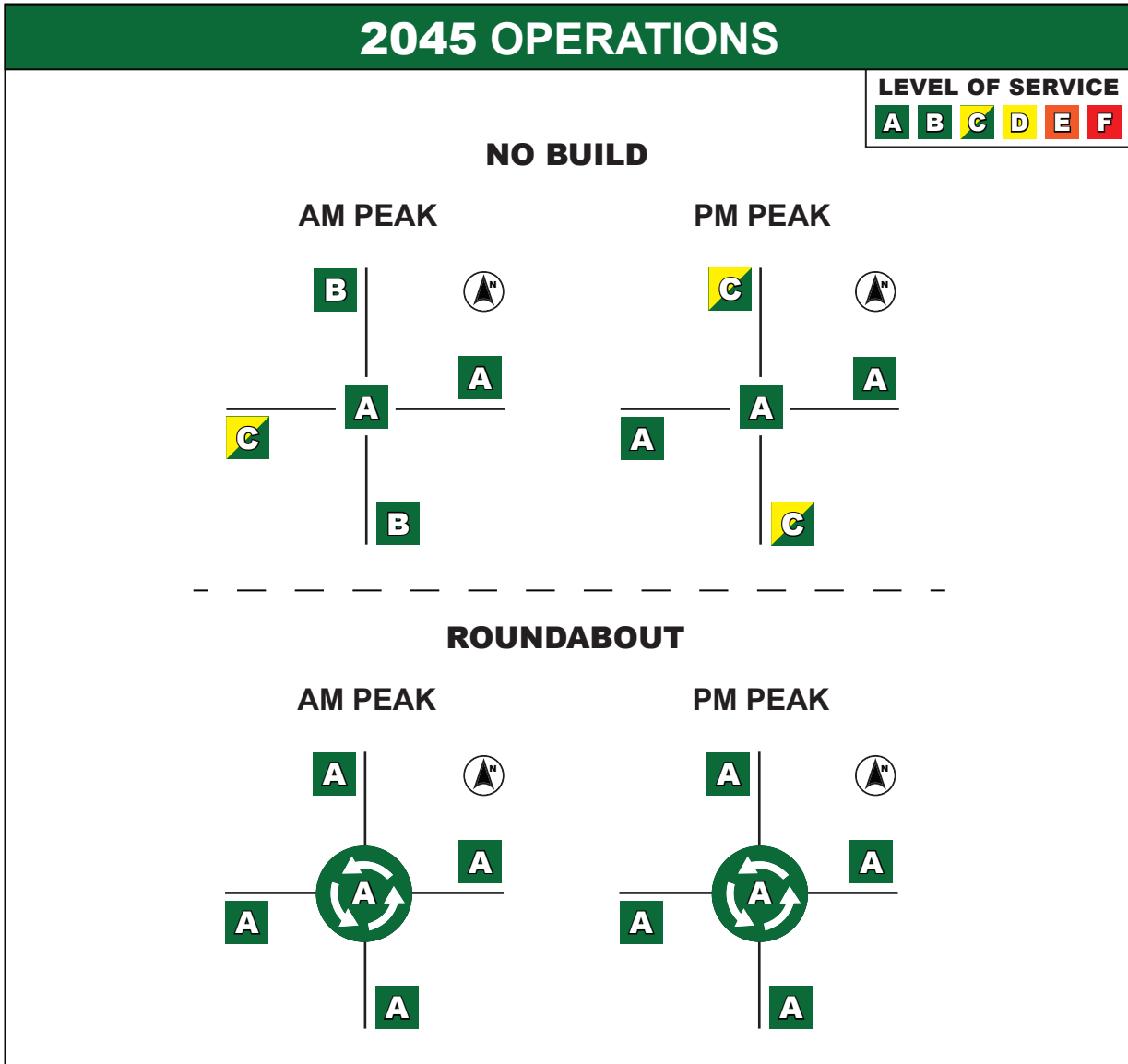


2015-2019 CRASH DATA

CRASHES	INJURIES			
	FATALITIES	TYPE A	TYPE B	TYPE C
2 ANGLE	0	0	0	0
0 HEAD-ON				

2045 OPERATIONS



Opinion of probable cost for single-lane roundabout

\$1.39 MILLION

L. Robert T. Longway Boulevard and Walnut Street

The intersection of Robert T. Longway Boulevard and Walnut Street was included in the early preliminary engineering phase with support from of the City of Flint due to intersection operations and future plans to close Kearsley Street at Walnut and make the intersection at Robert T. Longway Boulevard and Walnut Street the eastern entrance into the Flint Cultural Center. This intersection is a secondary analysis Tier Three intersection.

During the skim analysis, it was observed that there were two angle crashes and zero head on left turn crashes over the 5-year period. These crashes resulted in no fatalities or type A, type B, or type C injuries at the intersection.

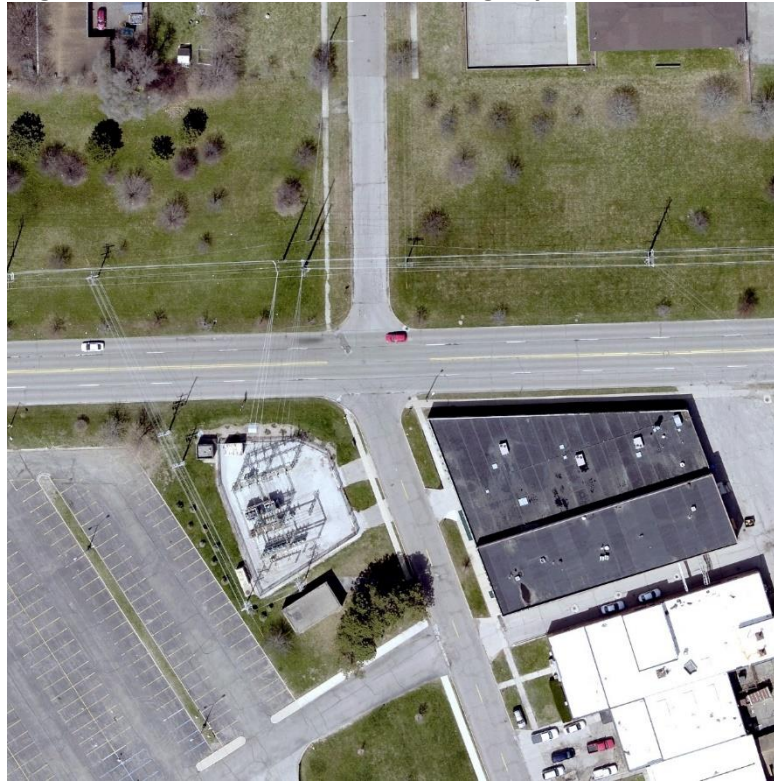
Future No-Build Conditions

The intersection of Robert T. Longway and Walnut Street is a two-way stop control intersection. Robert T. Longway runs east/west and is a four-lane roadway with two lanes in each direction. Walnut Street runs north/south and is a two-lane road with one lane in each direction. The Walnut Street approaches are stop controlled.

In the southwest quadrant of the intersection is a Consumers Energy electrical sub-station. The Buick Gallery is located adjacent to the right-of-way in the southeast quadrant. To the north of the intersection is vacant property owned by the City of Flint but there are high-voltage power lines that run east/west overhead.

An aerial of the existing intersection can be seen in Figure 13: Aerial view of Robert T. Longway and Walnut Street.

Figure 13: Aerial view of Robert T. Longway and Walnut Street



An operational analysis of the no-build condition was completed for the intersection using the 2045 forecast traffic volumes. The results of the analysis for future no-build conditions reveals that all approaches and movements of the intersection operate at LOS C or better during the AM and PM peak hours.

The 95th percentile queue lengths were reviewed at the intersection and results showed that all approaches experienced a maximum queue length of 48 feet (2 vehicles) during the AM peak hour and 44 feet (2 vehicles) during the PM peak hour.

The operational results for future no-build conditions are presented in Table 28.

Table 28: Operational Analysis for 2045 No-Build Conditions

Intersection	Approach	AM Peak		PM Peak	
		Delay/LOS	Queue (veh)*	Delay/LOS	Queue (veh)*
Robert T. Longway Boulevard and Walnut Street	Eastbound	0.2/A	1 (17 ft)	0.1/A	1 (32 ft)
	Westbound	0.1/A	1 (14 ft)	0.1/A	1 (16 ft)
	Northbound	12.7/B	2 (48 ft)	18.2/C	2 (41 ft)
	Southbound	12.5/B	2 (38 ft)	17.6/C	2 (44 ft)
	Overall	1.1/A		1.0/A	

* 95th percentile queue length

Roundabout Conditions

Due to the current four-lane cross-section on Robert T. Longway Boulevard, two potential roundabout layouts were developed. A two-lane by one-lane roundabout was drawn that allowed for a two-lane

approach for eastbound and westbound Robert T. Longway and a single-lane approach for Walnut Street. Because of the location of both the Consumers Energy electric substation and the Buick Gallery, the roundabout was offset to the north of the current location. The property to the north of the intersection is owned by the City of Flint, therefore no additional right-of-way would be needed to accommodate this shift. Although no additional right-of-way will be necessary, the Consumers Energy easement and overhead power will need to be relocated to accommodate a proposed roundabout. A full layout can be found at the end of this section.

An operational analysis of the roundabout (build) condition was completed for the intersection using the 2045 forecast traffic volumes. The results of the analysis for roundabout (build) conditions reveals that all approaches and movements of the intersection operate at LOS A during the AM and PM peak hours.

The 95th percentile queue lengths were reviewed at the intersection and results showed that all approaches experienced a maximum queue length of one vehicle during the AM peak hour and PM peak hour for the 2 by 1 layout and 2 vehicles during the AM and PM peak hour for the single-lane roundabout.

