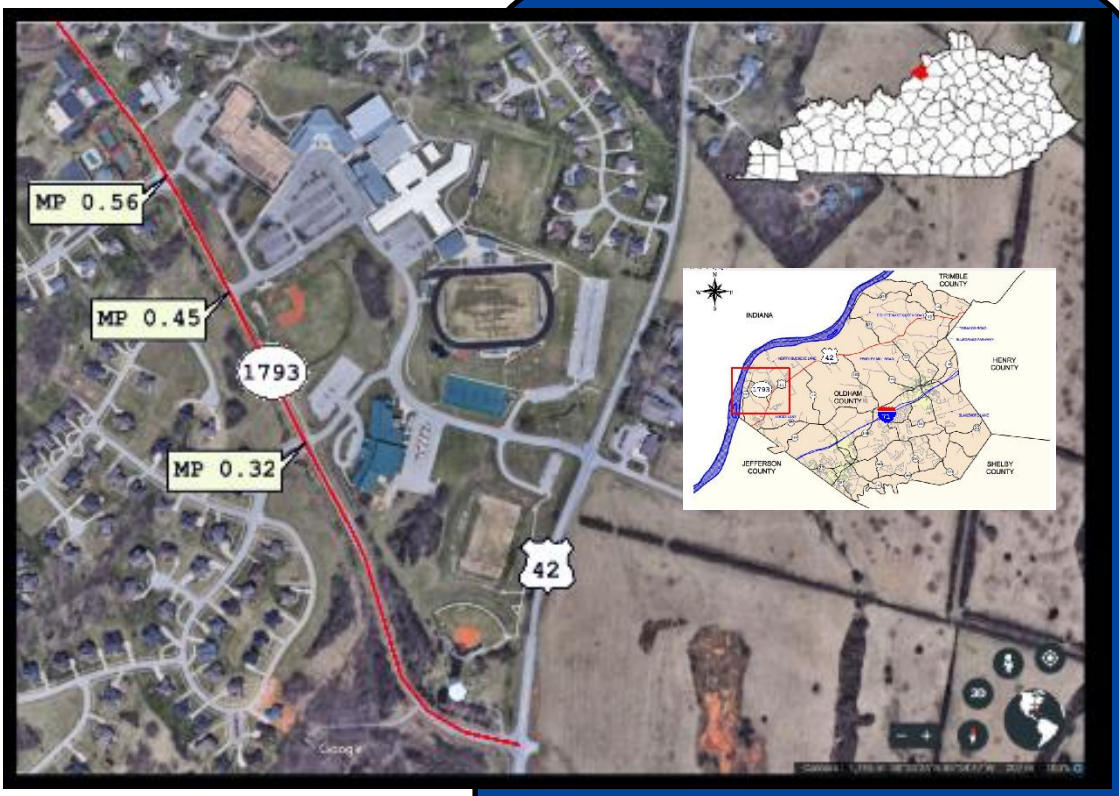
Data Needs Analysis



Scoping Study

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KENTUCKY TRANSPORTATION CABINET

KY 1793 at North Oldham County High School

Prepared by the KYTC Division of Planning
December 2019

I. PRELIMINARY PROJECT INFORMATION

County: OLDHAM **Item No.:**
Route Number(s):* KY 1793 **Road Name:** SOUTH HWY
Program No.: **UPN:** (Function) (County #) (Route) (MPs)
Federal Project No.: **Type of Work:** Intersection Improvement
(Year) **Highway Plan Project Description:**
(not in the hwy plan) Intersection improvement at North Oldham County High School

Beginning MP: 0.25 **Ending MP:** 0.65 **Project Length:** 0.4
In TIP: ☐ Yes ☑ No Reconcile Project Information in Clearview
State Class.: ☐ Primary ☑ Secondary **Route is on:** ☐ NHS ☐ NN ☐ Ext Wt
Functional Class.: ☑ Urban ☐ Rural Collector **Truck Class.:** AAA **% Trucks:**
MPO Area: Louisville/Southern Indiana (KIPDA) **Terrain:** Rolling
ADT (current): 4496 2018
Access Control: ☐ None ☑ Permit ☐ Fully Controlled ☐ Partial Spacing:
Median Type: ☑ Undivided ☑ Divided (Type): Flush MP .17-.4
Existing Bike Accommodations: Shoulder **Ped:** ☑ Sidewalk CR MP.3-.4
Posted Speed: ☐ 35 mph ☑ 45 mph ☐ 55 mph ☐ Other (Specify):
KYTC Guidelines Preliminarily Based on : **MPH Proposed Design Speed**

Roadway Data:	**EXISTING**	**COMMON GEOMETRIC PRACTICES****
No. of Lanes	2	2
Lane Width	10	10
Shoulder Width	2	6
Max. Superelevation***	6.00%	6%
Minimum Radius***	409.29	643
Maximum Grade	10%	9%
Minimum Sight Dist.	216	360
Sidewalk Width(urban)	4	4
Clear-zone†	25	35
Project Notes/Design Exceptions?		

