph)	2	0	1243	376	466	667	0	0	0	0	183	443
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		150		200	0		0	0		0	0	
Storage Lanes		1		3	1		0	0		0	1	
Taper Length (ft)		25			25			25			25	
Lane Util. Factor	0.86	1.00	0.86	1.00	0.86	0.86	1.00	1.00	1.00	1.00	0.95	0.91
Ped Bike Factor				0.92								1.00
Frt				0.850								0.989
Flt Protected					0.950	0.987					0.950	0.998
Satd. Flow (prot)	0	0	6408	1583	1522	4743	0	0	0	0	1681	1666
Flt Permitted			0.931		0.103	0.681					0.950	0.998
Satd. Flow (perm)	0	0	5966	1453	165	3273	0	0	0	0	1681	1666
Right Turn on Red				Yes			Yes			Yes		
Satd. Flow (RTOR)				127								3
Link Speed (mph)			30			30			30			26
Link Distance (ft)			675			234			238			187
Travel Time (s)			15.3			5.3			5.4			4.9
Confl. Peds. (#/hr)				33	33							
Peak Hour Factor	0.86	0.86	0.86	0.86	0.84	0.84	0.84	0.92	0.92	0.92	0.95	0.95
Adj. Flow (vph)	2	0	1445	437	555	794	0	0	0	0	193	466
Shared Lane Traffic (%)					50%						10%	
Lane Group Flow (vph)	0	0	1447	437	277	1072	0	0	0	0	174	522
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left
Median Width(ft)			20			20			12			12
Link Offset(ft)			0			0			-20			24
Crosswalk Width(ft)			16			16			16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15		9	15		9	15		9	15	
Turn Type	Perm		NA	Perm	pm+pt	NA					Split	NA
Protected Phases			2		3 11	2 3 11					4	4
Permitted Phases	2			2	11 2 3							
Minimum Split (s)	23.2		23.2	23.2							40.1	40.1
Total Split (s)	44.0		44.0	44.0							44.0	44.0
Total Split (%)	33.8%		33.8%	33.8%							33.8%	33.8%
Maximum Green (s)	38.8		38.8	38.8							37.9	37.9
Yellow Time (s)	5.2		5.2	5.2							6.1	6.1
All-Red Time (s)	0.0		0.0	0.0							0.0	0.0
Lost Time Adjust (s)			0.0	0.0							0.0	0.0
Total Lost Time (s)			5.2	5.2							6.1	6.1
Lead/Lag											Lag	Lag
Lead-Lag Optimize?											Yes	Yes
Walk Time (s)	4.0		4.0	4.0							4.0	4.0
Flash Dont Walk (s)	14.0		14.0	14.0							29.0	29.0
Pedestrian Calls (#/hr)	0		0	0							0	0
Act Effect Green (s)			38.8	38.8	78.0	75.6					37.9	37.9

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour

11: Field /Field #11 #12 & Woodall WBFR

Lane Group	SBR	Ø3	Ø5	Ø6	Ø8	Ø11
Lane Configurations						
Traffic Volume (vph)	348					
Future Volume (vph)	348					
Ideal Flow (vphpl)	1900					
Storage Length (ft)	0					
Storage Lanes	1					
Taper Length (ft)						
Lane Util. Factor	0.95					
Ped Bike Factor	0.94					
Frt	0.850					
Flt Protected						
Satd. Flow (prot)	1504					
Flt Permitted						
Satd. Flow (perm)	1416					
Right Turn on Red	Yes					
Satd. Flow (RTOR)	191					
Link Speed (mph)						
Link Distance (ft)						
Travel Time (s)						
Confl. Peds. (#/hr)	40					
Peak Hour Factor	0.95					
Adj. Flow (vph)	366					
Shared Lane Traffic (%)	10%					
Lane Group Flow (vph)	329					
Enter Blocked Intersection	No					
Lane Alignment	Right					
Median Width(ft)						
Link Offset(ft)						
Crosswalk Width(ft)						
Two way Left Turn Lane						
Headway Factor	1.00					
Turning Speed (mph)	9					
Turn Type	Perm					
Protected Phases		3	5	6	8	11
Permitted Phases	4					
Minimum Split (s)	40.1	8.0	8.0	21.9	31.0	8.0
Total Split (s)	44.0	9.0	35.0	42.0	53.0	33.0
Total Split (%)	33.8%	7%	27%	32%	41%	25%
Maximum Green (s)	37.9	5.0	30.0	36.6	47.0	29.0
Yellow Time (s)	6.1	3.5	5.0	5.4	6.0	3.5
All-Red Time (s)	0.0	0.5	0.0	0.0	0.0	0.5
Lost Time Adjust (s)	0.0					
Total Lost Time (s)	6.1					
Lead/Lag	Lag	Lead	Lead	Lag		
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		
Walk Time (s)	4.0			4.0	4.0	
Flash Dont Walk (s)	29.0			12.0	20.0	
Pedestrian Calls (#/hr)	0			0	0	
Act Effect Green (s)	37.9					

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour

11: Field /Field #11 #12 & Woodall WBFR

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Actuated g/C Ratio			0.30	0.30	0.60	0.58					0.29	0.29
v/c Ratio			0.81	0.84	0.56	0.46					0.36	1.07
Control Delay			32.6	31.4	6.2	3.5					39.0	104.9
Queue Delay			0.1	0.0	4.9	0.4					0.0	0.0
Total Delay			32.7	31.4	11.1	3.9					39.0	104.9
LOS			C	C	B	A					D	F
Approach Delay			32.4			5.4						66.8
Approach LOS			C			A						E
Queue Length 50th (ft)			343	273	17	22					122	~534
Queue Length 95th (ft)			355	#401	m20	24					192	#780
Internal Link Dist (ft)			595			154			158			107
Turn Bay Length (ft)				200								
Base Capacity (vph)			1780	522	495	2319					490	487
Starvation Cap Reductn			0	0	153	698					0	0
Spillback Cap Reductn			25	0	0	0					0	0
Storage Cap Reductn			0	0	0	0					0	0
Reduced v/c Ratio			0.82	0.84	0.81	0.66					0.36	1.07

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 66 (51%), Referenced to phase 2:EBWB, Start of Yellow

Natural Cycle: 100

Control Type: Pretimed

Maximum v/c Ratio: 1.07

Intersection Signal Delay: 32.1

Intersection LOS: C

Intersection Capacity Utilization 84.2%

ICU Level of Service E

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: Field /Field #11 #12 & Woodall WBFR

#11  Ø2 (R)	#11  Ø11	#11  Ø3	#11  Ø4
44 s	33 s	9 s	44 s
#12  Ø5	#12  Ø6	#12  Ø8	
35 s	42 s	53 s	

Lane Group	SBR	Ø3	Ø5	Ø6	Ø8	Ø11
Actuated g/C Ratio	0.29					
v/c Ratio	0.60					
Control Delay	21.0					
Queue Delay	0.0					
Total Delay	21.0					
LOS	C					
Approach Delay						
Approach LOS						
Queue Length 50th (ft)	102					
Queue Length 95th (ft)	212					
Internal Link Dist (ft)						
Turn Bay Length (ft)						
Base Capacity (vph)	548					
Starvation Cap Reductn	0					
Spillback Cap Reductn	0					
Storage Cap Reductn	0					
Reduced v/c Ratio	0.60					
Intersection Summary						