The operational results for future roundabout (build) conditions are presented in Table 29.

Table 29: Operational Analysis for Future Conditions

Intersection	Approach	AM Peak		PM Peak	
		Delay/LOS	Queue (veh)*	Delay/LOS	Queue (veh)*
Robert T. Longway Blvd and Walnut Street (2-EB/WB, 1-NB/SB circulating)	Eastbound	3.6/A	0.6	4.1/A	0.9
	Westbound	3.3/A	0.5	3.9/A	0.8
	Northbound	3.6/A	0.1	3.8/A	0.1
	Southbound	3.0/A	0.0	3.5/A	0.1
	Overall	3.5/A		4.0/A	
Robert T. Longway Blvd and Walnut Street (Single-lane RAB)	Eastbound	4.3/A	1.4	5.1/A	2.3
	Westbound	4.1/A	1.2	4.8/A	2.0
	Northbound	3.7/A	0.1	4.1/A	0.1
	Southbound	3.5/A	0.0	3.8/A	0.1
	Overall	4.2/A		4.9/A	

* 95th percentile queue length

Opinions of probable costs were developed for both scenarios. The 2 by 1 roundabout probable cost is \$1.61 million in year 2025 dollars. The single-lane roundabout probable cost is \$1.39 million in year 2025 dollars. These probable costs include a 20 percent contingency and 3 percent annual inflation. The potential fees from Consumers Energy to relocate their high voltage poles to accommodate the proposed layouts was estimated to be \$200,000 based on information provided from Consumers Energy. A full breakdown along with all assumptions can be found in Appendix 3.

Potential funding for this improvement could be made possible by regular road improvement funding or an earmark. There are no significant crashes of the type that would make the intersections eligible for safety funds and the intersection does not experience enough delay to make it eligible for CMAQ funding.

The Whiting Special Event Traffic Analysis

A separate traffic analysis was completed to determine the feasibility of a roundabout with an event at The Whiting. A trip generation was performed for The Whiting based on a 2,043-seat venue. A 50/50 split was used for distribution of vehicles leaving using Kearsley Street and Walnut Street. It was determined based on a trip generation rate from the 9th Edition of the Trip Generation Manual, there would be a total of 41 trips (21 in, 20 out) generated during the PM peak hour. Table 30 presents the trip generation.

Table 30: The Whiting Trip Generation

Development	Land Use	Land Use Code	Units		AM Peak Hour			PM Peak Hour		
					In	Out	Total	In	Out	Total
The Whiting	Live Theater	441	2,043	seats	-	-	-	21	20	41

This results in roughly five to six vehicles generated using Walnut Street to enter/exit The Whiting. Special events typically do not occur during the typical peak hours (7-9 a.m. and 4-6 p.m.). To create a more conservative case, 200 vehicles were added to the major movements entering/exiting The Whiting at Robert T. Longway Boulevard and Walnut Street: northbound right and left turning movements, eastbound right turning movement, westbound left turning movement. Table 31 presents the operational results for a single lane roundabout with a special event at The Whiting.

Table 31: Operational Analysis for Future Conditions – The Whiting Special Event

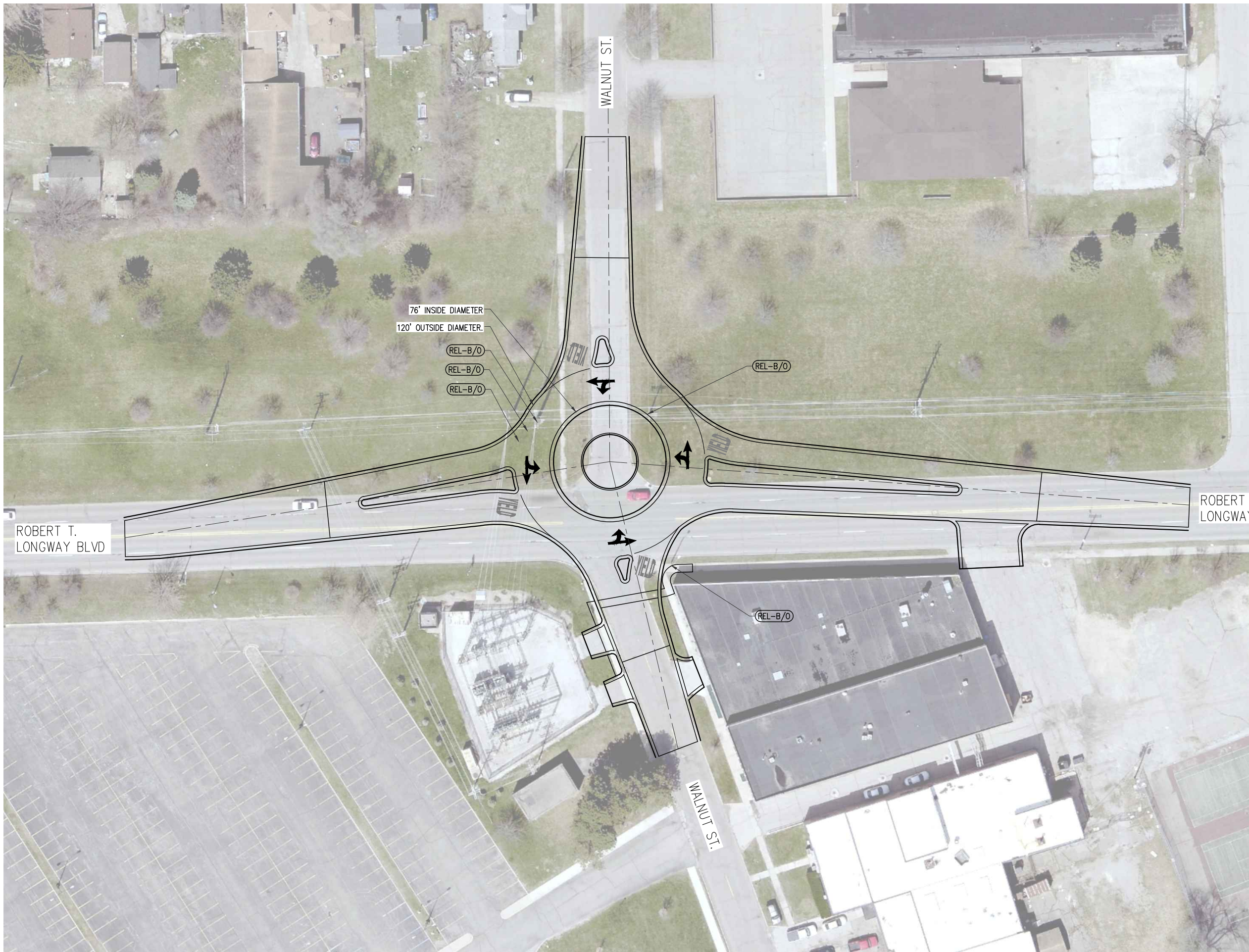
Intersection	Approach	Event Peak	
		Delay/LOS	Queue (veh)*
Robert T. Longway Blvd and Walnut Street (Single Lane RAB)	Eastbound	8.3/A	5.4
	Westbound	7.5/A	4.6
	Northbound	6.9/A	2.5
	Southbound	4.9/A	0.1
	Overall	7.6/A	

*95th Percentile queue length

Based on the addition of event traffic, a proposed single lane roundabout will operate with acceptable LOS during an event at The Whiting.

Recommendation

A roundabout would be feasible at this location, although it would be quite costly due to the necessary relocation of the Consumers Energy power lines. If the City of Flint moves forward with a road diet on Robert T. Longway east of northbound Chavez, a single-lane roundabout would be desirable.



76' INSIDE DIAMETER
120' OUTSIDE DIAMETER.

REL-B/O
REL-B/O
REL-B/O

REL-B/O

REL-B/O

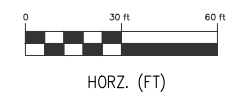
ROBERT T. LONGWAY BLVD

WALNUT ST.

ROBERT T. LONGWAY BLVD

WALNUT ST.

ROBERT T. LONGWAY BLVD AND WALNUT ST.
ROUNDABOUT CONCEPT
SCALE: 1" = 60'