Existing Rdwy. Plans available? ☑ Yes ☐ No
Year of Plans: 1958
☑ Traffic Forecast Requested
Date Requested: 7/22/2019
☐ Mapping/Survey Requested
Date Requested:
Type:

Bridge No.:‡	(Bridge #1)	(Bridge #2)
Sufficiency Rating		
Total Length		
Width, curb to curb		
Span Lengths		
Year Built		
Posted Weight Limit		
Structurally Deficient?		
Functionally Obsolete?		
Existing Bridge Type		

Existing Geotech Data Available? ☐ Yes ☑ No
Detour Length(s): n/a

*If more than one road is included in the project, include additional sheets.
**Based on proposed Design Speed
***AASHTO's A Policy on Geometric Design of Highways and Streets
+AASHTO's Roadside Design Guide
‡If more than two bridges are located on the project, include additional sheets.

II. PROJECT PURPOSE AND NEED

A. Legislation

none found.

Funding	*Phase*	*Year*	*Amount*
	D		
	R		
	U		
	C		

B. Project Status

KYTC Program Management asked the Division of Planning to initiate a DNA study to investigate the feasibility of turn lanes into the North Oldham High School campus. In 2018 from MP 1.542-1.828 there was a sidewalk construction project from Ridgeview Drive to Settlers Point Trail, D=$23,000, RW=$10,000, and C=$100,000. In 2011, from MP 1.8-2.15 there was a rockfall hazard correction, D=$115,000, RW=$830,000, U=$40,000, and C=$1,580,000. In 2000, at MP 0 there was a Left Turn Lane constructed from US42 to KY1793. In 2015, there was an AC concrete overlay in fair condition with rideability 128 and 129.

C. System Linkage

KY 1793, from the junction with US 42, west of Goshen to the junction with KY 3222, a distance of 2.141 miles (MP 0.000 to MP 2.141) in Oldham County. It has a functional classification as an Urban Collector. The State system is Rural Secondary. The classification is not likely to change as a result of this project.

D. Modal Interrelationships

KY 1793 helps connect the local economy to several business locations along the Ohio River. There is a section of sidewalk along KY 1793 in front of the schools. Large numbers of pedestrians have been observed to cross and walk along KY 1793 in both sidewalk and non-sidewalk portions of the study area.

E. Social Demands & Economic Development

KY 1793 provides roadway access to the North Oldham High School, North Oldham Middle School, and Harmony Elementary School. Also served by this route is the Creasey Mahan Nature Preserve and Park, Mahan-Oldham County Public Library, and Fire Department Station 1.

II. PROJECT PURPOSE AND NEED (cont.)

F. Transportation Demand

AADT (year) trends are as follows: 4310 vpd (1992), 3720 (1995), 4110 (1996), 5450 (2000), 3920 (2003), 2770 (2006), 3960 (2009), 3882 (2012), 4368 (2015), and 4496 (2018), and 6370 (2019).

G. Capacity

Theoretical capacity is 1700 passenger cars/ hour/ lane. Current field counts are 6630 aadt with 416 passenger cars/hour/lane in the peak hour. School traffic backs up on the side roads during peak delivery and pick up hours, so a HCM analysis and microsimulation model can be used to analyze the existing conditions at the posted 45mph design speed. The observed traffic speed is 34 mph.

H. Safety

Crash data was obtained from MP 0 to MP 2.1 on KY 1793 from the KY State Police database for a 4 year period from August 1, 2015 to August 1, 2019. There were 0 fatalities, 4 injury collisions, and 44 total collisions. Collision data was obtained from MP 0.2 to MP 0.7 on KY 1793 from the KY State Police database for a 3 year period from August 1, 2016 to September 1, 2019. There were 0 fatalities, 0 injury collisions, and 10 total collisions. CRF = 0.42 for 0.4 mile section by the schools.

I. Roadway Deficiencies

KY 1793 was built in the 1950's, so it has deficiencies from current KYTC's Common Geometric Practices for shoulder width, superelevation, minimum radius, maximum grade, minimum sight distance, and clear zone.

III. PRELIMINARY ENVIRONMENTAL OVERVIEW

A. Air Quality

Project is in: ☐ Attainment area ☑ Nonattainment or Maintenance Area ☐ PM 2.5 County

STIP Pg.#: **TIP Pg.#:**

B. Archeology/Historic Resources

☐ Known Archeological or Historic Resources are present

none found

C. Threatened and Endangered Species

none found

D. Hazardous Materials

☐ Potentially Contaminated Sites are present ☐ Potential Bridge or Structure Demolition

none found

E. Permitting

Check all that may apply: ☐ Waters of the US ☐ MS4 area ☐ Floodplain Impacts ☐ Navigable Waters of the US Impacts

Are 401/404 Permits likely to be required? ☐ Yes ☑ No Impacts to: ☐ Wetlands ☐ Stream/Lake/Pond

☐ ACE LON ☐ ACE NW ☐ ACE IP ☐ DOW IWQC ☐ Special Use Waters

none foreseen if the project disturbed limits are less than 1 acre.