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour

12: Woodall EBFR & Field #11 #12 & Field EB On-Ramp

												
Lane Group	EBU	EBL2	EBL	EBT	WBU	WBT	WBR	WBR2	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Volume (vph)	1	365	0	1089	3	1022	200	216	143	102	893	100
Future Volume (vph)	1	365	0	1089	3	1022	200	216	143	102	893	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)			0				0			0		0
Storage Lanes			1				1			1		0
Taper Length (ft)			25							25		
Lane Util. Factor	0.91	0.91	1.00	0.91	0.91	0.91	1.00	0.91	0.91	0.86	0.86	0.91
Frt							0.850					0.985
Flt Protected			0.950							0.950	0.999	
Satd. Flow (prot)	0	0	1770	5085	0	5085	1583	0	0	1522	4729	0
Flt Permitted			0.109			0.936				0.950	0.999	
Satd. Flow (perm)	0	0	203	5085	0	4760	1583	0	0	1522	4729	0
Right Turn on Red								Yes				Yes
Satd. Flow (RTOR)							102					15
Link Speed (mph)				30		30						30
Link Distance (ft)				234		419						191
Travel Time (s)				5.3		9.5						4.3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	397	0	1184	3	1111	217	235	155	111	971	109
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	0	0	398	1184	0	1114	452	0	0	255	1091	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Left	R NA	Left	Right	Right	R NA	Left	Left	Right
Median Width(ft)				20		12					12	
Link Offset(ft)				0		12					-24	
Crosswalk Width(ft)				16		16					16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15	15		9		9	9	9	15		9
Turn Type	custom	pm+pt	pm+pt	NA	Perm	NA	Perm		Perm	Split	NA	
Protected Phases		5	5	5 6		6				8	8	
Permitted Phases	5	5 6	5 6		6		6		8			
Minimum Split (s)	8.0	8.0	8.0		21.9	21.9	21.9		31.0	31.0	31.0	
Total Split (s)	35.0	35.0	35.0		42.0	42.0	42.0		53.0	53.0	53.0	
Total Split (%)	26.9%	26.9%	26.9%		32.3%	32.3%	32.3%		40.8%	40.8%	40.8%	
Maximum Green (s)	30.0	30.0	30.0		36.6	36.6	36.6		47.0	47.0	47.0	
Yellow Time (s)	5.0	5.0	5.0		5.4	5.4	5.4		6.0	6.0	6.0	
All-Red Time (s)	0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	
Lost Time Adjust (s)			0.0			0.0	0.0			0.0	0.0	
Total Lost Time (s)			5.0			5.4	5.4			6.0	6.0	
Lead/Lag	Lead	Lead	Lead		Lag	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes	Yes					
Walk Time (s)					4.0	4.0	4.0		4.0	4.0	4.0	
Flash Dont Walk (s)					12.0	12.0	12.0		20.0	20.0	20.0	
Pedestrian Calls (#/hr)					0	0	0		0	0	0	
Act Effect Green (s)			67.0	72.0		36.6	36.6			47.0	47.0	
Actuated g/C Ratio			0.52	0.55		0.28	0.28			0.36	0.36	
v/c Ratio			0.85	0.42		0.83	0.87			0.46	0.63	

Lane Group	Ø2	Ø3	Ø4	Ø11
Lane Configurations				
Traffic Volume (vph)				
Future Volume (vph)				
Ideal Flow (vphpl)				
Storage Length (ft)				
Storage Lanes				
Taper Length (ft)				
Lane Util. Factor				
Frt				
Flt Protected				
Satd. Flow (prot)				
Flt Permitted				
Satd. Flow (perm)				
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (mph)				
Link Distance (ft)				
Travel Time (s)				
Peak Hour Factor				
Adj. Flow (vph)				
Shared Lane Traffic (%)				
Lane Group Flow (vph)				
Enter Blocked Intersection				
Lane Alignment				
Median Width(ft)				
Link Offset(ft)				
Crosswalk Width(ft)				
Two way Left Turn Lane				
Headway Factor				
Turning Speed (mph)				
Turn Type				
Protected Phases	2	3	4	11
Permitted Phases				
Minimum Split (s)	23.2	8.0	40.1	8.0
Total Split (s)	44.0	9.0	44.0	33.0
Total Split (%)	34%	7%	34%	25%
Maximum Green (s)	38.8	5.0	37.9	29.0
Yellow Time (s)	5.2	3.5	6.1	3.5
All-Red Time (s)	0.0	0.5	0.0	0.5
Lost Time Adjust (s)				
Total Lost Time (s)				
Lead/Lag		Lead	Lag	
Lead-Lag Optimize?		Yes	Yes	
Walk Time (s)	4.0		4.0	
Flash Dont Walk (s)	14.0		29.0	
Pedestrian Calls (#/hr)	0		0	
Act Effct Green (s)				
Actuated g/C Ratio				
v/c Ratio				

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour
12: Woodall EBFR & Field #11 #12 & Field EB On-Ramp

												
Lane Group	EBU	EBL2	EBL	EBT	WBU	WBT	WBR	WBR2	NBU	NBL	NBT	NBR
Control Delay			27.2	3.8		43.2	45.2			35.3	35.9	
Queue Delay			5.2	1.0		2.2	5.0			0.0	0.0	
Total Delay			32.4	4.8		45.4	50.2			35.3	35.9	
LOS			C	A		D	D			D	D	
Approach Delay				11.8		46.8					35.8	
Approach LOS				B		D					D	
Queue Length 50th (ft)			59	45		343	148			190	289	
Queue Length 95th (ft)			m#372	m51		373	#468			287	343	
Internal Link Dist (ft)				154		339					111	
Turn Bay Length (ft)												
Base Capacity (vph)			466	2816		1340	518			550	1719	
Starvation Cap Reductn			35	1273		119	34			0	0	
Spillback Cap Reductn			0	186		34	0			0	0	
Storage Cap Reductn			0	0		0	0			0	0	
Reduced v/c Ratio			0.92	0.77		0.91	0.93			0.46	0.63	

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 66 (51%), Referenced to phase 2:EBWB, Start of Yellow

Natural Cycle: 100

Control Type: Pretimed

Maximum v/c Ratio: 1.07

Intersection Signal Delay: 31.2

Intersection LOS: C

Intersection Capacity Utilization 78.8%

ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: Woodall EBFR & Field #11 #12 & Field EB On-Ramp

#11  Ø2 (R)	#11  Ø11	#11  Ø3	#11  Ø4
44 s	33 s	9 s	44 s
#12  Ø5	#12  Ø6	#12  Ø8	
35 s	42 s	53 s	

Lane Group	Ø2	Ø3	Ø4	Ø11
Control Delay				
Queue Delay				
Total Delay				
LOS				
Approach Delay				
Approach LOS				
Queue Length 50th (ft)				
Queue Length 95th (ft)				
Internal Link Dist (ft)				
Turn Bay Length (ft)				
Base Capacity (vph)				
Starvation Cap Reductn				
Spillback Cap Reductn				
Storage Cap Reductn				
Reduced v/c Ratio				
Intersection Summary				

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour

13: Woodall WBFR & Harwood

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	306	0	0	840	71
Future Volume (vph)	0	306	0	0	840	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.88	1.00	1.00	0.91	0.91
Ped Bike Factor		0.91			1.00	
Frt		0.850			0.988	
Flt Protected						
Satd. Flow (prot)	0	2787	0	0	5005	0
Flt Permitted						
Satd. Flow (perm)	0	2543	0	0	5005	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		99			35	
Link Speed (mph)	30			30	24	
Link Distance (ft)	246			202	260	
Travel Time (s)	5.6			4.6	7.4	
Confl. Peds. (#/hr)		82				41
Peak Hour Factor	0.82	0.82	0.92	0.92	0.94	0.94
Adj. Flow (vph)	0	373	0	0	894	76
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	373	0	0	970	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			12	-12	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Turn Type		Perm			NA	
Protected Phases					8	
Permitted Phases		6				
Minimum Split (s)		20.0			20.0	
Total Split (s)		24.0			26.0	
Total Split (%)		48.0%			52.0%	
Maximum Green (s)		20.0			22.0	
Yellow Time (s)		3.5			3.5	
All-Red Time (s)		0.5			0.5	
Lost Time Adjust (s)		0.0			0.0	
Total Lost Time (s)		4.0			4.0	
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)		5.0			5.0	
Flash Dont Walk (s)		11.0			11.0	
Pedestrian Calls (#/hr)		0			0	
Act Effct Green (s)		20.0			22.0	
Actuated g/C Ratio		0.40			0.44	
v/c Ratio		0.35			0.44	
Control Delay		6.6			9.7	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour

13: Woodall WBFR & Harwood

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Queue Delay		0.0			0.1	
Total Delay		6.6			9.8	
LOS		A			A	
Approach Delay	6.6				9.8	
Approach LOS	A				A	
Queue Length 50th (ft)		25			86	
Queue Length 95th (ft)		43			96	
Internal Link Dist (ft)	166			122	180	
Turn Bay Length (ft)						
Base Capacity (vph)		1076			2221	
Starvation Cap Reductn		0			383	
Spillback Cap Reductn		4			180	
Storage Cap Reductn		0			0	
Reduced v/c Ratio		0.35			0.53	

Intersection Summary

Area Type: Other

Cycle Length: 50

Actuated Cycle Length: 50

Offset: 1 (2%), Referenced to phase 6:EBR, Start of Yellow

Natural Cycle: 40

Control Type: Pretimed

Maximum v/c Ratio: 0.44

Intersection Signal Delay: 8.9

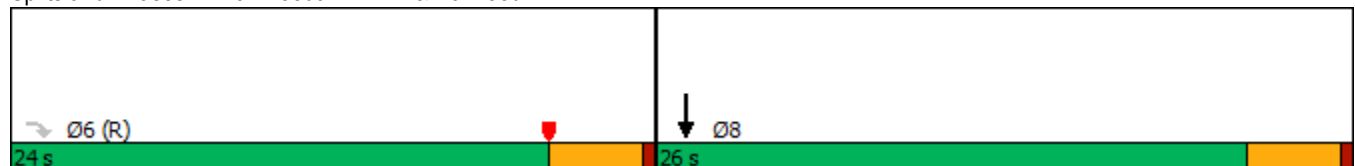
Intersection LOS: A

Intersection Capacity Utilization 40.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 13: Woodall WBFR & Harwood