CONCEPT PLAN - FOR DISCUSSION PURPOSES ONLY

PLAN DATE: MAY 27, 2021

ROWE PROFESSIONAL SERVICES COMPANY



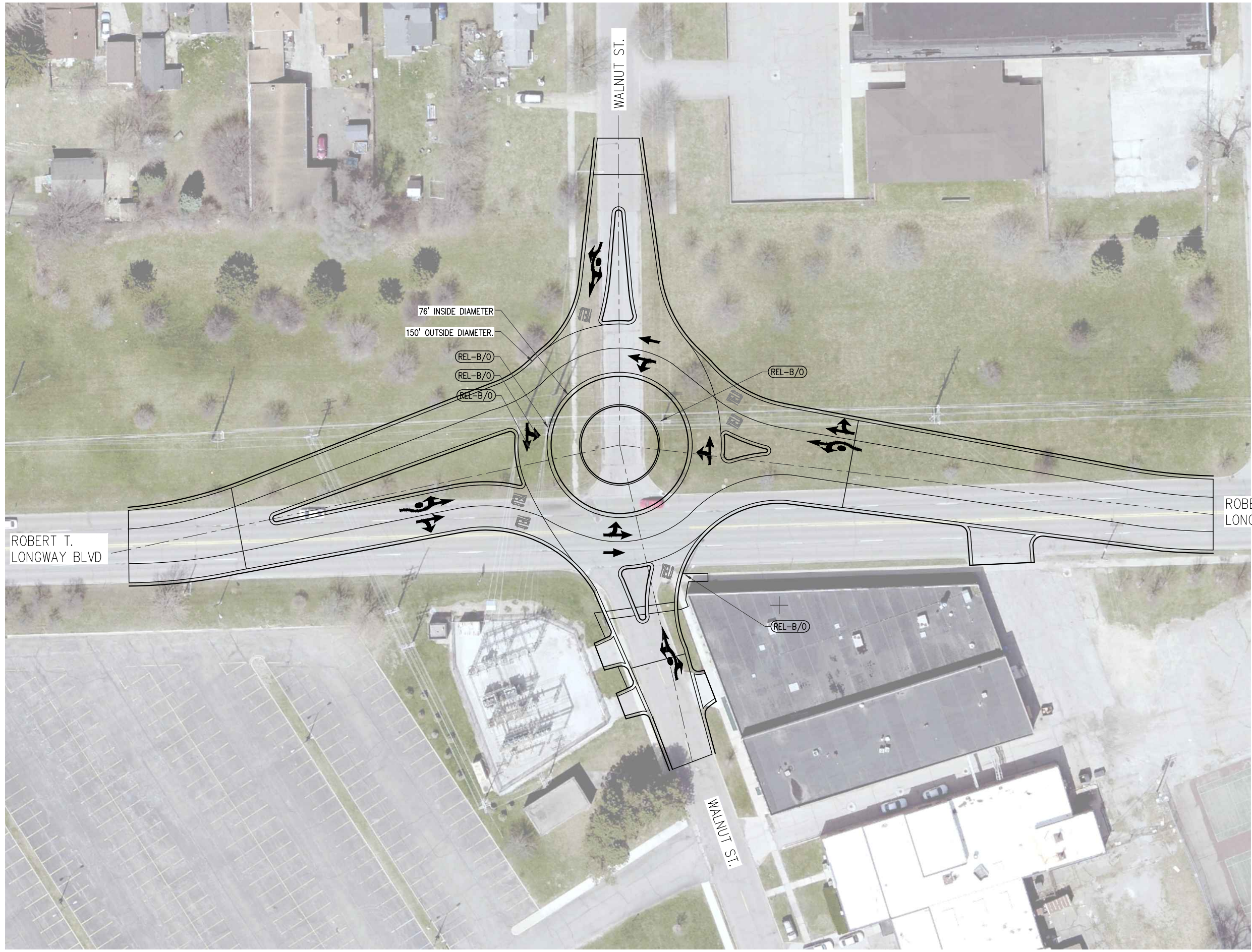
The Rowe Building
540 S. Saginaw St., Suite 200
Flint, MI 48502

O: (810) 341-7500
F: (810) 341-7573
www.rowepsc.com

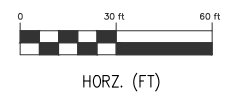
PREPARED FOR
GENESEE COUNTY ROAD COMMISSION
ROUNDABOUT CONCEPTS
ROBERT T LONGWAY BLVD AND WALNUT STREET
SINGLE LANE ROUNDABOUT CONCEPT

FIGURE NO.
12A
JOB No: 19C0262

Plotted: 6/3/2021 3:03 PM R:\Projects\19C0262\Draw\Measures\Draw_Concepts\RobertLongway_Walnut_Concept_Single.rvt



ROBERT T. LONGWAY BLVD
AND WALNUT ST.
ROUNDABOUT CONCEPT
SCALE: 1" = 60'



PLAN DATE: MAY 27, 2021

ROWE PROFESSIONAL SERVICES COMPANY
 O: (810) 341-7500
 F: (810) 341-7573
 www.rowepsc.com
 The Rowe Building
 540 S. Saginaw St., Suite 200
 Flint, MI 48502

PREPARED FOR
GENESEE COUNTY ROAD COMMISSION
ROUNDABOUT CONCEPTS
 ROBERT T LONGWAY BLVD AND WALNUT STREET
 DOUBLE LANE ROUNDABOUT CONCEPT

FIGURE NO.
12B
 JOB No: 19C0262

Robert T Longway Boulevard & Walnut Street - TMC

Tue Mar 9, 2021

Full Length (7 AM-9 AM, 4 PM-6 PM)

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

All Movements

ID: 817412, Location: 43.025598, -83.676457



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Robert T Longway Blvd Eastbound						Robert T Longway Blvd Westbound						Walnut St Northbound						Walnut St Southbound						Int
	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	L	T	R	U	App	Ped*	
2021-03-09 7:00AM	0	33	4	0	37	0	2	24	0	0	26	0	0	0	1	0	1	0	0	0	1	0	1	0	65
7:15AM	1	35	4	0	40	0	0	39	0	0	39	0	0	0	1	0	1	0	1	0	1	0	2	0	82
7:30AM	1	66	8	0	75	0	0	73	0	0	73	0	1	0	1	0	2	0	2	0	2	0	4	0	154
7:45AM	0	70	8	0	78	0	2	73	1	0	76	0	0	0	0	0	0	0	2	0	0	0	2	0	156
Hourly Total	2	204	24	0	230	0	4	209	1	0	214	0	1	0	3	0	4	0	5	0	4	0	9	0	457
8:00AM	2	72	6	0	80	0	1	64	0	0	65	0	7	0	7	0	14	0	1	0	2	0	3	0	162
8:15AM	3	63	4	0	70	0	1	46	0	0	47	0	2	0	4	0	6	0	1	0	1	0	2	0	125
8:30AM	0	66	8	0	74	0	0	55	1	0	56	0	2	0	1	0	3	0	0	0	5	0	5	0	138
8:45AM	0	60	12	0	72	0	0	57	0	0	57	0	0	0	0	0	0	0	0	0	3	0	3	0	132
Hourly Total	5	261	30	0	296	0	2	222	1	0	225	0	11	0	12	0	23	0	2	0	11	0	13	0	557
4:00PM	2	97	4	0	103	0	1	110	1	0	112	0	1	0	3	0	4	0	3	1	2	0	6	0	225
4:15PM	2	99	2	0	103	0	1	71	0	0	72	0	1	2	2	0	5	0	0	0	2	0	2	0	182
4:30PM	1	90	1	0	92	0	1	107	2	0	110	0	3	0	0	0	3	0	2	2	2	0	6	0	211
4:45PM	0	102	5	0	107	0	1	81	1	0	83	0	3	0	1	0	4	0	1	0	1	0	2	0	196
Hourly Total	5	388	12	0	405	0	4	369	4	0	377	0	8	2	6	0	16	0	6	3	7	0	16	0	814
5:00PM	2	92	10	0	104	0	0	85	1	0	86	0	4	0	4	0	8	0	2	0	2	0	4	0	202
5:15PM	1	81	9	0	91	0	2	71	0	0	73	0	3	0	2	0	5	0	1	1	4	0	6	0	175
5:30PM	4	96	7	0	107	0	3	80	0	0	83	0	1	2	2	0	5	0	2	0	2	0	4	0	199
5:45PM	3	77	7	0	87	1	0	68	2	0	70	0	0	1	2	0	3	0	2	0	3	0	5	0	165
Hourly Total	10	346	33	0	389	1	5	304	3	0	312	0	8	3	10	0	21	0	7	1	11	0	19	0	741
Total	22	1199	99	0	1320	1	15	1104	9	0	1128	0	28	5	31	0	64	0	20	4	33	0	57	0	2569
% Approach	1.7%	90.8%	7.5%	0%	-	-	1.3%	97.9%	0.8%	0%	-	-	43.8%	7.8%	48.4%	0%	-	-	35.1%	7.0%	57.9%	0%	-	-	-
% Total	0.9%	46.7%	3.9%	0%	51.4%	-	0.6%	43.0%	0.4%	0%	43.9%	-	1.1%	0.2%	1.2%	0%	2.5%	-	0.8%	0.2%	1.3%	0%	2.2%	-	-
Lights	22	1167	94	0	1283	-	14	1078	9	0	1101	-	24	5	31	0	60	-	20	4	32	0	56	-	2500
% Lights	100%	97.3%	94.9%	0%	97.2%	-	93.3%	97.6%	100%	0%	97.6%	-	85.7%	100%	100%	0%	93.8%	-	100%	100%	97.0%	0%	98.2%	-	97.3%
Single-Unit Trucks	0	17	1	0	18	-	1	15	0	0	16	-	0	0	0	0	0	-	0	0	0	0	0	-	34
% Single-Unit Trucks	0%	1.4%	1.0%	0%	1.4%	-	6.7%	1.4%	0%	0%	1.4%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	1.3%
Articulated Trucks	0	3	0	0	3	-	0	3	0	0	3	-	0	0	0	0	0	-	0	0	0	0	0	-	6
% Articulated Trucks	0%	0.3%	0%	0%	0.2%	-	0%	0.3%	0%	0%	0.3%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0.2%
Buses	0	12	4	0	16	-	0	7	0	0	7	-	4	0	0	0	4	-	0	0	1	0	1	-	28
% Buses	0%	1.0%	4.0%	0%	1.2%	-	0%	0.6%	0%	0%	0.6%	-	14.3%	0%	0%	0%	6.3%	-	0%	0%	3.0%	0%	1.8%	-	1.1%
Bicycles on Road	0	0	0	0	0	-	0	1	0	0	1	-	0	0	0	0	0	-	0	0	0	0	0	-	1
% Bicycles on Road	0%	0%	0%	0%	0%	-	0%	0.1%	0%	0%	0.1%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%
Pedestrians	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Pedestrians	-	-	-	-	-	100%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

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

Robert T Longway Boulevard & Walnut Street - TMC

Tue Mar 9, 2021

Full Length (7 AM-9 AM, 4 PM-6 PM)