F. Noise

Are existing or planned noise sensitive receptors adjacent to the proposed project? ☐ Yes ☑ No

Is this considered a "Type I Project" according to KYTC Noise Analysis and Abatement Policy? ☐ Yes ☑ No

G. Socioeconomic

Check all that may apply: ☐ Low Income/Minority Populations ☐ Relocations ☐ Local Land Use Plan available

none found

H. Section 4(f) or 6(f) Resources

The following are present on the project: ☐ Section 4(f) Resources ☐ Section 6(f) Resources

none found

Anticipated Environmental Document: CE for Minor Projects

IV. PROJECT NEED, PURPOSE & SCOPE

A. Need:

KY 1793 intersection at the North Oldham County High School has congestion and mobility issues for vehicular and pedestrian traffic during peak traffic periods. The North Oldham Middle School entrance operates at LOS F during the AM peak period. The North Oldham High School entrance operates at LOS D during the AM peak period.

B. Purpose:

The purpose of this study is to address congestion and mobility issues on KY 1793 at entrances to the North Oldham High School campus.

C. Scope:

Alternative 1: No Build.
Alternative 2: Install traffic signals at MP 0.321, 0.45, and 0.56 to address congestion issues. D= $60,000 x2 R= $0 U= $0 C= $220,000 x2
Alternative 3: Install roundabouts at MP 0.321,0.45, and 0.56 to address congestion issues. D= $300,000 x2 R= $1,500,000 x2 U= $1,500,000 x2 C=$2,500,000 x2
Alternative 4: Install left turn lanes at each school entrance. D= $65,000 x2 R= $115,000 x2 U= $125,000 x2 C= $600,000 x2

V. PROJECT ESTIMATE & METHODOLOGY

Estimate Methodology:

Estimates obtained using KYTC average bid prices for similar projects. The current estimate shown is for the left turn lanes, alternative # 4.

Current Estimate

Phase	Estimate
Planning	
Design	$130,000
R/W	$230,000
Utilities	$250,000
Const	$1,200,000
Total	**$1,810,000**

VI. UTILITIES POTENTIALLY AFFECTED - CONTACT INFORMATION

Company Name -	Louisville Water Company
Contact -	Laura Kinder
Address -	550 South Third St., Louisville KY 40202
Email -	lwcgisproducts@lwcky.com
Company Name -	Veolia / Oldham County Env. Authority (Sewer)
Contact -	Justin C. Reed
Address -	700 W Jefferson St., LaGrange KY 40031
Phone No. -	502-225-9477
Company Name -	Charter / Spectrum (Communication)
Contact -	Nathen Howerton
Address -	10168 Linn Station Rd, Suite 120, Louisville KY 40233
Phone No. -	502-357-4318
Company Name -	LG&E and KU (Gas and Electric)
Address -	LGE: 820 W Broadway, Louisville Ky 40202
Address -	KU: 215 11th St., Crarollton KY 41008
Phone No. -	LGE: 800-331-7370 KU: 800-383-5582
Company Name -	AT&T (Communication)
Contact -	Scott Roche
Address -	1340 E John Rowan Blvd., Bardstown KY 40004
Phone No. -	502-348-4528
Company Name -	Century Link (Communication)
Contact -	Renoy Thomas
Address -	Tulsa OK, 74103
Email -	renoy.thomas@centurylink.com
Company Name -	Windstream (Communication)
Contact -	James Galvin
Address -	111 South Main St., Elizabethtown KY 42701
Phone No. -	270-765-1818

VII. TABLES AND EXHIBITS

DNA study report

Appendices

A	Traffic counts
B	HCS outputs
C	CCRF and Crash data
D	Existing plans
E	Environmental
F	Utilities
G	LAMPO TIP

Traffic Analysis Technical Memo

KY 1793 Data Needs Analysis (DNA) Study

At the request of the KYTC Division of Program Management, the Division of Planning has completed a DNA Study for KY 1793 in Oldham County, Kentucky between MP 0.000 and 0.558. As part of this effort, existing traffic data was collected and analyzed, with the study area and count locations shown in **Figure 1**.