North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour

14: Woodall EBFR & Harwood

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø2
Lane Configurations			↑↑↑				
Traffic Volume (vph)	0	0	1061	150	0	0	
Future Volume (vph)	0	0	1061	150	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	0.91	0.91	1.00	1.00	
Ped Bike Factor			0.99				
Frt			0.981				
Flt Protected							
Satd. Flow (prot)	0	0	4933	0	0	0	
Flt Permitted							
Satd. Flow (perm)	0	0	4933	0	0	0	
Right Turn on Red		Yes		Yes			
Satd. Flow (RTOR)			61				
Link Speed (mph)	30		26			30	
Link Distance (ft)	974		416			261	
Travel Time (s)	22.1		10.9			5.9	
Confl. Peds. (#/hr)				32			
Peak Hour Factor	0.92	0.92	0.96	0.96	0.92	0.92	
Adj. Flow (vph)	0	0	1105	156	0	0	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	0	0	1261	0	0	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Right	Left	Left	
Median Width(ft)	0		0			0	
Link Offset(ft)	24		0			0	
Crosswalk Width(ft)	16		16			16	
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Turning Speed (mph)	15	9		9	15		
Turn Type			NA				
Protected Phases			4			2	
Permitted Phases							
Minimum Split (s)			20.9			21.0	
Total Split (s)			75.0			25.0	
Total Split (%)			75.0%			25%	
Maximum Green (s)			70.1			20.0	
Yellow Time (s)			3.6			3.6	
All-Red Time (s)			1.3			1.4	
Lost Time Adjust (s)			0.0				
Total Lost Time (s)			4.9				
Lead/Lag							
Lead-Lag Optimize?							
Walk Time (s)			4.0			4.0	
Flash Dont Walk (s)			8.0			8.0	
Pedestrian Calls (#/hr)			0			0	
Act Effect Green (s)			70.1				
Actuated g/C Ratio			0.70				
v/c Ratio			0.36				
Control Delay			4.2				

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour

14: Woodall EBFR & Harwood

							
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	Ø2
Queue Delay			0.3				
Total Delay			4.5				
LOS			A				
Approach Delay			4.5				
Approach LOS			A				
Queue Length 50th (ft)			56				
Queue Length 95th (ft)			81				
Internal Link Dist (ft)	894		336			181	
Turn Bay Length (ft)							
Base Capacity (vph)			3476				
Starvation Cap Reductn			1263				
Spillback Cap Reductn			1383				
Storage Cap Reductn			0				
Reduced v/c Ratio			0.60				

Intersection Summary

Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 30 (30%), Referenced to phase 2:Ped, Start of Yellow	
Natural Cycle: 45	
Control Type: Pretimed	
Maximum v/c Ratio: 0.36	
Intersection Signal Delay: 4.5	Intersection LOS: A
Intersection Capacity Utilization 28.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 14: Woodall EBFR & Harwood



North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour

15: Woodall WBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑						↑↑↑	
Traffic Volume (vph)	0	0	0	361	635	0	0	0	0	0	583	129
Future Volume (vph)	0	0	0	361	635	0	0	0	0	0	583	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	0.91	0.91
Ped Bike Factor					0.91						0.96	
Frt											0.973	
Flt Protected					0.982							
Satd. Flow (prot)	0	0	0	0	4994	0	0	0	0	0	4744	0
Flt Permitted					0.982							
Satd. Flow (perm)	0	0	0	0	4569	0	0	0	0	0	4744	0
Right Turn on Red			Yes	Yes		Yes			Yes			Yes
Satd. Flow (RTOR)					109						59	
Link Speed (mph)		30			30			30			24	
Link Distance (ft)		836			267			260			433	
Travel Time (s)		19.0			6.1			5.9			12.3	
Confl. Peds. (#/hr)				94								88
Peak Hour Factor	0.92	0.92	0.92	0.97	0.97	0.97	0.92	0.92	0.92	0.82	0.82	0.82
Adj. Flow (vph)	0	0	0	372	655	0	0	0	0	0	711	157
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	1027	0	0	0	0	0	868	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		20			-20			12			-12	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type				Perm	NA						NA	
Protected Phases					2						4	
Permitted Phases				2								
Minimum Split (s)				21.2	21.2						21.2	
Total Split (s)				54.0	54.0						46.0	
Total Split (%)				54.0%	54.0%						46.0%	
Maximum Green (s)				48.8	48.8						40.8	
Yellow Time (s)				3.6	3.6						3.6	
All-Red Time (s)				1.6	1.6						1.6	
Lost Time Adjust (s)					0.0						0.0	
Total Lost Time (s)					5.2						5.2	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)				4.0	4.0						4.0	
Flash Dont Walk (s)				8.0	8.0						8.0	
Pedestrian Calls (#/hr)				0	0						0	
Act Effect Green (s)					48.8						40.8	
Actuated g/C Ratio					0.49						0.41	
v/c Ratio					0.45						0.44	
Control Delay					4.0						19.6	

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour

15: Woodall WBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay					0.1						0.0	
Total Delay					4.1						19.6	
LOS					A						B	
Approach Delay					4.1						19.6	
Approach LOS					A						B	
Queue Length 50th (ft)					9						115	
Queue Length 95th (ft)					13						m107	
Internal Link Dist (ft)		756			187			180			353	
Turn Bay Length (ft)												
Base Capacity (vph)					2285						1970	
Starvation Cap Reductn					305						0	
Spillback Cap Reductn					0						0	
Storage Cap Reductn					0						0	
Reduced v/c Ratio					0.52						0.44	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 87 (87%), Referenced to phase 2:WBTL and 6:, Start of Yellow

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 11.2

Intersection LOS: B

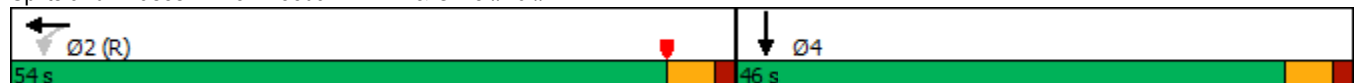
Intersection Capacity Utilization 43.8%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 15: Woodall WBFR & Olive #16 #21



North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour

16: Woodall EBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑↑↑	↑		↑↑↑				
Traffic Volume (vph)	0	0	0	0	942	404	71	965	0	0	0	0
Future Volume (vph)	0	0	0	0	942	404	71	965	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00
Ped Bike Factor						0.96		1.00				
Frt						0.850						
Flt Protected								0.997				
Satd. Flow (prot)	0	0	0	0	5085	1583	0	5070	0	0	0	0
Flt Permitted								0.997				
Satd. Flow (perm)	0	0	0	0	5085	1522	0	5049	0	0	0	0
Right Turn on Red			Yes			Yes	Yes		Yes			Yes
Satd. Flow (RTOR)						23		34				
Link Speed (mph)		30			30			26			30	
Link Distance (ft)		267			231			261			427	
Travel Time (s)		6.1			5.3			6.8			9.7	
Confl. Peds. (#/hr)						11	24					
Peak Hour Factor	0.92	0.92	0.92	0.96	0.96	0.96	0.90	0.90	0.90	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	981	421	79	1072	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	981	421	0	1151	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		20			-20			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type					NA	Perm	Perm	NA				
Protected Phases					2			4				
Permitted Phases						2	4					
Minimum Split (s)					22.1	22.1	21.1	21.1				
Total Split (s)					58.0	58.0	42.0	42.0				
Total Split (%)					58.0%	58.0%	42.0%	42.0%				
Maximum Green (s)					51.9	51.9	36.9	36.9				
Yellow Time (s)					3.6	3.6	3.6	3.6				
All-Red Time (s)					2.5	2.5	1.5	1.5				
Lost Time Adjust (s)					0.0	0.0		0.0				
Total Lost Time (s)					6.1	6.1		5.1				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)					4.0	4.0	4.0	4.0				
Flash Dont Walk (s)					8.0	8.0	8.0	8.0				
Pedestrian Calls (#/hr)					0	0	0	0				
Act Effct Green (s)					51.9	51.9		36.9				
Actuated g/C Ratio					0.52	0.52		0.37				
v/c Ratio					0.37	0.53		0.61				
Control Delay					14.8	17.9		32.6				