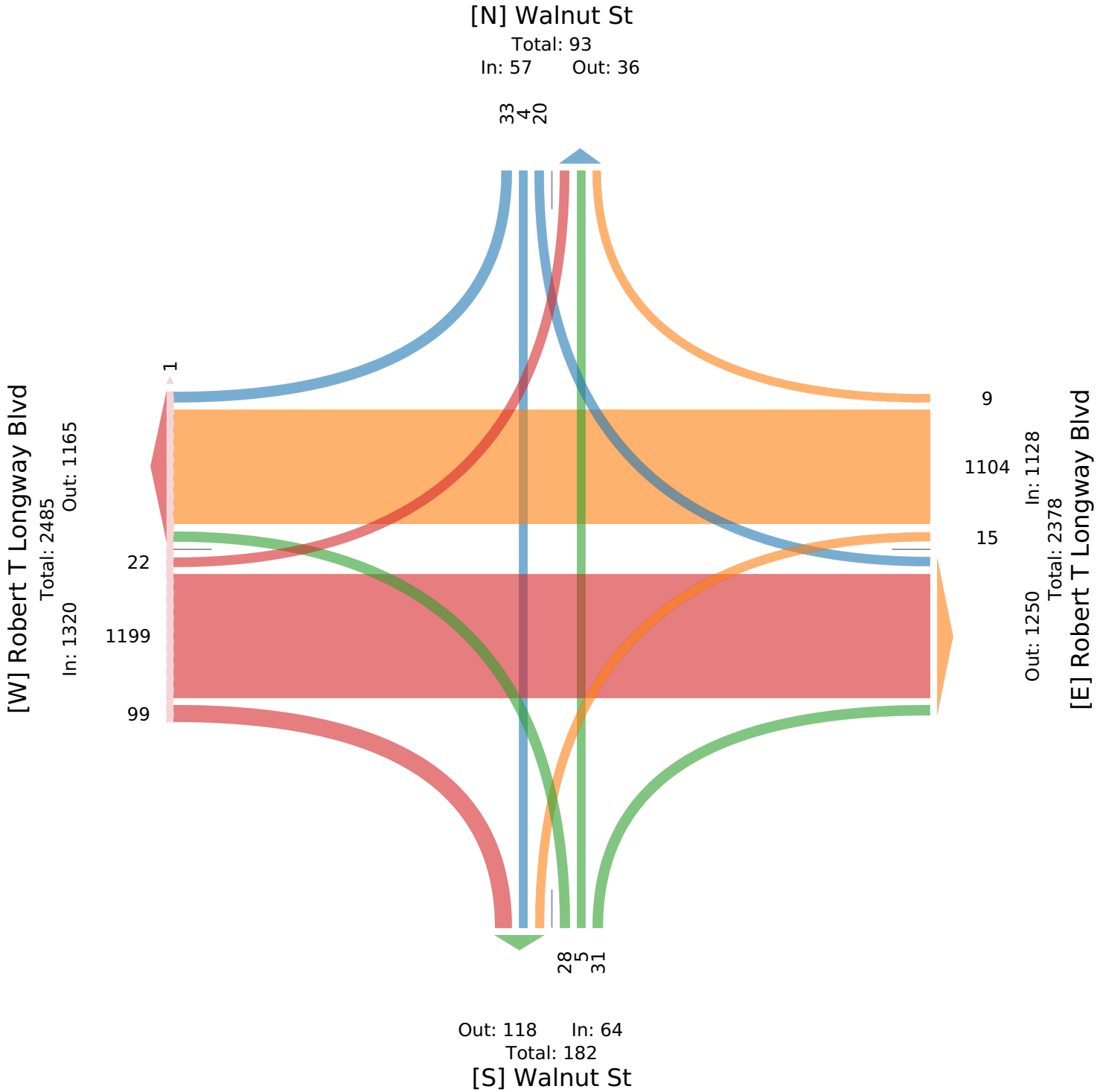
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 817412, Location: 43.025598, -83.676457



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Robert T Longway Boulevard & Walnut Street - TMC

Tue Mar 9, 2021

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

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

All Movements

ID: 817412, Location: 43.025598, -83.676457



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Robert T Longway Blvd Eastbound						Robert T Longway Blvd Westbound						Walnut St Northbound						Walnut St 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
2021-03-09 7:30AM	1	66	8	0	75	0	0	73	0	0	73	0	1	0	1	0	2	0	2	0	2	0	4	0	154
7:45AM	0	70	8	0	78	0	2	73	1	0	76	0	0	0	0	0	0	0	2	0	0	0	2	0	156
8:00AM	2	72	6	0	80	0	1	64	0	0	65	0	7	0	7	0	14	0	1	0	2	0	3	0	162
8:15AM	3	63	4	0	70	0	1	46	0	0	47	0	2	0	4	0	6	0	1	0	1	0	2	0	125
Total	6	271	26	0	303	0	4	256	1	0	261	0	10	0	12	0	22	0	6	0	5	0	11	0	597
% Approach	2.0%	89.4%	8.6%	0%	-	-	1.5%	98.1%	0.4%	0%	-	-	45.5%	0%	54.5%	0%	-	-	54.5%	0%	45.5%	0%	-	-	-
% Total	1.0%	45.4%	4.4%	0%	50.8%	-	0.7%	42.9%	0.2%	0%	43.7%	-	1.7%	0%	2.0%	0%	3.7%	-	1.0%	0%	0.8%	0%	1.8%	-	-
PHF	0.500	0.941	0.813	-	0.947	-	0.500	0.877	0.250	-	0.859	-	0.357	-	0.429	-	0.393	-	0.750	-	0.625	-	0.688	-	0.921
Lights	6	262	25	0	293	-	3	246	1	0	250	-	9	0	12	0	21	-	6	0	5	0	11	-	575
% Lights	100%	96.7%	96.2%	0%	96.7%	-	75.0%	96.1%	100%	0%	95.8%	-	90.0%	0%	100%	0%	95.5%	-	100%	0%	100%	0%	100%	-	96.3%
Single-Unit Trucks	0	6	0	0	6	-	1	5	0	0	6	-	0	0	0	0	0	-	0	0	0	0	0	-	12
% Single-Unit Trucks	0%	2.2%	0%	0%	2.0%	-	25.0%	2.0%	0%	0%	2.3%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	2.0%
Articulated Trucks	0	1	0	0	1	-	0	2	0	0	2	-	0	0	0	0	0	-	0	0	0	0	0	-	3
% Articulated Trucks	0%	0.4%	0%	0%	0.3%	-	0%	0.8%	0%	0%	0.8%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0.5%
Buses	0	2	1	0	3	-	0	3	0	0	3	-	1	0	0	0	1	-	0	0	0	0	0	-	7
% Buses	0%	0.7%	3.8%	0%	1.0%	-	0%	1.2%	0%	0%	1.1%	-	10.0%	0%	0%	0%	4.5%	-	0%	0%	0%	0%	0%	-	1.2%
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0
% Bicycles on Road	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

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

Robert T Longway Boulevard & Walnut Street - TMC

Tue Mar 9, 2021

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

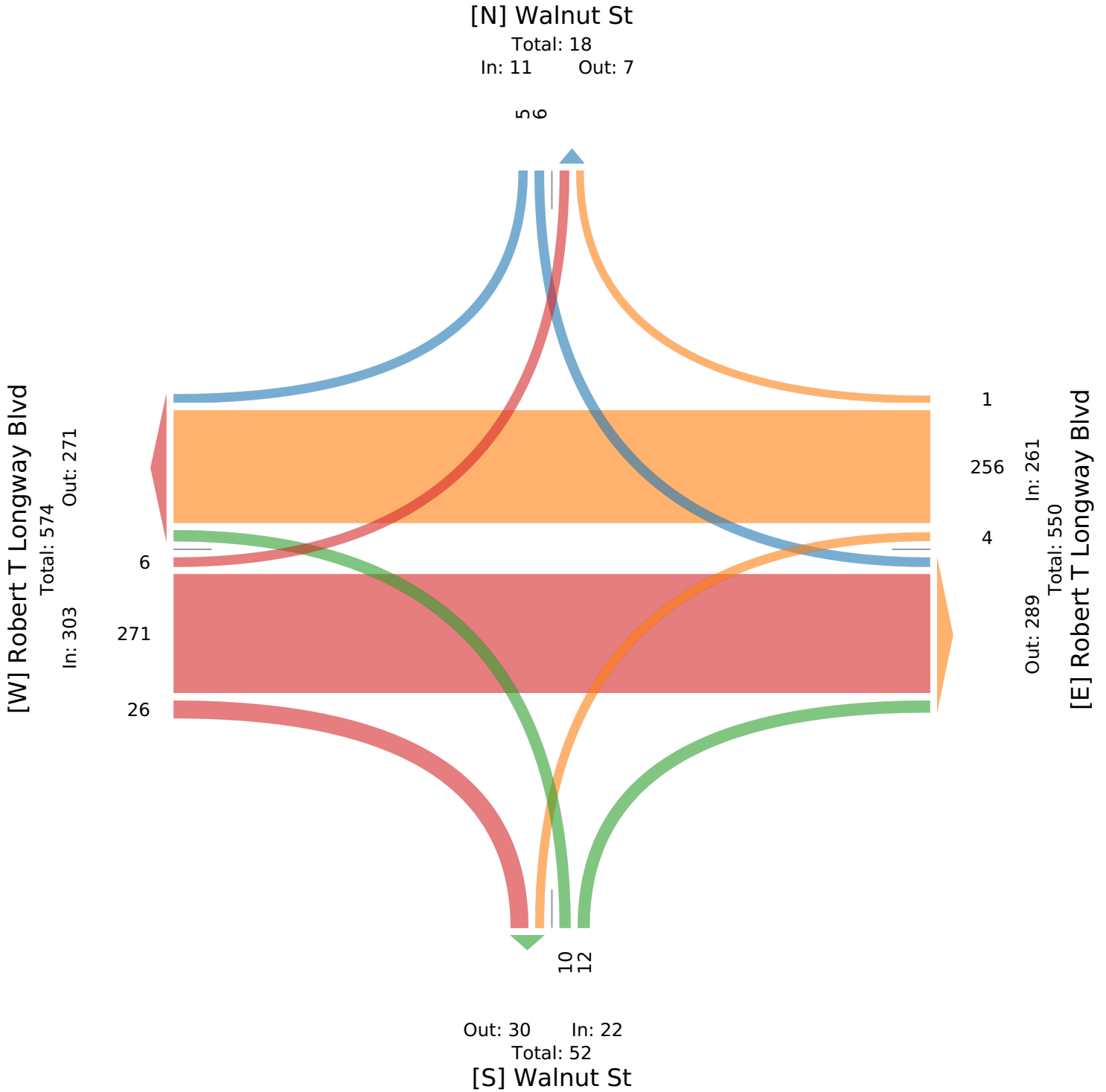
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 817412, Location: 43.025598, -83.676457