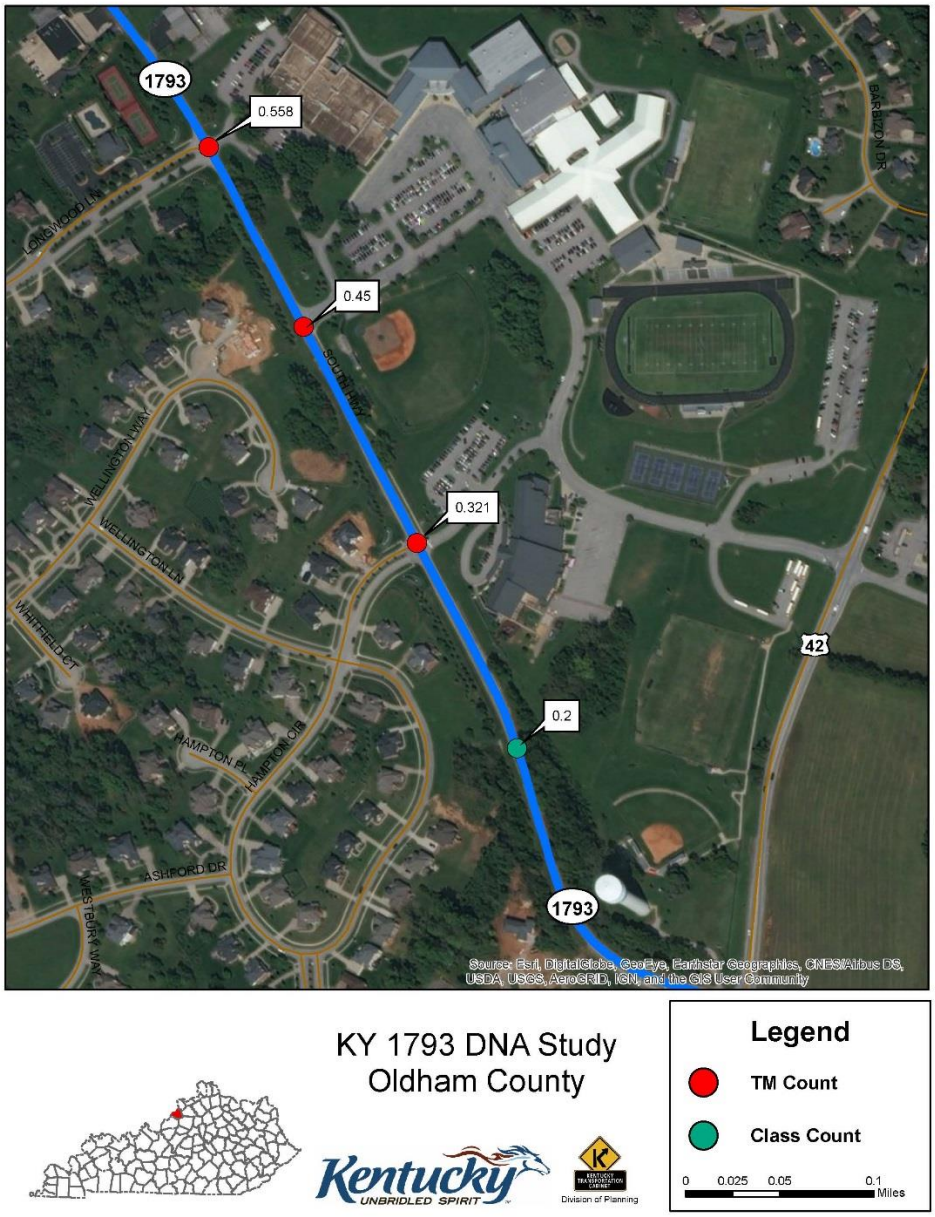

Figure 1 – Count Locations

KY 1793 is functionally classified as an urban major collector and provides direct access to North Oldham High School, North Oldham Middle School, Harmony Elementary School, and the Longwood subdivision. It carries one 10-foot lane in each direction with a 2-foot combination shoulder (one foot paved).

Turning movement counts were collected at the 3 locations noted on August 27, 2019. 48-hour vehicle classification counts taken at the same time were faulty and were re-collected on September 23-26, 2019. The raw count data can be found in **Appendix A**. The AM Peak Hour was observed to take place from 7:45 AM – 8:45 AM, while the PM Peak Hour was observed to take place from 3:45 PM – 4:45 PM. Volumes may not balance due to alternate entry/exit points from the North Oldham High School campus on US 42.

KYTC and the Kentucky Transportation Center (KTC) developed a spreadsheet-based tool to analyze if right or left turn lanes are warranted. Using this methodology, turn lane warrants were run for each movement and each peak time period. No intersections warranted right turn lanes. The results of the warrant analysis are shown in **Table 1**.

Table 1 – Left Turn Lane Warrants

	NB	SB
Hampton Circle/HES	In Place	X*
NOHS		X
Longwood Ln/NOMS		

* *Due to a bug in the KTC turn lane calculator, this location meets a turn lane warrant although the software says otherwise.*

As shown, left turn lanes are warranted at Hampton Circle/Harmony Elementary School and North Oldham High School. Given the close distance between these locations, a two-way left turn lane (TWLTL) should be considered as an alternative throughout the study area. Additionally, given the heavy pedestrian crossings inherent in school campus settings, sidewalks and crossings should be further investigated, along with possible signalization.

Highway Capacity Software Two-Way Stop Control Version 7.8.5 was used to analyze existing turning movements at the 3 indicated intersections. All intersections are two-way stop controlled. These results are shown in **Table 2**. Detailed analysis sheets can be found in **Appendix B**.