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour

16: Woodall EBFR & Olive #16 #21

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay					0.0	0.0		39.3				
Total Delay					14.8	17.9		71.9				
LOS					B	B		E				
Approach Delay					15.8			71.9				
Approach LOS					B			E				
Queue Length 50th (ft)					130	159		245				
Queue Length 95th (ft)					161	249		311				
Internal Link Dist (ft)		187			151			181			347	
Turn Bay Length (ft)												
Base Capacity (vph)					2639	800		1884				
Starvation Cap Reductn					0	0		813				
Spillback Cap Reductn					69	2		487				
Storage Cap Reductn					0	0		0				
Reduced v/c Ratio					0.38	0.53		1.07				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 82 (82%), Referenced to phase 2:WBT and 6:, Start of Yellow

Natural Cycle: 45

Control Type: Pretimed

Maximum v/c Ratio: 0.61

Intersection Signal Delay: 41.1

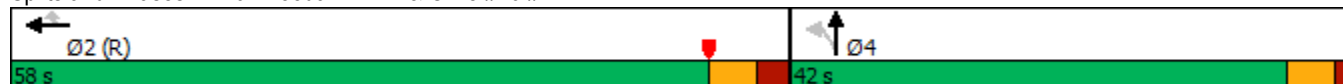
Intersection LOS: D

Intersection Capacity Utilization 55.6%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 16: Woodall EBFR & Olive #16 #21



North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour

17: Woodall WBFR & Pearl #17 #18

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations			↑↑↑	↑	↑	↑↑↑						↑↑↑
Traffic Volume (vph)	1	0	1718	205	185	978	0	0	0	0	98	343
Future Volume (vph)	1	0	1718	205	185	978	0	0	0	0	98	343
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		250		0	0		0	0		0	0	
Storage Lanes		1		1	1		0	0		0	0	
Taper Length (ft)		25			25			25			25	
Lane Util. Factor	0.91	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	0.91	0.91
Ped Bike Factor				0.95								0.90
Frt				0.850								0.939
Flt Protected					0.950							0.993
Satd. Flow (prot)	0	0	5085	1583	1770	5085	0	0	0	0	0	4282
Flt Permitted			0.940		0.089							0.993
Satd. Flow (perm)	0	0	4780	1504	166	5085	0	0	0	0	0	4282
Right Turn on Red				Yes			Yes			Yes		
Satd. Flow (RTOR)				198								149
Link Speed (mph)			30			30			30			30
Link Distance (ft)			1034			257			433			138
Travel Time (s)			23.5			5.8			9.8			3.1
Confl. Peds. (#/hr)				13	13							
Peak Hour Factor	0.98	0.98	0.98	0.98	0.92	0.92	0.92	0.92	0.92	0.92	0.78	0.78
Adj. Flow (vph)	1	0	1753	209	201	1063	0	0	0	0	126	440
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	1754	209	201	1063	0	0	0	0	0	954
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left
Median Width(ft)			12			12			0			0
Link Offset(ft)			0			0			0			0
Crosswalk Width(ft)			16			16			16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15		9	15		9	15		9	15	
Turn Type	Perm		NA	Perm	pm+pt	NA					Split	NA
Protected Phases			2		1 11	6					4	4
Permitted Phases	2			2	6							
Minimum Split (s)	21.1		21.1	21.1		28.1					22.0	22.0
Total Split (s)	40.0		40.0	40.0		77.0					23.0	23.0
Total Split (%)	40.0%		40.0%	40.0%		77.0%					23.0%	23.0%
Maximum Green (s)	34.9		34.9	34.9		71.9					17.0	17.0
Yellow Time (s)	3.6		3.6	3.6		3.6					3.9	3.9
All-Red Time (s)	1.5		1.5	1.5		1.5					2.1	2.1
Lost Time Adjust (s)			0.0	0.0		0.0						0.0
Total Lost Time (s)			5.1	5.1		5.1						6.0
Lead/Lag	Lag		Lag	Lag								
Lead-Lag Optimize?	Yes		Yes	Yes								
Walk Time (s)	4.0		4.0	4.0		4.0					4.0	4.0
Flash Dont Walk (s)	6.0		6.0	6.0		19.0					6.0	6.0
Pedestrian Calls (#/hr)	0		0	0		0					0	0
Act Effect Green (s)			34.9	34.9	72.0	71.9						17.0

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour

17: Woodall WBFR & Pearl #17 #18

Lane Group	SBR	Ø1	Ø11
Lane Configurations			
Traffic Volume (vph)	303		
Future Volume (vph)	303		
Ideal Flow (vphpl)	1900		
Storage Length (ft)	0		
Storage Lanes	0		
Taper Length (ft)			
Lane Util. Factor	0.91		
Ped Bike Factor			
Frt			
Flt Protected			
Satd. Flow (prot)	0		
Flt Permitted			
Satd. Flow (perm)	0		
Right Turn on Red	Yes		
Satd. Flow (RTOR)			
Link Speed (mph)			
Link Distance (ft)			
Travel Time (s)			
Confl. Peds. (#/hr)	77		
Peak Hour Factor	0.78		
Adj. Flow (vph)	388		
Shared Lane Traffic (%)			
Lane Group Flow (vph)	0		
Enter Blocked Intersection	No		
Lane Alignment	Right		
Median Width(ft)			
Link Offset(ft)			
Crosswalk Width(ft)			
Two way Left Turn Lane			
Headway Factor	1.00		
Turning Speed (mph)	9		
Turn Type			
Protected Phases	1	11	
Permitted Phases			
Minimum Split (s)	8.0	8.0	
Total Split (s)	20.0	17.0	
Total Split (%)	20%	17%	
Maximum Green (s)	15.0	13.0	
Yellow Time (s)	3.0	3.5	
All-Red Time (s)	2.0	0.5	
Lost Time Adjust (s)			
Total Lost Time (s)			
Lead/Lag	Lead		
Lead-Lag Optimize?	Yes		
Walk Time (s)			
Flash Dont Walk (s)			
Pedestrian Calls (#/hr)			
Act Effect Green (s)			

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour

17: Woodall WBFR & Pearl #17 #18

												
Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Actuated g/C Ratio			0.35	0.35	0.72	0.72						0.17
v/c Ratio			1.05	0.32	0.36	0.29						1.12
Control Delay			52.4	1.3	20.3	1.8						103.1
Queue Delay			10.1	0.0	3.2	0.4						0.0
Total Delay			62.5	1.3	23.5	2.3						103.1
LOS			E	A	C	A						F
Approach Delay			56.0			5.7						103.1
Approach LOS			E			A						F
Queue Length 50th (ft)			~458	2	71	26						~227
Queue Length 95th (ft)			#557	m2	m97	m30						#241
Internal Link Dist (ft)			954			177			353			58
Turn Bay Length (ft)												
Base Capacity (vph)			1668	653	552	3656						851
Starvation Cap Reductn			0	0	256	1932						0
Spillback Cap Reductn			39	0	0	0						0
Storage Cap Reductn			0	0	0	0						0
Reduced v/c Ratio			1.08	0.32	0.68	0.62						1.12

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 88 (88%), Referenced to phase 2:EBTU and 6:WBTL, Start of Yellow

Natural Cycle: 75

Control Type: Pretimed

Maximum v/c Ratio: 1.12

Intersection Signal Delay: 51.5

Intersection LOS: D

Intersection Capacity Utilization 81.0%

ICU Level of Service D

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

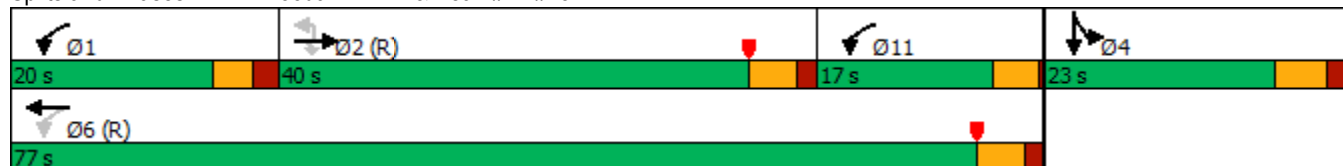
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 17: Woodall WBFR & Pearl #17 #18





Lane Group	SBR	Ø1	Ø11
Actuated g/C Ratio			
v/c Ratio			
Control Delay			
Queue Delay			
Total Delay			
LOS			
Approach Delay			
Approach LOS			
Queue Length 50th (ft)			
Queue Length 95th (ft)			
Internal Link Dist (ft)			
Turn Bay Length (ft)			
Base Capacity (vph)			
Starvation Cap Reductn			
Spillback Cap Reductn			
Storage Cap Reductn			
Reduced v/c Ratio			
Intersection Summary			