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Robert T Longway Boulevard & Walnut Street - TMC

Tue Mar 9, 2021

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

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

All Movements

ID: 817412, Location: 43.025598, -83.676457



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US

Leg Direction	Robert T Longway Blvd Eastbound					Robert T Longway Blvd Westbound					Walnut St Northbound					Walnut St 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				
2021-03-09 4:00PM	2	97	4	0	103	0	1	110	1	0	112	0	1	0	3	0	4	0	3	1	2	0	6	0	225
4:15PM	2	99	2	0	103	0	1	71	0	0	72	0	1	2	2	0	5	0	0	0	2	0	2	0	182
4:30PM	1	90	1	0	92	0	1	107	2	0	110	0	3	0	0	0	3	0	2	2	2	0	6	0	211
4:45PM	0	102	5	0	107	0	1	81	1	0	83	0	3	0	1	0	4	0	1	0	1	0	2	0	196
Total	5	388	12	0	405	0	4	369	4	0	377	0	8	2	6	0	16	0	6	3	7	0	16	0	814
% Approach	1.2%	95.8%	3.0%	0%	-	-	1.1%	97.9%	1.1%	0%	-	-	50.0%	12.5%	37.5%	0%	-	-	37.5%	18.8%	43.8%	0%	-	-	-
% Total	0.6%	47.7%	1.5%	0%	49.8%	-	0.5%	45.3%	0.5%	0%	46.3%	-	1.0%	0.2%	0.7%	0%	2.0%	-	0.7%	0.4%	0.9%	0%	2.0%	-	-
PHF	0.625	0.951	0.600	-	0.946	-	1.000	0.839	0.500	-	0.842	-	0.667	0.250	0.500	-	0.800	-	0.500	0.375	0.875	-	0.667	-	0.904
Lights	5	376	11	0	392	-	4	363	4	0	371	-	7	2	6	0	15	-	6	3	7	0	16	-	794
% Lights	100%	96.9%	91.7%	0%	96.8%	-	100%	98.4%	100%	0%	98.4%	-	87.5%	100%	100%	0%	93.8%	-	100%	100%	100%	0%	100%	-	97.5%
Single-Unit Trucks	0	5	0	0	5	-	0	5	0	0	5	-	0	0	0	0	0	-	0	0	0	0	0	-	10
% Single-Unit Trucks	0%	1.3%	0%	0%	1.2%	-	0%	1.4%	0%	0%	1.3%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	1.2%
Articulated Trucks	0	0	0	0	0	-	0	1	0	0	1	-	0	0	0	0	0	-	0	0	0	0	0	-	1
% Articulated Trucks	0%	0%	0%	0%	0%	-	0%	0.3%	0%	0%	0.3%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0.1%
Buses	0	7	1	0	8	-	0	0	0	0	0	-	1	0	0	0	1	-	0	0	0	0	0	-	9
% Buses	0%	1.8%	8.3%	0%	2.0%	-	0%	0%	0%	0%	0%	-	12.5%	0%	0%	0%	6.3%	-	0%	0%	0%	0%	0%	-	1.1%
Bicycles on Road	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0
% Bicycles on Road	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	-	0%
Pedestrians	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	-	0
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	-	0
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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

Robert T Longway Boulevard & Walnut Street - TMC

Tue Mar 9, 2021

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

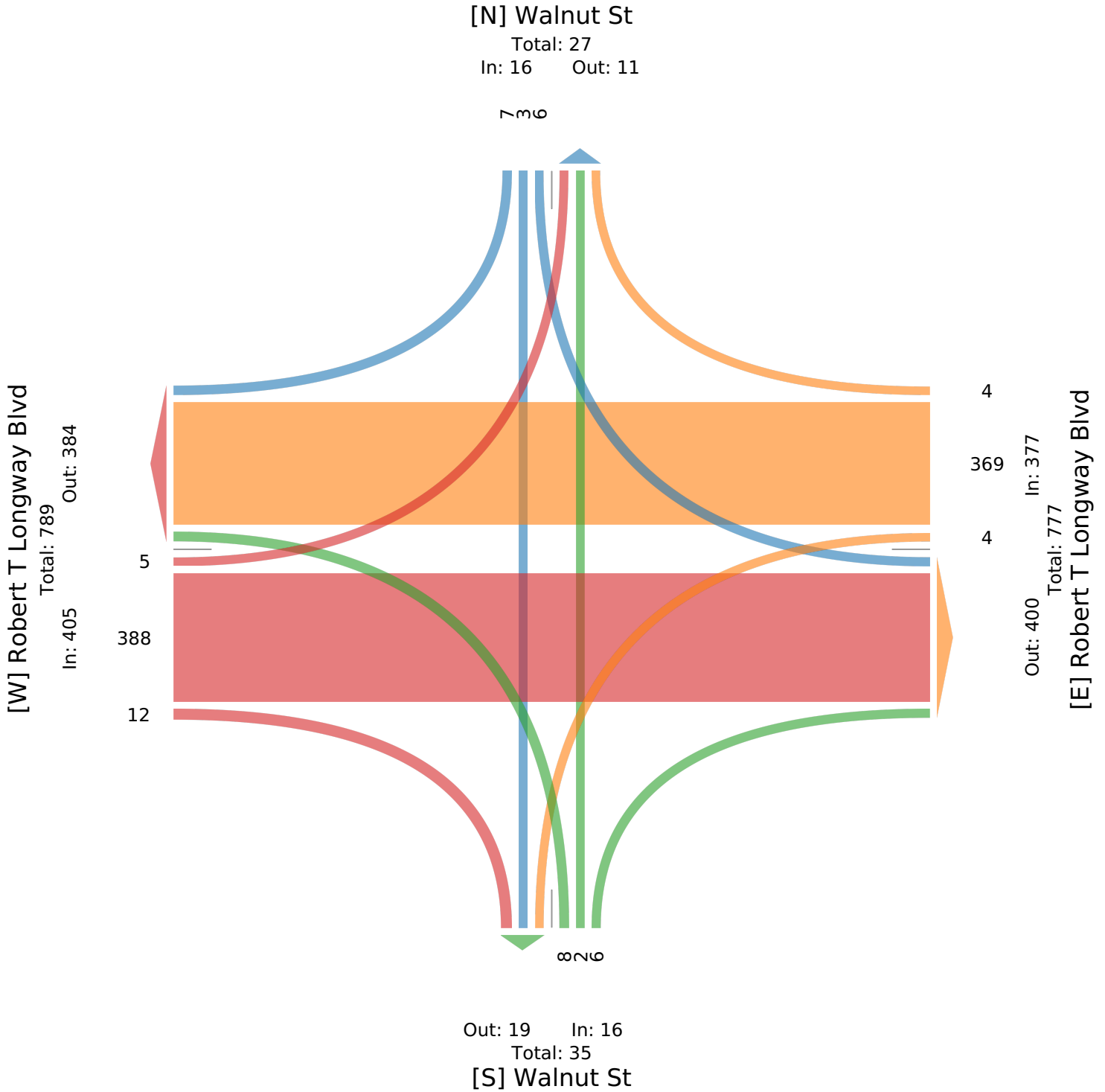
All Classes (Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)

All Movements

ID: 817412, Location: 43.025598, -83.676457



Provided by: Gewalt Hamilton Associates Inc.
625 Forest Edge Drive, Vernon Hills, IL, 60061, US



Intersection												
Int Delay, s/veh	1.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	8	353	34	5	333	1	13	0	16	8	0	7
Future Vol, veh/h	8	353	34	5	333	1	13	0	16	8	0	7
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	95	95	95	86	86	86	60	60	60	69	69	69
Heavy Vehicles, %	3	3	3	4	4	4	5	5	5	0	0	0
Mvmt Flow	8	372	36	6	387	1	22	0	27	12	0	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	388	0	0	408	0	0	612	806	204	602	824	194
Stage 1	-	-	-	-	-	-	406	406	-	400	400	-
Stage 2	-	-	-	-	-	-	206	400	-	202	424	-
Critical Hdwy	4.16	-	-	4.18	-	-	7.6	6.6	7	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.6	5.6	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.6	5.6	-	6.5	5.5	-
Follow-up Hdwy	2.23	-	-	2.24	-	-	3.55	4.05	3.35	3.5	4	3.3
Pot Cap-1 Maneuver	1160	-	-	1133	-	-	371	308	794	388	310	821
Stage 1	-	-	-	-	-	-	585	589	-	603	605	-
Stage 2	-	-	-	-	-	-	768	592	-	787	590	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1160	-	-	1133	-	-	362	303	794	371	305	821
Mov Cap-2 Maneuver	-	-	-	-	-	-	362	303	-	371	305	-
Stage 1	-	-	-	-	-	-	580	584	-	598	601	-
Stage 2	-	-	-	-	-	-	753	588	-	754	585	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.2			0.1			12.7			12.5		
HCM LOS							B			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	517	1160	-	-	1133	-	-	499
HCM Lane V/C Ratio	0.093	0.007	-	-	0.005	-	-	0.044
HCM Control Delay (s)	12.7	8.1	0	-	8.2	0	-	12.5
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.1