Table 2 - KY 1793 Traffic Analysis

KY 1793 @ Hampton Circle / Harmony Elementary School												
	KY 1793						Hampton Circle			Harmony Elementary School		
	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
AM Peak Volume (veh/h)	16	309	4	49	316	15	20	9	44	14	5	60
Control Delay (s/veh)	8.5			8.6			26.1			20.0		
Level of Service (LOS)	A			A			D			C		
PM Peak Volume (veh/h)	42	246	9	12	285	13	12	4	24	19	2	33
Control Delay (s/veh)	8.4			8.1			17.1			17.4		
Level of Service (LOS)	A			A			C			C		

KY 1793 @ North Oldham High School												
		KY 1793								North Oldham High School		
		Northbound		Southbound						Westbound		
		T	R	L	T					L		R
AM Peak Volume (veh/h)		271	131	59	345					43		22
Control Delay (s/veh)				9.1						25.8		
Level of Service (LOS)				A						D		
PM Peak Volume (veh/h)		254	30	19	235					92		46
Control Delay (s/veh)				8.3						18.1		
Level of Service (LOS)				A						C		

KY 1793 @ Longwood Lane / North Oldham Middle School												
	KY 1793						Longwood Lane			North Oldham Middle School		
	Northbound			Southbound			Eastbound			Westbound		
	L	T	R	L	T	R	L	T	R	L	T	R
AM Peak Volume (veh/h)	16	87	187	59	211	4	2	8	29	157	6	47
Control Delay (s/veh)	8.0			8.5			14.0			129.1		
Level of Service (LOS)	A			A			B			F		
PM Peak Volume (veh/h)	24	239	40	11	132	2	5	0	27	95	4	41
Control Delay (s/veh)	7.7			8.2			10.8			23.1		
Level of Service (LOS)	A			A			B			C		

Appendix A – Traffic Counts

Kentucky Transportation Cabinet

Short-term Hourly Traffic Volume for 09/23/2019 to 09/26/2019

Site names: 093504
County: Oldham
Funct Class: U Collector
Location: 093-KY-1793 -000 @ .900 From: KY 42 To: OLD KY 1793/KY

Seasonal Factor Grp: 3
Daily Factor Grp: 3
Axle Factor Grp: 17
Growth Factor Grp: 17

	Sun, Sep 22, 2019			Mon, Sep 23, 2019			Tue, Sep 24, 2019			Wed, Sep 25, 2019			Thu, Sep 26, 2019			Fri, Sep 27, 2019			Sat, Sep 28, 2019		
	Road	Pos	Neg	Road	Pos	Neg	Road	Pos	Neg	Road	Pos	Neg	Road	Pos	Neg	Road	Pos	Neg	Road	Pos	Neg
00:00							5	2	3	14	13	1	22	19	3						
01:00							5	3	2	3	2	1	10	5	5						
02:00							7	3	4	4	0	4	5	3	2						
03:00							3	1	2	12	5	7	6	3	3						
04:00							20	4	16	23	6	17	16	2	14						
05:00							77	17	60	72	13	59	80	11	69						
06:00							187	38	149	179	29	150	194	38	156						
07:00							440	153	287	463	173	290	509	204	305						
08:00							652	294	358	660	307	353	662	304	358						
09:00							297	112	185	316	147	169	289	111	178						
10:00							247	116	131	274	121	153									
11:00				318	143	175	319	134	185	312	129	183									
12:00				301	156	145	334	184	150	365	195	170									
13:00				275	141	134	319	160	159	262	155	107									
14:00				319	155	164	344	171	173	352	152	200									
15:00				583	273	310	588	292	296	589	277	312									
16:00				490	259	231	532	277	255	545	306	239									
17:00				553	311	242	583	368	215	588	330	258									
18:00				505	309	196	552	336	216	461	275	186									
19:00				396	219	177	524	252	272	369	212	157									
20:00				224	159	65	305	188	117	324	199	125									
21:00				103	76	27	218	104	114	165	117	48									
22:00				46	34	12	47	36	11	61	47	14									
23:00				21	13	8	25	16	9	19	14	5									
Total				4,134	2,248	1,886	6,630	3,261	3,369	6,432	3,224	3,208	1,793	700	1,093						
AM Peak Vol							661	308	358	679	329	353									
AM Peak Fct							.839	.755	.799	.812	.734	.857									
AM Peak Hr				:	:	:	7: 45	7: 45	8: 00	7: 45	7: 30	8: 00									
PM Peak Vol				624	329	341	640	416	345	641	342	362									
PM Peak Fct				.739	.848	.557	.721	.92	.564	.7	.847	.526									
PM Peak Hr				15: 15	17: 45	15: 15	17: 30	17: 30	15: 30	15: 30	16: 30	15: 45									
Seasonal Fct				.976	.976	.976	.976	.976	.976	.976	.976	.976	.976	.976	.976						
Daily Fct				1.046	1.046	1.046	.940	.940	.940	.932	.932	.932	.920	.920	.920						
Axle Fct				.500	.500	.500	.500	.500	.500	.500	.500	.500	.500	.500	.500						
Pulse Fct				2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000						

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Comment 2: Change These in The Preferences Window
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Comment 4: Then Click the Comments Tab