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour

18: Woodall EBFR & Pearl #17 #18

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 			  			  				
Traffic Volume (vph)	728	1170	0	0	1020	155	156	1063	157	0	0	0
Future Volume (vph)	728	1170	0	0	1020	155	156	1063	157	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	250		0	0		0	0		0
Storage Lanes	2		0	1		1	0		0	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	1.00	0.91	1.00	0.91	0.91	0.91	1.00	1.00	1.00
Frt						0.850		0.983				
Flt Protected	0.950							0.994				
Satd. Flow (prot)	3433	3539	0	0	5085	1583	0	4969	0	0	0	0
Flt Permitted	0.125							0.994				
Satd. Flow (perm)	452	3539	0	0	5085	1583	0	4969	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						92		24				
Link Speed (mph)		30			30			26			30	
Link Distance (ft)		257			1016			427			143	
Travel Time (s)		5.8			23.1			11.2			3.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	791	1272	0	0	1109	168	170	1155	171	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	791	1272	0	0	1109	168	0	1496	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			0			0	
Link Offset(ft)		0			0			-12			12	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA			NA	Perm	Perm	NA				
Protected Phases	15	2			6			4				
Permitted Phases	2					6	4					
Minimum Split (s)	8.0	21.4			27.0	27.0	23.1	23.1				
Total Split (s)	31.0	63.0			32.0	32.0	37.0	37.0				
Total Split (%)	31.0%	63.0%			32.0%	32.0%	37.0%	37.0%				
Maximum Green (s)	26.0	57.6			27.0	27.0	31.0	31.0				
Yellow Time (s)	3.0	3.6			3.6	3.6	3.6	3.6				
All-Red Time (s)	2.0	1.8			1.4	1.4	2.4	2.4				
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0				
Total Lost Time (s)	5.0	5.4			5.0	5.0		6.0				
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)		4.0			4.0	4.0	4.0	4.0				
Flash Dont Walk (s)		8.0			18.0	18.0	8.0	8.0				
Pedestrian Calls (#/hr)		0			0	0	0	0				
Act Effct Green (s)	58.0	57.6			27.0	27.0		31.0				
Actuated g/C Ratio	0.58	0.58			0.27	0.27		0.31				
v/c Ratio	0.76	0.62			0.81	0.34		0.96				

North Harwood Tower
Lanes, Volumes, Timings

Phase 2 Background + Site Conditions - PM Peak Hour

18: Woodall EBFR & Pearl #17 #18

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	7.4	3.1			39.6	15.9		34.0				
Queue Delay	52.0	0.9			0.0	0.0		0.5				
Total Delay	59.4	4.0			39.6	15.9		34.5				
LOS	E	A			D	B		C				
Approach Delay		25.2			36.5			34.5				
Approach LOS		C			D			C				
Queue Length 50th (ft)	52	42			241	37		374				
Queue Length 95th (ft)	m48	m40			295	93		#458				
Internal Link Dist (ft)		177			936			347			63	
Turn Bay Length (ft)												
Base Capacity (vph)	1037	2038			1372	494		1556				
Starvation Cap Reductn	458	440			0	0		7				
Spillback Cap Reductn	0	0			0	0		0				
Storage Cap Reductn	0	0			0	0		0				
Reduced v/c Ratio	1.37	0.80			0.81	0.34		0.97				

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 65 (65%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 80

Control Type: Pretimed

Maximum v/c Ratio: 0.96

Intersection Signal Delay: 31.1

Intersection LOS: C

Intersection Capacity Utilization 81.0%

ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 18: Woodall EBFR & Pearl #17 #18



Intersection												
Int Delay, s/veh	3.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑↑								↑↑	↑		
Traffic Vol, veh/h	41	822	3	0	0	0	0	0	107	106	0	0
Future Vol, veh/h	41	822	3	0	0	0	0	0	107	106	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	0	-	-
Veh in Median Storage, #	-	0	-	-	16979	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	45	893	3	0	0	0	0	0	116	115	0	0

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	0	0	0	-	-	-	448	447	-
Stage 1	-	-	-	-	-	-	-	0	-
Stage 2	-	-	-	-	-	-	-	447	-
Critical Hdwy	5.34	-	-	-	-	-	7.14	6.44	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	6.74	-
Follow-up Hdwy	3.12	-	-	-	-	-	3.92	3.82	-
Pot Cap-1 Maneuver	-	-	-	0	0	0	477	532	0
Stage 1	-	-	-	0	0	-	-	0	0
Stage 2	-	-	-	0	0	-	513	0	0
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	-	-	477	402	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	402	-
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	388	-

Approach	EB	NB	SB
HCM Control Delay, s		15	17.5
HCM LOS		C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	SBLn1
Capacity (veh/h)	477	-	-	-	402
HCM Lane V/C Ratio	0.244	-	-	-	0.287
HCM Control Delay (s)	15	-	-	-	17.5
HCM Lane LOS	C	-	-	-	C
HCM 95th %tile Q(veh)	0.9	-	-	-	1.2

Intersection						
Int Delay, s/veh	8.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗			↖↖↖	
Traffic Vol, veh/h	0	285	0	0	1044	96
Future Vol, veh/h	0	285	0	0	1044	96
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	16974	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	303	0	0	1111	102

Major/Minor	Minor2		Major2	
Conflicting Flow All	-	607	-	0
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	-	7.14	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	-	3.92	-	-
Pot Cap-1 Maneuver	0	377	-	-
Stage 1	0	-	-	-
Stage 2	0	-	-	-
Platoon blocked, %			-	-
Mov Cap-1 Maneuver	-	377	-	-
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	SB
HCM Control Delay, s	44	0
HCM LOS	E	

Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	377	-	-
HCM Lane V/C Ratio	0.804	-	-
HCM Control Delay (s)	44	-	-
HCM Lane LOS	E	-	-
HCM 95th %tile Q(veh)	7	-	-

Intersection												
Int Delay, s/veh	4.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔			↔↔			↔			↔	
Traffic Vol, veh/h	5	215	29	8	62	2	108	0	54	31	0	10
Future Vol, veh/h	5	215	29	8	62	2	108	0	54	31	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	234	32	9	67	2	117	0	59	34	0	11
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	69	0	0	266	0	0	312	347	133	213	362	35
Stage 1	-	-	-	-	-	-	260	260	-	86	86	-
Stage 2	-	-	-	-	-	-	52	87	-	127	276	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1530	-	-	1295	-	-	617	575	892	725	564	1030
Stage 1	-	-	-	-	-	-	722	692	-	912	823	-
Stage 2	-	-	-	-	-	-	954	822	-	863	680	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1530	-	-	1295	-	-	605	569	892	671	558	1030
Mov Cap-2 Maneuver	-	-	-	-	-	-	605	569	-	671	558	-
Stage 1	-	-	-	-	-	-	719	689	-	908	817	-
Stage 2	-	-	-	-	-	-	937	816	-	803	677	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.9			12.2			10.2		
HCM LOS							B			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	678	1530	-	-	1295	-	-	733				
HCM Lane V/C Ratio	0.26	0.004	-	-	0.007	-	-	0.061				
HCM Control Delay (s)	12.2	7.4	0	-	7.8	0	-	10.2				
HCM Lane LOS	B	A	A	-	A	A	-	B				
HCM 95th %tile Q(veh)	1	0	-	-	0	-	-	0.2				

North Harwood Tower
HCM 6th TWSC

Phase 2 Background + Site Conditions - PM Peak Hour
22: Adjacent North Drive/Adjacent South Drive & Harwood

Intersection													
Int Delay, s/veh	2												
Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↔↔			↔↔			↔↔			↔↔	
Traffic Vol, veh/h	2	16	237	1	1	166	14	52	0	20	0	0	0
Future Vol, veh/h	2	16	237	1	1	166	14	52	0	20	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	17	258	1	1	180	15	57	0	22	0	0	0
Major/Minor	Major1			Major2			Minor1			Minor2			
Conflicting Flow All	196	195	0	0	259	0	0	389	494	130	357	487	98
Stage 1	-	-	-	-	-	-	-	297	297	-	190	190	-
Stage 2	-	-	-	-	-	-	-	92	197	-	167	297	-
Critical Hdwy	6.44	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.52	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1077	1375	-	-	1303	-	-	544	475	896	574	479	939
Stage 1	-	-	-	-	-	-	-	687	666	-	794	742	-
Stage 2	-	-	-	-	-	-	-	905	737	-	818	666	-
Platoon blocked, %			-	-		-	-						
Mov Cap-1 Maneuver	1334	1334	-	-	1303	-	-	536	466	896	552	470	939
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	536	466	-	552	470	-
Stage 1	-	-	-	-	-	-	-	675	654	-	780	741	-
Stage 2	-	-	-	-	-	-	-	904	736	-	784	654	-
Approach	EB			WB			NB			SB			
HCM Control Delay, s	0.6			0			11.9			0			
HCM LOS							B			A			
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1					
Capacity (veh/h)	603	1334	-	-	1303	-	-	-					
HCM Lane V/C Ratio	0.13	0.013	-	-	0.001	-	-	-					
HCM Control Delay (s)	11.9	7.7	0.1	-	7.8	0	-	0					
HCM Lane LOS	B	A	A	-	A	A	-	A					
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	-					