Intersection: 1: Walnut St & Robert T Longway Blvd

Movement	EB	WB	NB	SB
Directions Served	LT	LT	LTR	LTR
Maximum Queue (ft)	36	32	57	41
Average Queue (ft)	3	2	20	12
95th Queue (ft)	17	14	48	38
Link Distance (ft)	457	422	261	316
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 0

Intersection												
Int Delay, s/veh	1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Vol, veh/h	7	505	16	5	480	5	10	3	8	8	4	9
Future Vol, veh/h	7	505	16	5	480	5	10	3	8	8	4	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	95	95	95	84	84	84	80	80	80	67	67	67
Heavy Vehicles, %	3	3	3	2	2	2	6	6	6	0	0	0
Mvmt Flow	7	532	17	6	571	6	13	4	10	12	6	13

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	577	0	0	549	0	0	856	1144	275	868	1149	289
Stage 1	-	-	-	-	-	-	555	555	-	586	586	-
Stage 2	-	-	-	-	-	-	301	589	-	282	563	-
Critical Hdwy	4.16	-	-	4.14	-	-	7.62	6.62	7.02	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.62	5.62	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.62	5.62	-	6.5	5.5	-
Follow-up Hdwy	2.23	-	-	2.22	-	-	3.56	4.06	3.36	3.5	4	3.3
Pot Cap-1 Maneuver	986	-	-	1017	-	-	245	193	711	250	200	714
Stage 1	-	-	-	-	-	-	474	502	-	468	500	-
Stage 2	-	-	-	-	-	-	672	484	-	707	512	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	986	-	-	1017	-	-	232	189	711	239	196	714
Mov Cap-2 Maneuver	-	-	-	-	-	-	232	189	-	239	196	-
Stage 1	-	-	-	-	-	-	469	497	-	463	496	-
Stage 2	-	-	-	-	-	-	646	480	-	685	507	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.1			18.2			17.6		
HCM LOS							C			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	299	986	-	-	1017	-	-	316
HCM Lane V/C Ratio	0.088	0.007	-	-	0.006	-	-	0.099
HCM Control Delay (s)	18.2	8.7	0	-	8.6	0	-	17.6
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.3

Intersection: 1: Walnut St & Robert T Longway Blvd

Movement	EB	WB	NB	SB
Directions Served	LT	LT	LTR	LTR
Maximum Queue (ft)	57	36	49	48
Average Queue (ft)	5	2	15	17
95th Queue (ft)	32	16	41	44
Link Distance (ft)	452	413	250	301
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 0

Robert T Longway Blvd and Walnut Street – 2 by 1 – AM Peak

Rodel - C:\Users\902JAM\OneDrive - ROWE PSC\19C0262_GeneseeCountyRAB\RODEL\RobertLongway_Walnut.rod

File View Help



Project: Robert T Longway Blvd and W Date: 4-Jun-2021 Model: Rodel 2017 Timeslice: 7.5 Full Geometry: Full Geometry Peak: AM Feet: Feet RHD
 Name: 2045 Flows: 2045 Delay: Control Results: Veh Peak60/15m Synthetic Flow Profile: Synthetic Flow Profile Conf: 50 Light: Light 125

Approach Geometry						
	Leg Name	Bearing	G	V	n	
1	SB-Walnut Street	Y 0	0	14.00	1	
2	EB-Robert T Lo...	Y 102	0	22.00	2	
3	NB-Walnut Street	Y 198	0	12.00	1	
4	WB-Robert T Lo...	Y 262	0	22.00	2	

Entry Geometry					Circ Geom		
E	n	L'	R	Φ	D	C	n
16.00	1	150.00	65.00	23.00	150.00	30.00	2
26.00	2	164.00	80.00	20.00	150.00	18.00	1
16.00	1	115.00	65.00	26.00	150.00	30.00	2
26.00	2	164.00	80.00	20.00	150.00	18.00	1

Exit Geometry			
Ex	n	Vx	n
16.00	1	14.00	1
28.00	2	22.00	2
16.00	1	12.00	1
28.00	2	22.00	2

Entry Capacity Mods	
-+ Cap (w/h)	Xwalk Fact
0	1.000
0	1.000
0	1.000
0	1.000

Volume Modifiers		
Leg Name	%Truck	Factor
1 SB-Walnut Street	0.0	1.00
2 EB-Robert T Lo...	3.0	1.00
3 NB-Walnut Street	5.0	1.00
4 WB-Robert T Lo...	4.0	1.00

Turning Volumes (veh/hr)					
	U-Turn	Exit-3	Exit-2	Exit-1	Bypass
	0	8	0	7	0
	0	8	353	34	0
	0	13	0	16	0
	0	5	333	1	0

Arrival Volume Ratios			Arrival Volume Times (min)			PHF
Ratio1	Ratio2	Ratio3	Time1	Time2	Time3	
0.750	1.125	0.750	0	30	60	
0.750	1.125	0.750	0	30	60	
0.750	1.125	0.750	0	30	60	
0.750	1.125	0.750	0	30	60	

Calibration Accidents Economics Bypass

	Peak 60min Results	Bypass Type	Flow Rate (veh/hr)		Opp Rate (veh/hr)		Capacity (veh/hr)		Ave VCR		Ave Del (sec/veh)		Max Q (veh)		Max Q95% (veh)		LOS A-F			
			Entry	Bypass	Entry	Bypass	Entry	Bypass	Entry	Bypass	Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Entry	By	Leg
1	SB-Walnut Street	None	15		351		1147		0.0131		2.96		2.96	0.01		0.04		A		A
2	EB-Robert T Long...	None	395		13		2321		0.1702		3.62		3.62	0.24		0.64		A		A
3	NB-Walnut Street	None	29		369		1018		0.0285		3.67		3.67	0.03		0.08		A		A
4	WB-Robert T Lon...	None	339		21		2268		0.1495		3.25		3.25	0.19		0.50		A		A
All	Intersection												3.45							A

Results 60 Results 15 Int / Slope - 60 Int / Slope - 15 Economics Global Results

Robert T Longway Blvd and Walnut Street – 2 by 1 – PM Peak

Rodel - C:\Users\902JAM\OneDrive - ROWE PSC\19C0262_GeneseeCountyRAB\RODEL\RobertLongway_Walnut.rod

File View Help



Project: Robert T Longway Blvd and W | Date: 4-Jun-2021 | Model: Rodel 2017 | Timeslice: 7.5 | Full Geometry | Peak: PM | Feet | RHD
 Name: 2045 | Flows: 2045 | Delay: Control | Results: Veh | Peak60/15m | Synthetic Flow Profile | Conf: 50 | Light | 126

Approach Geometry						
	Leg Name	Bearing	G	V	n	
1	SB-Walnut Street	0	0	14.00	1	
2	EB-Robert T Lo...	102	0	22.00	2	
3	NB-Walnut Street	198	0	12.00	1	
4	WB-Robert T Lo...	262	0	22.00	2	

Entry Geometry							Circ Geom		
E	n	L'	R	Φ	D	C	n		
16.00	1	150.00	65.00	23.00	150.00	30.00	2		
26.00	2	164.00	80.00	20.00	150.00	18.00	1		
16.00	1	115.00	65.00	26.00	150.00	30.00	2		
26.00	2	164.00	80.00	20.00	150.00	18.00	1		

Exit Geometry			
Ex	n	Vx	n
16.00	1	14.00	1
28.00	2	22.00	2
16.00	1	12.00	1
28.00	2	22.00	2

Entry Capacity Mods	
-+ Cap (v/h)	Xwalk Fact
0	1.000
0	1.000
0	1.000
0	1.000

Volume Modifiers		
Leg Name	%Truck	Factor
1 SB-Walnut Street	0.0	1.00
2 EB-Robert T Lo...	3.0	1.00
3 NB-Walnut Street	6.0	1.00
4 WB-Robert T Lo...	2.0	1.00

Turning Volumes (veh/hr)					
	U-Turn	Exit-3	Exit-2	Exit-1	Bypass
	0	8	4	9	0
	0	7	505	16	0
	0	10	3	8	0
	0	5	480	5	0

Arrival Volume Ratios			Arrival Volume Times (min)			PHF
Ratio1	Ratio2	Ratio3	Time1	Time2	Time3	
0.750	1.125	0.750	0	30	60	
0.750	1.125	0.750	0	30	60	
0.750	1.125	0.750	0	30	60	
0.750	1.125	0.750	0	30	60	

Calibration |
 Accidents |
 Economics |
 Bypass

Run

	Peak 60min Results	Bypass Type	Flow Rate (veh/hr)		Opp Rate (veh/hr)		Capacity (veh/hr)		Ave VCR		Ave Del (sec/veh)		Max Q (veh)		Max Q95% (veh)		LOS A-F			
			Entry	Bypass	Entry	Bypass	Entry	Bypass	Entry	Bypass	Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Entry	By	Leg
1	SB-Walnut Street	None	21		495		1090		0.0193		3.49		3.49	0.02		0.06		A		A
2	EB-Robert T Long...	None	528		17		2317		0.2279		4.07		4.07	0.33		0.87		A		A
3	NB-Walnut Street	None	21		520		944		0.0222		3.82		3.82	0.02		0.06		A		A
4	WB-Robert T Lon...	None	490		20		2358		0.2078		3.85		3.85	0.29		0.77		A		A
All	Intersection												3.95							A