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07:30 AM	3	74	1	0	0	0	0	0	0	66	3	0	15	0	6	0
07:45 AM	1	51	1	0	0	0	0	0	1	51	3	0	8	0	3	0
08:00 AM	2	78	16	0	5	2	3	0	0	62	2	0	10	5	3	0
08:15 AM	9	93	16	0	26	0	4	0	0	124	4	0	13	3	10	0
08:30 AM	3	94	16	0	29	3	7	0	3	72	7	0	13	1	4	0
08:45 AM	0	61	1	0	1	0	1	0	1	24	4	0	19	0	0	0
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09:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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Comment 4: Then Click the Comments Tab

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07:15 AM	0	57	71	0	31	0	8	0	22	12	0	0	0	0	0	0
07:30 AM	0	35	29	0	43	0	45	0	34	40	0	0	0	0	0	0
07:45 AM	0	46	7	0	3	0	8	0	10	42	0	0	0	0	0	0
08:00 AM	0	90	5	0	11	0	7	0	12	49	0	0	0	0	0	0
08:15 AM	0	110	18	0	4	0	13	0	52	113	0	0	0	0	0	0
08:30 AM	0	99	29	0	4	0	15	0	54	67	0	0	0	0	0	0
08:45 AM	0	65	3	0	0	0	4	0	3	22	0	0	0	0	0	0
09:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00 PM	0	25	11	0	1	0	1	0	4	29	0	0	0	0	0	0
02:15 PM	0	25	8	0	12	0	4	0	5	32	0	0	0	0	0	0
02:30 PM	0	32	4	0	19	0	9	0	9	32	0	0	0	0	0	0
02:45 PM	0	21	3	0	17	0	32	0	9	36	0	0	0	0	0	0
03:00 PM	0	14	2	0	2	0	2	0	1	54	0	0	0	0	0	0
03:15 PM	0	54	1	0	3	0	3	0	11	64	0	0	0	0	0	0
03:30 PM	0	36	4	0	2	0	3	0	23	51	0	0	0	0	0	0
03:45 PM	0	85	4	0	26	0	71	0	12	67	0	0	0	0	0	0
04:00 PM	0	52	7	0	10	0	9	0	7	58	0	0	0	0	0	0
04:15 PM	0	49	4	0	7	0	8	0	6	60	0	0	0	0	0	0
04:30 PM	0	49	4	0	3	0	4	0	5	69	0	0	0	0	0	0
04:45 PM	0	39	4	0	9	0	12	0	8	84	0	0	0	0	0	0
05:00 PM	0	27	9	0	13	0	13	0	10	67	0	0	0	0	0	0
05:15 PM	0	30	2	0	11	0	6	0	8	66	0	0	0	0	0	0
05:30 PM	0	69	6	0	10	0	4	0	2	64	0	0	0	0	0	0
05:45 PM	0	71	18	0	7	0	7	0	9	100	0	0	0	0	0	0

File Name: Not Named 2
Start Date: 8/27/2019
Start Time: 7:00:00 AM
Site Code: 09320003
Comment 1: Default Comments
Comment 2: Change These in The Preferences Window
Comment 3: Select File/Preference in the Main Scree
Comment 4: Then Click the Comments Tab

	From North				From East				From South				From West			
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
07:00 AM	1	69	0	0	0	0	0	0	1	5	2	0	4	0	0	0
07:15 AM	1	103	4	0	1	0	4	0	9	35	2	0	16	0	0	0
07:30 AM	1	49	3	0	1	0	7	0	22	50	5	0	5	0	0	0
07:45 AM	1	40	10	0	2	0	16	0	28	15	4	0	4	0	0	0
08:00 AM	0	58	13	0	12	1	31	0	46	17	2	0	6	3	0	0
08:15 AM	2	54	28	0	21	2	62	0	83	27	6	0	7	4	1	0
08:30 AM	1	59	8	0	12	3	48	0	30	28	4	0	12	1	1	0
08:45 AM	0	41	0	0	0	0	9	0	3	15	3	0	10	0	0	0
09:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00 PM	2	27	0	0	0	0	3	0	3	26	1	0	6	0	0	0
02:15 PM	1	25	0	0	1	0	3	0	1	37	5	0	6	0	0	0
02:30 PM	0	26	0	0	1	0	6	0	3	42	7	0	3	0	1	0
02:45 PM	0	19	0	0	2	0	2	0	6	41	8	0	3	0	2	0
03:00 PM	0	13	10	0	0	0	1	0	35	17	3	0	4	1	0	0
03:15 PM	0	22	6	0	4	1	30	0	29	36	2	0	3	1	1	0
03:30 PM	2	27	4	0	1	0	14	0	22	22	7	0	1	0	0	0
03:45 PM	0	28	7	0	23	2	52	0	19	66	9	0	9	0	2	0
04:00 PM	1	29	4	0	14	0	24	0	11	54	4	0	6	0	1	0
04:15 PM	0	36	0	0	3	0	12	0	4	55	7	0	5	0	2	0
04:30 PM	1	39	0	0	1	2	7	0	6	64	4	0	7	0	0	0
04:45 PM	0	30	7	0	2	1	9	0	21	64	7	0	4	1	0	0
05:00 PM	0	27	4	0	0	0	5	0	14	60	9	0	4	0	2	0
05:15 PM	2	27	3	0	0	0	5	0	25	50	1	0	1	0	0	0
05:30 PM	0	56	2	0	6	0	15	0	6	62	6	0	6	0	0	0
05:45 PM	1	71	1	1	6	0	12	0	9	90	7	0	5	0	0	0