Synchro™ Output - Harwood Lane Reduction Analysis Traffic

North Harwood Tower
Lanes, Volumes, Timings

Harwood Analysis - AM Peak Hour

1: McKinney & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	91	242	38	12	123	11	1	34	182	78	7	122
Future Volume (vph)	91	242	38	12	123	11	1	34	182	78	7	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	100		0		0		0		0
Storage Lanes	1		0	1		0		0		0		0
Taper Length (ft)	25			25				25				25
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor	0.92	0.99			0.99				0.93			
Frt		0.979			0.989				0.960			
Flt Protected	0.950				0.996				0.994			
Satd. Flow (prot)	1770	1805	0	0	3459	0	0	0	3138	0	0	0
Flt Permitted	0.950				0.925				0.837			
Satd. Flow (perm)	1634	1805	0	0	3203	0	0	0	2631	0	0	0
Right Turn on Red			Yes			Yes				Yes		
Satd. Flow (RTOR)		10			10				73			
Link Speed (mph)		30			30				30			
Link Distance (ft)		424			278				526			
Travel Time (s)		9.6			6.3				12.0			
Confl. Peds. (#/hr)	54		37	37		54		60		86		86
Peak Hour Factor	0.96	0.96	0.96	0.92	0.92	0.92	0.86	0.86	0.86	0.86	0.93	0.93
Adj. Flow (vph)	95	252	40	13	134	12	1	40	212	91	8	131
Shared Lane Traffic (%)												
Lane Group Flow (vph)	95	292	0	0	159	0	0	0	344	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	R NA	Left
Median Width(ft)		12			12				0			
Link Offset(ft)		0			0				0			
Crosswalk Width(ft)		16			16				16			
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	9	15		9	9	15
Turn Type	Prot	NA		Perm	NA		Perm	Perm	NA		Perm	Perm
Protected Phases	8!				4!				2			
Permitted Phases		8		4			2	2			6	6
Minimum Split (s)	23.4	23.4		23.4	23.4		23.4	23.4	23.4		23.4	23.4
Total Split (s)	46.0	46.0		46.0	46.0		54.0	54.0	54.0		54.0	54.0
Total Split (%)	46.0%	46.0%		46.0%	46.0%		54.0%	54.0%	54.0%		54.0%	54.0%
Maximum Green (s)	40.6	40.6		40.6	40.6		48.6	48.6	48.6		48.6	48.6
Yellow Time (s)	3.6	3.6		3.6	3.6		3.2	3.2	3.2		3.2	3.2
All-Red Time (s)	1.8	1.8		1.8	1.8		2.2	2.2	2.2		2.2	2.2
Lost Time Adjust (s)	-1.4	0.0			-1.4				-1.4			
Total Lost Time (s)	4.0	5.4			4.0				4.0			
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0		4.0	4.0
Flash Dont Walk (s)	13.0	13.0		13.0	13.0		13.0	13.0	13.0		13.0	13.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0		0	0
Act Effect Green (s)	42.0	40.6			42.0				50.0			

North Harwood Tower
Lanes, Volumes, Timings

Harwood Analysis - AM Peak Hour

1: McKinney & Harwood

	↓	↙
Lane Group	SBT	SBR
Lane Configurations	4T	
Traffic Volume (vph)	280	157
Future Volume (vph)	280	157
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		0
Storage Lanes		0
Taper Length (ft)		
Lane Util. Factor	0.95	0.95
Ped Bike Factor	0.93	
Frt	0.958	
Flt Protected	0.989	
Satd. Flow (prot)	3246	0
Flt Permitted	0.761	
Satd. Flow (perm)	2412	0
Right Turn on Red		Yes
Satd. Flow (RTOR)	80	
Link Speed (mph)	30	
Link Distance (ft)	348	
Travel Time (s)	7.9	
Confl. Peds. (#/hr)		60
Peak Hour Factor	0.93	0.93
Adj. Flow (vph)	301	169
Shared Lane Traffic (%)		
Lane Group Flow (vph)	609	0
Enter Blocked Intersection	No	No
Lane Alignment	Left	Right
Median Width(ft)	0	
Link Offset(ft)	0	
Crosswalk Width(ft)	16	
Two way Left Turn Lane		
Headway Factor	1.00	1.00
Turning Speed (mph)		9
Turn Type	NA	
Protected Phases	6	
Permitted Phases		
Minimum Split (s)	23.4	
Total Split (s)	54.0	
Total Split (%)	54.0%	
Maximum Green (s)	48.6	
Yellow Time (s)	3.2	
All-Red Time (s)	2.2	
Lost Time Adjust (s)	-1.4	
Total Lost Time (s)	4.0	
Lead/Lag		
Lead-Lag Optimize?		
Walk Time (s)	4.0	
Flash Dont Walk (s)	13.0	
Pedestrian Calls (#/hr)	0	
Act Effect Green (s)	50.0	

North Harwood Tower
Lanes, Volumes, Timings

Harwood Analysis - AM Peak Hour

1: McKinney & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Actuated g/C Ratio	0.42	0.41			0.42				0.50			
v/c Ratio	0.13	0.40			0.12				0.25			
Control Delay	11.8	14.1			15.4				3.2			
Queue Delay	0.0	0.0			0.0				0.0			
Total Delay	11.8	14.1			15.4				3.2			
LOS	B	B			B				A			
Approach Delay		13.5			15.4				3.2			
Approach LOS		B			B				A			
Queue Length 50th (ft)	16	51			37				4			
Queue Length 95th (ft)	32	80			63				15			
Internal Link Dist (ft)		344			198				446			
Turn Bay Length (ft)												
Base Capacity (vph)	743	738			1351				1352			
Starvation Cap Reductn	0	0			0				0			
Spillback Cap Reductn	0	0			0				0			
Storage Cap Reductn	0	0			0				0			
Reduced v/c Ratio	0.13	0.40			0.12				0.25			

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 38 (38%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.49

Intersection Signal Delay: 9.2

Intersection LOS: A

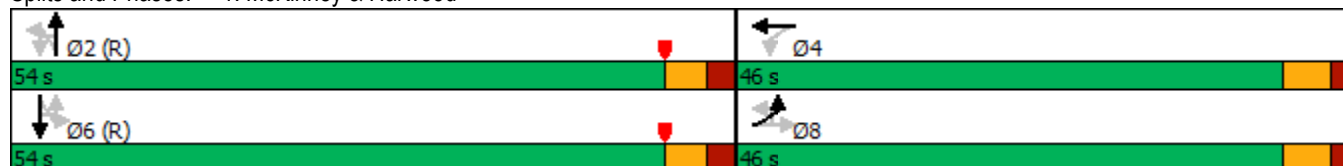
Intersection Capacity Utilization 76.9%

ICU Level of Service D

Analysis Period (min) 15

! Phase conflict between lane groups.

Splits and Phases: 1: McKinney & Harwood





Lane Group	SBT	SBR
Actuated g/C Ratio	0.50	
v/c Ratio	0.49	
Control Delay	7.7	
Queue Delay	0.4	
Total Delay	8.1	
LOS	A	
Approach Delay	8.1	
Approach LOS	A	
Queue Length 50th (ft)	35	
Queue Length 95th (ft)	153	
Internal Link Dist (ft)	268	
Turn Bay Length (ft)		
Base Capacity (vph)	1246	
Starvation Cap Reductn	248	
Spillback Cap Reductn	0	
Storage Cap Reductn	0	
Reduced v/c Ratio	0.61	
Intersection Summary		

North Harwood Tower
Lanes, Volumes, Timings

Harwood Analysis - AM Peak Hour

13: Woodall WBFR & Harwood

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	62	0	0	943	346
Future Volume (vph)	0	62	0	0	943	346
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	0.91
Ped Bike Factor		0.90			0.98	
Frt		0.865			0.960	
Flt Protected						
Satd. Flow (prot)	0	1611	0	0	4795	0
Flt Permitted						
Satd. Flow (perm)	0	1453	0	0	4795	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		75			157	
Link Speed (mph)	30			30	24	
Link Distance (ft)	242			217	260	
Travel Time (s)	5.5			4.9	7.4	
Confl. Peds. (#/hr)		47				15
Peak Hour Factor	0.77	0.77	0.92	0.92	0.83	0.83
Adj. Flow (vph)	0	81	0	0	1136	417
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	81	0	0	1553	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			12	-12	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Turn Type		Perm			NA	
Protected Phases					4	
Permitted Phases		2				
Minimum Split (s)		20.0			20.0	
Total Split (s)		38.0			62.0	
Total Split (%)		38.0%			62.0%	
Maximum Green (s)		34.0			58.0	
Yellow Time (s)		3.5			3.5	
All-Red Time (s)		0.5			0.5	
Lost Time Adjust (s)		0.0			0.0	
Total Lost Time (s)		4.0			4.0	
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)		5.0			5.0	
Flash Dont Walk (s)		11.0			11.0	
Pedestrian Calls (#/hr)		0			0	
Act Effct Green (s)		34.0			58.0	
Actuated g/C Ratio		0.34			0.58	
v/c Ratio		0.15			0.55	
Control Delay		5.5			4.8	