Results 60 |
 Results 15 |
 Int / Slope - 60 |
 Int / Slope - 15 |
 Economics |
 Global Results

Robert T Longway Blvd and Walnut Street – Single – AM Peak

Rodel - C:\Users\902JAM\OneDrive - ROWE PSC\19C0262_GeneseeCountyRAB\RODEL\RobertLongway_Walnut_Single.rod

File View Help



Project: Robert T Longway Blvd and W | Date: 4Jun-2021 | Model: Rodel 2017 | Timeslice: 7.5 | Full Geometry: Full Geometry | Peak: AM | Feet: Feet | **RHD**
 Name: 2045 - Single Lane | Flows: 2045 | Delay: Queuing | Results: Veh | Peak60/15m | Synthetic Flow Profile: Synthetic Flow Profile | Conf: 50 | Light: Light | 61

Approach Geometry					
Leg Name	Bearing	G	V	n	
1 SB-Walnut Street	0	0	12.00	1	
2 EB-Robert T Lo...	99	0	12.00	1	
3 NB-Walnut Street	198	0	12.00	1	
4 WB-Robert T Lo...	265	0	12.00	1	

Entry Geometry						Circ Geom		
E	n	L'	R	Φ	D	C	n	
18.00	1	164.00	65.00	24.00	120.00	22.00	1	
18.00	1	164.00	65.00	25.00	120.00	22.00	1	
18.00	1	164.00	65.00	25.00	120.00	22.00	1	
18.00	1	164.00	65.00	21.00	120.00	22.00	1	

Exit Geometry			
Ex	n	Vx	n
18.00	1	12.00	1
18.00	1	12.00	1
18.00	1	12.00	1
18.00	1	12.00	1

Entry Capacity Mods	
-> Cap (v/h)	Xwalk Fact
0	1.000
0	1.000
0	1.000
0	1.000

Volume Modifiers		
Leg Name	%Truck	Factor
1 SB-Walnut Street	0.0	1.00
2 EB-Robert T Lo...	3.0	1.00
3 NB-Walnut Street	5.0	1.00
4 WB-Robert T Lo...	4.0	1.00

Turning Volumes (veh/hr)					
	U-Turn	Exit-3	Exit-2	Exit-1	Bypass
	0	8	0	7	0
	0	8	353	34	0
	0	13	0	16	0
	0	5	333	1	0

Arrival Volume Ratios			Arrival Volume Times (min)			PHF
Ratio1	Ratio2	Ratio3	Time1	Time2	Time3	
0.750	1.125	0.750	0	30	60	
0.750	1.125	0.750	0	30	60	
0.750	1.125	0.750	0	30	60	
0.750	1.125	0.750	0	30	60	

Calibration | Accidents | Economics | Bypass

Run

	Peak 60min Results	Bypass Type	Flow Rate (veh/hr)		Opp Rate (veh/hr)		Capacity (veh/hr)		Ave VCR		Ave Del (sec/veh)		Max Q (veh)		Max Q95% (veh)		LOS A-F			
			Entry	Bypass	Entry	Bypass	Entry	Bypass	Entry	Bypass	Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Entry	By	Leg
1	SB-Walnut Street	None	15		351		1128		0.0133		3.41		3.41	0.02		0.04		A		A
2	EB-Robert T Long...	None	395		13		1261		0.3133		4.20		4.20	0.54		1.41		A		A
3	NB-Walnut Street	None	29		369		1012		0.0287		3.67		3.67	0.03		0.09		A		A
4	WB-Robert T Lon...	None	339		21		1248		0.2715		3.95		3.95	0.43		1.13		A		A
All	Intersection												4.05							A

Results 60 | Results 15 | Int / Slope - 60 | Int / Slope - 15 | Economics | Global Results

Robert T Longway Blvd and Walnut Street – Single – PM Peak

Rodel - C:\Users\902JAM\OneDrive - ROWE PSC\19C0262_GeneseeCountyRAB\RODEL\RobertLongway_Walnut_Single.rod

File View Help



Project: Robert T Longway Blvd and W | Date: 4-Jun-2021 | Model: Rodel 2017 | Timeslice: 7.5 | Full Geometry | Peak: PM | Feet | RHD
 Name: 2045 - Single Lane | Flows: 2045 | Delay: Queuing | Results: Veh | Peak60/15m | Synthetic Flow Profile | Conf: 50 | Light | 62

Approach Geometry					
	Leg Name	Bearing	G	V	n
1	SB-Walnut Street	0	0	12.00	1
2	EB-Robert T Lo...	99	0	12.00	1
3	NB-Walnut Street	198	0	12.00	1
4	WB-Robert T Lo...	265	0	12.00	1

Entry Geometry					Circ Geom		
E	n	L'	R	Φ	D	C	n
18.00	1	164.00	65.00	24.00	120.00	22.00	1
18.00	1	164.00	65.00	25.00	120.00	22.00	1
18.00	1	164.00	65.00	25.00	120.00	22.00	1
18.00	1	164.00	65.00	21.00	120.00	22.00	1

Exit Geometry			
Ex	n	Vx	n
18.00	1	12.00	1
18.00	1	12.00	1
18.00	1	12.00	1
18.00	1	12.00	1

Entry Capacity Mods	
-+ Cap (v/h)	Xwalk Fact
0	1.000
0	1.000
0	1.000
0	1.000

Volume Modifiers		
Leg Name	%Truck	Factor
1 SB-Walnut Street	0.0	1.00
2 EB-Robert T Lo...	3.0	1.00
3 NB-Walnut Street	6.0	1.00
4 WB-Robert T Lo...	2.0	1.00

Turning Volumes (veh/hr)					
	U-Turn	Exit-3	Exit-2	Exit-1	Bypass
	0	8	4	9	0
	0	7	505	16	0
	0	10	3	8	0
	0	5	480	5	0

Arrival Volume Ratios			Arrival Volume Times (min)			PHF
Ratio1	Ratio2	Ratio3	Time1	Time2	Time3	
0.750	1.125	0.750	0	30	60	
0.750	1.125	0.750	0	30	60	
0.750	1.125	0.750	0	30	60	
0.750	1.125	0.750	0	30	60	

Calibration |
 Accidents |
 Economics |
 Bypass

Run

	Peak 60min Results	Bypass Type	Flow Rate (veh/hr)		Opp Rate (veh/hr)		Capacity (veh/hr)		Ave VCR		Ave Del (sec/veh)		Max Q (veh)		Max Q95% (veh)		LOS A-F			
			Entry	Bypass	Entry	Bypass	Entry	Bypass	Entry	Bypass	Entry	Bypass	Leg	Entry	Bypass	Entry	Bypass	Entry	By	Leg
1	SB-Walnut Street	None	21		495		1043		0.0201		3.71		3.71	0.03		0.07		A		A
2	EB-Robert T Long...	None	528		17		1258		0.4196		4.95		4.95	0.87		2.25		A		A
3	NB-Walnut Street	None	21		520		909		0.0231		4.02		4.02	0.03		0.07		A		A
4	WB-Robert T Lon...	None	490		20		1298		0.3774		4.55		4.55	0.74		1.91		A		A
All	Intersection												4.72							A

Results 60 |
 Results 15 |
 Int / Slope - 60 |
 Int / Slope - 15 |
 Economics |
 Global Results

Robert T Longway Blvd and Walnut Street – Single – The Whiting Event Traffic

Rodel - R:\Projects\19C0262\Docs\Design\RobertTLongway_Walnut_Whiting\RobertTLongway_Walnut_Single_Whiting_LOS.rod

File View Help



Project: Robert T Longway Blvd and W Date: 26-Jul-2021 Model: Rodel 2017 Timeslice: 15 Full Geometry: Peak: PM Feet: RHD
 Name: 2045 - Single Lane Flows: 2045 Delay: Queuing Results: Veh Peak60/15m Synthetic Flow Profile Conf: 50 Light: 89

Approach Geometry						
	Leg Name	Bearing	G	V	n	
1	SB-Walnut Street	Y 0	0	12.00	1	
2	EB-Robert T Lo...	Y 99	0	12.00	1	
3	NB-Walnut Street	Y 198	0	12.00	1	
4	WB-Robert T Lo...	Y 265	0	12.00	1	

Entry Geometry					Circ Geom		
E	n	L'	R	Φ	D	C	n
18.00	1	164.00	65.00	24.00	120.00	22.00	1
18.00	1	164.00	65.00	25.00	120.00	22.00	1
18.00	1	164.00	65.00	25.00	120.00	22.00	1
18.00	1	164.00	65.00	21.00	120.00	22.00	1

Exit Geometry			
Ex	n	Vx	n
18.00	1	12.00	1
18.00	1	12.00	1
18.00	1	12.00	1
18.00	1	12.00	1

Entry Capacity Mods	
-> Cap (v/h)	Xwalk Fact
0	1.000
0	1.000
0	1.000
0	1.000

Volume Modifiers		
Leg Name	%Truck	Factor
1 SB-Walnut Street	0.0	1.00
2 EB-Robert T Lo...	3.0	1.00
3 NB-Walnut Street	6.0	1.00
4 WB-Robert T Lo...	2.0	1.00