Appendix B – HCS Outputs

HCS7 Two-Way Stop-Control Report

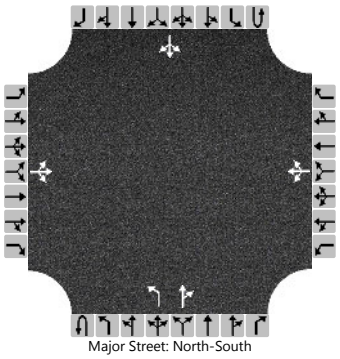
General Information

Analyst	Stephen DeWitte
Agency/Co.	KYTC
Date Performed	12/8/2019
Analysis Year	2019
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	KY 1793 DNA

Site Information

Intersection	KY 1793 @ HES/Hampton Cir
Jurisdiction	D5
East/West Street	HES/Hampton Circle
North/South Street	KY 1793
Peak Hour Factor	0.71
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	1	1	0	0	0	1	0
Configuration			LTR				LTR			L		TR			LTR	
Volume (veh/h)		20	9	44		14	5	60		16	309	4		49	316	15
Percent Heavy Vehicles (%)		9	9	9		9	9	9		9				9		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.19	6.59	6.29		7.19	6.59	6.29		4.19				4.19		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.58	4.08	3.38		3.58	4.08	3.38		2.28				2.28		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			103				111			23				69		
Capacity, c (veh/h)			272				350			1059				1083		
v/c Ratio			0.38				0.32			0.02				0.06		
95% Queue Length, Q_{95} (veh)			1.7				1.3			0.1				0.2		
Control Delay (s/veh)			26.1				20.0			8.5				8.6		
Level of Service (LOS)			D				C			A				A		
Approach Delay (s/veh)		26.1				20.0				0.4				1.7		
Approach LOS		D				C										

HCS7 Two-Way Stop-Control Report

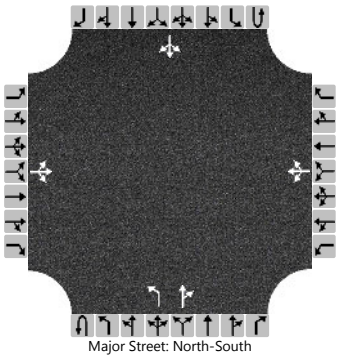
General Information

Analyst	Stephen DeWitte
Agency/Co.	KYTC
Date Performed	12/8/2019
Analysis Year	2019
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	KY 1793 DNA

Site Information

Intersection	KY 1793 @ HES/Hampton Cir
Jurisdiction	D5
East/West Street	HES/Hampton Circle
North/South Street	KY 1793
Peak Hour Factor	0.71
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	1	1	0	0	0	1	0
Configuration			LTR				LTR			L		TR			LTR	
Volume (veh/h)		12	4	24		19	2	33		42	246	9		12	285	13
Percent Heavy Vehicles (%)		9	9	9		9	9	9		9				9		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.19	6.59	6.29		7.19	6.59	6.29		4.19				4.19		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.58	4.08	3.38		3.58	4.08	3.38		2.28				2.28		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			56				76			59				17		
Capacity, c (veh/h)			355				366			1103				1162		
v/c Ratio			0.16				0.21			0.05				0.01		
95% Queue Length, Q_{95} (veh)			0.6				0.8			0.2				0.0		
Control Delay (s/veh)			17.1				17.4			8.4				8.1		
Level of Service (LOS)			C				C			A				A		
Approach Delay (s/veh)		17.1				17.4				1.2				0.5		
Approach LOS		C				C										

HCS7 Two-Way Stop-Control Report

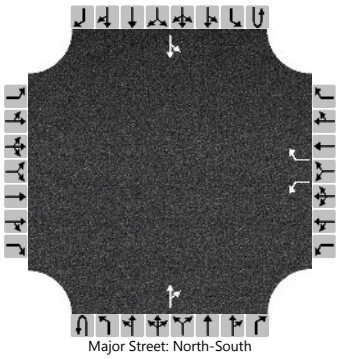
General Information

Analyst	Stephen DeWitte
Agency/Co.	KYTC
Date Performed	12/8/2019
Analysis Year	2019
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	KY 1793 DNA

Site Information

Intersection	KY 1793 @ NOHS
Jurisdiction	D5
East/West Street	NOHS
North/South Street	KY 1793
Peak Hour Factor	0.70
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	0	1	0	0	0	1	0
Configuration						L		R				TR		LT		
Volume (veh/h)						43		22			271	131		59	345	
Percent Heavy Vehicles (%)						9		9						9		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No										
Median Type | Storage						Undivided										