North Harwood Tower
Lanes, Volumes, Timings

Harwood Analysis - AM Peak Hour
13: Woodall WBFR & Harwood

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Queue Delay		0.0			0.7	
Total Delay		5.5			5.5	
LOS		A			A	
Approach Delay	5.5				5.5	
Approach LOS	A				A	
Queue Length 50th (ft)		3			53	
Queue Length 95th (ft)		15			60	
Internal Link Dist (ft)	162			137	180	
Turn Bay Length (ft)						
Base Capacity (vph)		543			2847	
Starvation Cap Reductn		0			829	
Spillback Cap Reductn		0			0	
Storage Cap Reductn		0			0	
Reduced v/c Ratio		0.15			0.77	

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 91 (91%), Referenced to phase 2:EBR, Start of Yellow
 Natural Cycle: 40
 Control Type: Pretimed
 Maximum v/c Ratio: 0.55
 Intersection Signal Delay: 5.5
 Intersection LOS: A
 Intersection Capacity Utilization 46.4%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 13: Woodall WBFR & Harwood



Intersection												
Int Delay, s/veh	1.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	6	62	115	33	302	8	17	0	8	2	0	6
Future Vol, veh/h	6	62	115	33	302	8	17	0	8	2	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	67	125	36	328	9	18	0	9	2	0	7
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	337	0	0	192	0	0	552	553	130	553	611	333
Stage 1	-	-	-	-	-	-	144	144	-	405	405	-
Stage 2	-	-	-	-	-	-	408	409	-	148	206	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1222	-	-	1381	-	-	444	441	920	444	409	709
Stage 1	-	-	-	-	-	-	859	778	-	622	598	-
Stage 2	-	-	-	-	-	-	620	596	-	855	731	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1222	-	-	1381	-	-	429	426	920	429	396	709
Mov Cap-2 Maneuver	-	-	-	-	-	-	429	426	-	429	396	-
Stage 1	-	-	-	-	-	-	853	773	-	618	582	-
Stage 2	-	-	-	-	-	-	598	581	-	841	726	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.3			0.7			12.3			11		
HCM LOS							B			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	517	1222	-	-	1381	-	-	610				
HCM Lane V/C Ratio	0.053	0.005	-	-	0.026	-	-	0.014				
HCM Control Delay (s)	12.3	8	-	-	7.7	-	-	11				
HCM Lane LOS	B	A	-	-	A	-	-	B				
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0				

North Harwood Tower
HCM 6th TWSC

Harwood Analysis - AM Peak Hour
22: Adjacent North Drive/Adjacent South Drive & Harwood

Intersection													
Int Delay, s/veh	2.2												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Vol, veh/h	148	188	43	30	138	154	1	1	1	0	0	0	0
Future Vol, veh/h	148	188	43	30	138	154	1	1	1	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	-	None	-	-	None
Storage Length	50	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	161	204	47	33	150	167	1	1	1	0	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2			
Conflicting Flow All	317	0	0	251	0	0	0	850	933	228	850	873	234
Stage 1	-	-	-	-	-	-	0	550	550	-	300	300	-
Stage 2	-	-	-	-	-	-	0	300	383	-	550	573	-
Critical Hdwy	4.12	-	-	4.12	-	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1243	-	-	1314	-	-	0	280	266	811	280	289	805
Stage 1	-	-	-	-	-	-	0	519	516	-	709	666	-
Stage 2	-	-	-	-	-	-	0	709	612	-	519	504	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1243	-	-	1314	-	-	0	246	224	811	246	244	805
Mov Cap-2 Maneuver	-	-	-	-	-	-	0	246	224	-	246	244	-
Stage 1	-	-	-	-	-	-	0	452	449	-	617	645	-
Stage 2	-	-	-	-	-	-	0	687	593	-	451	438	-

Approach	EB			WB			NB			SB			
HCM Control Delay, s	3.3			0.7			20.5			0			
HCM LOS							C				A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	234	1243	-	-	1314	-	-	-
HCM Lane V/C Ratio	0.009	0.129	-	-	0.025	-	-	-
HCM Control Delay (s)	20.5	8.3	-	-	7.8	-	-	0
HCM Lane LOS	C	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0	0.4	-	-	0.1	-	-	-

North Harwood Tower
Lanes, Volumes, Timings

Harwood Analysis - PM Peak Hour

1: McKinney & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	174	123	108	15	107	92	23	273	20	10	74	350
Future Volume (vph)	174	123	108	15	107	92	23	273	20	10	74	350
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	100		0	0		0		0	
Storage Lanes	1		0	1		0	0		0		0	
Taper Length (ft)	25			25			25				25	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Ped Bike Factor	0.95	0.95			0.96			0.98				0.96
Frt		0.930			0.935			0.990				0.979
Flt Protected	0.950				0.997			0.996				0.992
Satd. Flow (prot)	1770	1640	0	0	3169	0	0	3439	0	0	0	3376
Flt Permitted	0.950				0.921			0.911				0.804
Satd. Flow (perm)	1675	1640	0	0	2916	0	0	3138	0	0	0	2677
Right Turn on Red			Yes			Yes			Yes			
Satd. Flow (RTOR)		51			130			10				19
Link Speed (mph)		30			30			30				30
Link Distance (ft)		424			269			526				348
Travel Time (s)		9.6			6.1			12.0				7.9
Confl. Peds. (#/hr)	46		59	59		46	67		72		72	
Peak Hour Factor	0.80	0.80	0.80	0.71	0.71	0.71	0.92	0.92	0.92	0.84	0.84	0.84
Adj. Flow (vph)	218	154	135	21	151	130	25	297	22	12	88	417
Shared Lane Traffic (%)												
Lane Group Flow (vph)	218	289	0	0	302	0	0	344	0	0	0	600
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	R NA	Left	Left
Median Width(ft)		12			12			0				0
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	9	15	
Turn Type	Prot	NA		Perm	NA		pm+pt	NA		Perm	Perm	NA
Protected Phases	8!				4!		5	2				6
Permitted Phases		8		4			2			6	6	
Minimum Split (s)	23.4	23.4		23.4	23.4		8.0	23.4		23.4	23.4	23.4
Total Split (s)	44.0	44.0		44.0	44.0		19.0	56.0		37.0	37.0	37.0
Total Split (%)	44.0%	44.0%		44.0%	44.0%		19.0%	56.0%		37.0%	37.0%	37.0%
Maximum Green (s)	38.6	38.6		38.6	38.6		15.0	50.6		31.6	31.6	31.6
Yellow Time (s)	3.6	3.6		3.6	3.6		3.5	3.2		3.2	3.2	3.2
All-Red Time (s)	1.8	1.8		1.8	1.8		0.5	2.2		2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0			0.0			0.0				0.0
Total Lost Time (s)	5.4	5.4			5.4			5.4				5.4
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Walk Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	4.0
Flash Dont Walk (s)	13.0	13.0		13.0	13.0			13.0		13.0	13.0	13.0
Pedestrian Calls (#/hr)	0	0		0	0			0		0	0	0
Act Effect Green (s)	38.6	38.6			38.6			50.6				31.6

North Harwood Tower
Lanes, Volumes, Timings

Harwood Analysis - PM Peak Hour

1: McKinney & Harwood

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	70
Future Volume (vph)	70
Ideal Flow (vphpl)	1900
Storage Length (ft)	0
Storage Lanes	0
Taper Length (ft)	
Lane Util. Factor	0.95
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	67
Peak Hour Factor	0.84
Adj. Flow (vph)	83
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Enter Blocked Intersection	No
Lane Alignment	Right
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	1.00
Turning Speed (mph)	9
Turn Type	
Protected Phases	
Permitted Phases	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Maximum Green (s)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Walk Time (s)	
Flash Dont Walk (s)	
Pedestrian Calls (#/hr)	
Act Effect Green (s)	

North Harwood Tower
Lanes, Volumes, Timings

Harwood Analysis - PM Peak Hour

1: McKinney & Harwood

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Actuated g/C Ratio	0.39	0.39			0.39			0.51				0.32
v/c Ratio	0.32	0.44			0.25			0.21				0.70
Control Delay	15.8	13.1			11.2			23.8				26.1
Queue Delay	0.0	0.0			0.0			0.0				0.3
Total Delay	15.8	13.1			11.2			23.8				26.4
LOS	B	B			B			C				C
Approach Delay		14.3			11.2			23.8				26.4
Approach LOS		B			B			C				C
Queue Length 50th (ft)	54	51			35			106				193
Queue Length 95th (ft)	76	74			43			151				234
Internal Link Dist (ft)		344			189			446				268
Turn Bay Length (ft)												
Base Capacity (vph)	683	664			1205			1633				858
Starvation Cap Reductn	0	0			0			0				37
Spillback Cap Reductn	0	0			0			0				0
Storage Cap Reductn	0	0			0			0				0
Reduced v/c Ratio	0.32	0.44			0.25			0.21				0.73

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 48 (48%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

Natural Cycle: 55

Control Type: Pretimed

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 19.8

Intersection LOS: B

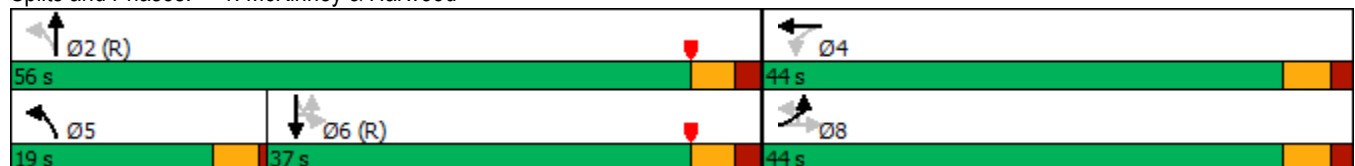
Intersection Capacity Utilization 77.3%

ICU Level of Service D

Analysis Period (min) 15

! Phase conflict between lane groups.

Splits and Phases: 1: McKinney & Harwood





Lane Group	SBR
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

North Harwood Tower
Lanes, Volumes, Timings

Harwood Analysis - PM Peak Hour
13: Woodall WBFR & Harwood

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	306	0	0	840	71
Future Volume (vph)	0	306	0	0	840	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.91	0.91
Ped Bike Factor		0.91			0.99	
Frt		0.865			0.988	
Flt Protected						
Satd. Flow (prot)	0	1611	0	0	4992	0
Flt Permitted						
Satd. Flow (perm)	0	1471	0	0	4992	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		56			35	
Link Speed (mph)	30			30	24	
Link Distance (ft)	246			202	260	
Travel Time (s)	5.6			4.6	7.4	
Confl. Peds. (#/hr)		82				41
Peak Hour Factor	0.82	0.82	0.92	0.92	0.94	0.94
Adj. Flow (vph)	0	373	0	0	894	76
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	373	0	0	970	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			0	0	
Link Offset(ft)	0			12	-12	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Turn Type		Perm			NA	
Protected Phases					8	
Permitted Phases		6				
Minimum Split (s)		20.0			20.0	
Total Split (s)		24.0			26.0	
Total Split (%)		48.0%			52.0%	
Maximum Green (s)		20.0			22.0	
Yellow Time (s)		3.5			3.5	
All-Red Time (s)		0.5			0.5	
Lost Time Adjust (s)		0.0			0.0	
Total Lost Time (s)		4.0			4.0	
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)		5.0			5.0	
Flash Dont Walk (s)		11.0			11.0	
Pedestrian Calls (#/hr)		0			0	
Act Effct Green (s)		20.0			22.0	
Actuated g/C Ratio		0.40			0.44	
v/c Ratio		0.60			0.44	
Control Delay		12.3			9.7	

North Harwood Tower
Lanes, Volumes, Timings

Harwood Analysis - PM Peak Hour
13: Woodall WBFR & Harwood

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Queue Delay		0.0			0.1	
Total Delay		12.3			9.8	
LOS		B			A	
Approach Delay	12.3				9.8	
Approach LOS	B				A	
Queue Length 50th (ft)		55			86	
Queue Length 95th (ft)		113			96	
Internal Link Dist (ft)	166			122	180	
Turn Bay Length (ft)						
Base Capacity (vph)		622			2216	
Starvation Cap Reductn		0			381	
Spillback Cap Reductn		2			188	
Storage Cap Reductn		0			0	
Reduced v/c Ratio		0.60			0.53	

Intersection Summary

Area Type: Other

Cycle Length: 50

Actuated Cycle Length: 50

Offset: 1 (2%), Referenced to phase 6:EBR, Start of Yellow

Natural Cycle: 40

Control Type: Pretimed

Maximum v/c Ratio: 0.60

Intersection Signal Delay: 10.5

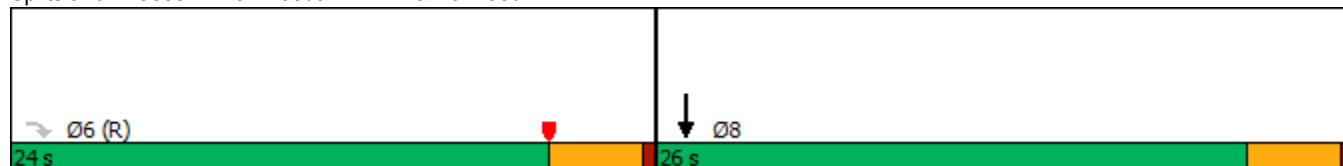
Intersection LOS: B

Intersection Capacity Utilization 49.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 13: Woodall WBFR & Harwood



North Harwood Tower
HCM 6th TWSC

Harwood Analysis - PM Peak Hour
21: North Drive/South Drive & Harwood

Intersection												
Int Delay, s/veh	5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↻		↻	↻			↻			↻	
Traffic Vol, veh/h	5	215	29	8	62	2	108	0	54	31	0	10
Future Vol, veh/h	5	215	29	8	62	2	108	0	54	31	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	234	32	9	67	2	117	0	59	34	0	11
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	69	0	0	266	0	0	352	347	250	376	362	68
Stage 1	-	-	-	-	-	-	260	260	-	86	86	-
Stage 2	-	-	-	-	-	-	92	87	-	290	276	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1532	-	-	1298	-	-	603	576	789	581	565	995
Stage 1	-	-	-	-	-	-	745	693	-	922	824	-
Stage 2	-	-	-	-	-	-	915	823	-	718	682	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1532	-	-	1298	-	-	592	570	789	533	559	995
Mov Cap-2 Maneuver	-	-	-	-	-	-	592	570	-	533	559	-
Stage 1	-	-	-	-	-	-	742	690	-	918	818	-
Stage 2	-	-	-	-	-	-	899	817	-	662	679	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.9			12.6			11.5		
HCM LOS							B			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	646	1532	-	-	1298	-	-	601				
HCM Lane V/C Ratio	0.273	0.004	-	-	0.007	-	-	0.074				
HCM Control Delay (s)	12.6	7.4	-	-	7.8	-	-	11.5				
HCM Lane LOS	B	A	-	-	A	-	-	B				
HCM 95th %tile Q(veh)	1.1	0	-	-	0	-	-	0.2				

North Harwood Tower
HCM 6th TWSC

Harwood Analysis - PM Peak Hour
22: Adjacent North Drive/Adjacent South Drive & Harwood

Intersection												
Int Delay, s/veh	2.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	237	1	1	166	14	52	0	20	0	0	0
Future Vol, veh/h	16	237	1	1	166	14	52	0	20	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	50	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	17	258	1	1	180	15	57	0	22	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	195	0	0	259	0	0	483	490	259	494	483	188
Stage 1	-	-	-	-	-	-	293	293	-	190	190	-
Stage 2	-	-	-	-	-	-	190	197	-	304	293	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1378	-	-	1306	-	-	494	479	780	486	483	854
Stage 1	-	-	-	-	-	-	715	670	-	812	743	-
Stage 2	-	-	-	-	-	-	812	738	-	705	670	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1378	-	-	1306	-	-	489	473	780	468	477	854
Mov Cap-2 Maneuver	-	-	-	-	-	-	489	473	-	468	477	-
Stage 1	-	-	-	-	-	-	706	662	-	802	742	-
Stage 2	-	-	-	-	-	-	811	737	-	677	662	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	0	12.7	0
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	546	1378	-	-	1306	-	-	-
HCM Lane V/C Ratio	0.143	0.013	-	-	0.001	-	-	-
HCM Control Delay (s)	12.7	7.6	-	-	7.8	-	-	0
HCM Lane LOS	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.5	0	-	-	0	-	-	-