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.49		6.29						4.19		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.58		3.38						2.28		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						61		31						84		
Capacity, c (veh/h)						189		571						965		
v/c Ratio						0.33		0.06						0.09		
95% Queue Length, Q_{95} (veh)						1.3		0.2						0.3		
Control Delay (s/veh)						33.0		11.7						9.1		
Level of Service (LOS)						D		B						A		
Approach Delay (s/veh)						25.8								2.3		
Approach LOS						D										

HCS7 Two-Way Stop-Control Report

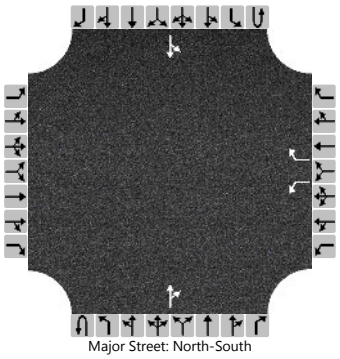
General Information

Analyst	Stephen DeWitte
Agency/Co.	KYTC
Date Performed	12/8/2019
Analysis Year	2019
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	KY 1793 DNA

Site Information

Intersection	KY 1793 @ NOHS
Jurisdiction	D5
East/West Street	NOHS
North/South Street	KY 1793
Peak Hour Factor	0.70
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	0	1	0	0	0	1	0
Configuration						L		R				TR		LT		
Volume (veh/h)						92		46			254	30		19	235	
Percent Heavy Vehicles (%)						9		9						9		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No										
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.49		6.29						4.19		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.58		3.38						2.28		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						131		66						27		
Capacity, c (veh/h)						346		648						1116		
v/c Ratio						0.38		0.10						0.02		
95% Queue Length, Q_{95} (veh)						1.7		0.3						0.1		
Control Delay (s/veh)						21.6		11.2						8.3		
Level of Service (LOS)						C		B						A		
Approach Delay (s/veh)						18.1								0.9		
Approach LOS						C										

HCS7 Two-Way Stop-Control Report

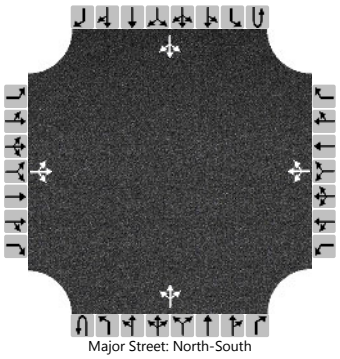
General Information

Analyst	Stephen DeWitte
Agency/Co.	KYTC
Date Performed	12/8/2019
Analysis Year	2019
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	KY 1793 DNA

Site Information

Intersection	KY 1793 @ NOMS/Longwood L
Jurisdiction	D5
East/West Street	NOMS Driveway/Longwood La
North/South Street	KY 1793
Peak Hour Factor	0.68
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		2	8	29		157	6	47		16	87	187		59	211	4
Percent Heavy Vehicles (%)		9	9	9		9	9	9		9				9		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.19	6.59	6.29		7.19	6.59	6.29		4.19				4.19		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.58	4.08	3.38		3.58	4.08	3.38		2.28				2.28		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			57				309			24				87		
Capacity, c (veh/h)			459				277			1205				1119		
v/c Ratio			0.12				1.12			0.02				0.08		
95% Queue Length, Q_{95} (veh)			0.4				13.0			0.1				0.3		
Control Delay (s/veh)			14.0				129.1			8.0				8.5		
Level of Service (LOS)			B				F			A				A		
Approach Delay (s/veh)		14.0				129.1				0.6				2.5		
Approach LOS		B				F										

HCS7 Two-Way Stop-Control Report

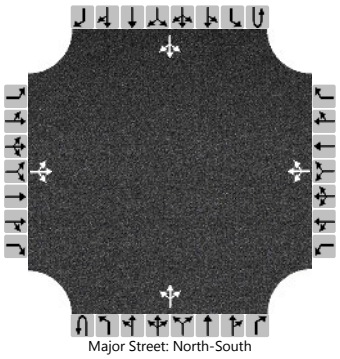
General Information

Analyst	Stephen DeWitte
Agency/Co.	KYTC
Date Performed	12/8/2019
Analysis Year	2019
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	KY 1793 DNA

Site Information

Intersection	KY 1793 @ NOMS/Longwood L
Jurisdiction	D5
East/West Street	NOMS Driveway/Longwood La
North/South Street	KY 1793
Peak Hour Factor	0.71
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		5	0	27		95	4	41		24	239	40		11	132	2
Percent Heavy Vehicles (%)		9	9	9		9	9	9		9				9		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.19	6.59	6.29		7.19	6.59	6.29		4.19				4.19		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.58	4.08	3.38		3.58	4.08	3.38		2.28				2.28		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			45				197			34				15		
Capacity, c (veh/h)			661				392			1345				1130		
v/c Ratio			0.07				0.50			0.03				0.01		
95% Queue Length, Q_{95} (veh)			0.2				2.7			0.1				0.0		
Control Delay (s/veh)			10.8				23.1			7.7				8.2		
Level of Service (LOS)			B				C			A				A		
Approach Delay (s/veh)	10.8				23.1				0.8				0.7			
Approach LOS	B				C											