Turning Volumes (veh/hr)						
	U-Turn	Exit-3	Exit-2	Exit-1	Bypass	
	0	8	4	9	0	
	0	7	505	200	0	
	0	200	3	200	0	
	0	200	480	5	0	

Arrival Volume Ratios			Arrival Volume Times (min)			PHF
Ratio1	Ratio2	Ratio3	Time1	Time2	Time3	
0.750	1.125	0.750	0	30	60	
0.750	1.125	0.750	0	30	60	
0.750	1.125	0.750	0	30	60	
0.750	1.125	0.750	0	30	60	

Calibration Accidents Economics Bypass

Run

	Peak 60min Results	Bypass Type	Flow Rate (veh/hr)		Opp Rate (veh/hr)		Capacity (veh/hr)		Ave VCR		Ave Del (sec/veh)		Max Q (veh)		Max Q95% (veh)		LOSA-F		
			Entry	Bypass	Entry	Bypass	Entry	Bypass	Entry	Bypass	Entry	Bypass	Leg	Entry	Bypass	Entry	Byp	Leg	
1	SB-Walnut Street	None	21		880		800		0.0263		4.89		4.89	0.03	0.09			A	A
2	EB-Robert T Long...	None	712		212		1145		0.6219		8.32		8.32	2.17	5.38			A	A
3	NB-Walnut Street	None	403		520		909		0.4434		6.85		6.85	0.97	2.49			A	A
4	WB-Robert T Lon...	None	685		210		1180		0.5807		7.46		7.46	1.84	4.61			A	A
All	Intersection												7.63						A

Results 60 Results 15 Int / Slope - 60 Int / Slope - 15 Economics Global Results

Genesee County Roundabout Study - EPE Analysis

Intersection	
Robert T Longway Blvd and Walnut Street	
Opinion of Probable Cost	
By: ROWE Date: 7/9/2021	

PAY ITEM DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	AMOUNT
Mobilization (10%)	1	LSUM	\$76,000.00	\$76,000.00
Sidewalk, Rem	130	Syd	\$10.00	\$1,300.00
Pavt, Rem	4600	Syd	\$10.00	\$46,000.00
Curb and Gutter, Rem	2000	Ft	\$10.00	\$20,000.00
Embankment, CIP	3000	Cyd	\$15.00	\$45,000.00
Excavation, Earth	2000	Cyd	\$10.00	\$20,000.00
Aggregate Base	2200	Ton	\$21.00	\$46,200.00
HMA, 4E10	600	Ton	\$85.00	\$51,000.00
HMA Approach	15	Ton	\$50.00	\$750.00
Conc Pavt, Nonreinf, 9 inch	2610	Syd	\$45.00	\$117,450.00
Joint, Contraction, Cp	2400	Ft	\$10.00	\$24,000.00
Joint, Expansion, E3	1300	Ft	\$15.00	\$19,500.00
Driveway, Nonreinf Conc, 9 inch	150	Syd	\$50.00	\$7,500.00
Curb and Gutter, Conc, Det B1	2500	Ft	\$25.00	\$62,500.00
Curb and Gutter, Conc, Det D1	230	Ft	\$25.00	\$5,750.00
Curb, Conc, Det E1	110	Ft	\$25.00	\$2,750.00
Driveway Opening, Conc, Det M	140	Ft	\$22.00	\$3,080.00
Detectable Warning Surface	10	Ft	\$40.00	\$400.00
Curb Ramp Opening, Conc	14	Ft	\$25.00	\$350.00
Sidewalk, Conc, 4 inch	210	Sft	\$5.00	\$1,050.00
Sidewalk Ramp, Conc, 6 inch	100	Sft	\$10.00	\$1,000.00
Conc Pavt, Decorative Colored, 9 inch	5200	Sft	\$12.50	\$65,000.00
Turf Establishment, Performance	5000	Syd	\$5.00	\$25,000.00
MOT	1	LSUM	\$56,000.00	\$56,000.00
Drainage	1	LSUM	\$100,000.00	\$100,000.00
Pavement Markings	1	LSUM	\$15,000.00	\$15,000.00
Signing	1	LSUM	\$20,000.00	\$20,000.00
Relocation of 46kV Consumers Energy Poles	1	LSUM	\$200,000.00	\$200,000.00
TOTAL				\$1,032,580

<i>CONTINGENCY (20%)</i>	<i>\$206,516.00</i>
ESTIMATED TOTAL CONSTRUCTION COST (YEAR 2021)	\$1,239,096.00
<i>3% ANNUAL INFLATION 2021 TO 2025</i>	<i>\$155,517.46</i>
ESTIMATED TOTAL CONSTRUCTION COST (YEAR 2025)	\$1,394,613.46

Assumptions:

6" Agg base used for driveways and shoulders, 8" used for roadway, 12" used for islands (10% of total added)

Asphalt shoulder gravel thickness was calculated using a 5" depth

Assumed 5" HMA thickness for approach and 8" thick for HMA roadway

B1 curb was calculated by adding the splitter islands along with the roadways, minus the radius for the roundabout

E1 curb was calculated for the inner roundabout curb

E2 joint expansion was calculated for the outer radius of the roundabout

E3 joint expansion was calculated using the radius of curves from the B/C of the roundabout and splitter islands

D1 curb was calculated for the truck apron

Drainage includes enclosed storm for all curbed areas, spillways, and underdrain

MOT taken as approximately ~8% of total before mobilization; based on previous roundabout projects

ROW acquisition costs not included

Joints assumed for central island/splitter islands

Genesee County Roundabout Study - EPE Analysis

Intersection				
Robert T Longway Blvd and Walnut Street 2 Way				
Opinion of Probable Cost				
				By: ROWE
				Date: 7/9/2021
PAY ITEM DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	AMOUNT
Mobilization (10%)	1	LSUM	\$90,300.00	\$90,300.00
Sidewalk, Rem	130	Syd	\$10.00	\$1,300.00
Pavt, Rem	4600	Syd	\$10.00	\$46,000.00
Curb and Gutter, Rem	2000	Ft	\$10.00	\$20,000.00
Embankment, CIP	3500	Cyd	\$15.00	\$52,500.00
Excavation, Earth	2500	Cyd	\$10.00	\$25,000.00
Aggregate Base	2750	Ton	\$21.00	\$57,750.00
HMA, 4E10	890	Ton	\$85.00	\$75,650.00
HMA Approach	15	Ton	\$50.00	\$750.00
Conc Pavt, Nonreinf, 9 inch	3600	Syd	\$45.00	\$162,000.00
Joint, Contraction, Cp	3200	Ft	\$10.00	\$32,000.00
Joint, Expansion, E3	1500	Ft	\$15.00	\$22,500.00
Driveway, Nonreinf Conc, 9 inch	150	Syd	\$50.00	\$7,500.00
Curb and Gutter, Conc, Det B1	2600	Ft	\$25.00	\$65,000.00
Curb and Gutter, Conc, Det D1	230	Ft	\$25.00	\$5,750.00
Curb, Conc. Det E1	155	Ft	\$25.00	\$3,875.00
Driveway Opening, Conc, Det M	140	Ft	\$22.00	\$3,080.00
Detectable Warning Surface	10	Ft	\$40.00	\$400.00
Curb Ramp Opening, Conc	14	Ft	\$25.00	\$350.00
Sidewalk, Conc, 4 inch	210	Sft	\$5.00	\$1,050.00
Sidewalk Ramp, Conc, 6 inch	100	Sft	\$10.00	\$1,000.00
Conc Pavt, Decorative Colored, 9 inch	7400	Sft	\$12.50	\$92,500.00
Turf Establishment, Performance	5000	Syd	\$5.00	\$25,000.00
MOT	1	LSUM	\$67,000.00	\$67,000.00
Drainage	1	LSUM	\$100,000.00	\$100,000.00
Pavement Markings	1	LSUM	\$15,000.00	\$15,000.00
Signing	1	LSUM	\$20,000.00	\$20,000.00
Relocation of 46kV Consumers Energy Poles	1	LSUM	\$200,000.00	\$200,000.00
TOTAL				\$1,193,255

	<i>CONTINGENCY (20%)</i>	\$238,651.00
	ESTIMATED TOTAL CONSTRUCTION COST (YEAR 2021)	\$1,431,906.00
	<i>3% ANNUAL INFLATION 2021 TO 2025</i>	<i>\$179,716.82</i>
	ESTIMATED TOTAL CONSTRUCTION COST (YEAR 2025)	\$1,611,622.82

Assumptions:

- 6" Agg base used for driveways and shoulders, 8" used for roadway, 12" used for islands (10% of total added)
- Asphalt shoulder gravel thickness was calculated using a 5" depth
- Assumed 5" HMA thickness for approach and 8" thick for HMA roadway
- B1 curb was calculated by adding the splitter islands along with the roadways, minus the radius for the roundabout
- E1 curb was calculated for the inner roundabout curb
- E2 joint expansion was calculated for the outer radius of the roundabout
- E3 joint expansion was calculated using the radius of curves from the B/C of the roundabout and splitter islands
- D1 curb was calculated for the truck apron
- Drainage includes enclosed storm for all curbed areas, spillways, and underdrain
- MOT taken as approximately ~8% of total before mobilization; based on previous roundabout projects
- ROW acquisition costs not included
- Joints assumed for central island/splitter islands

NUMBER OF CRASHES OR INJURED PERSONS.

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
	2015	2016	2017	2018	2019

Fatal and A-Injury Reduction	%REDUCTION	78%	Roundabout		
Number of Crashes	0	0	0	0	0

A-Injured or Killed Persons	0	0	0	0	0
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Minor Crash Reduction	%REDUCTION	57%	0		
Number of Crashes	0	0	0	0	7
	0	0	0	0	7
	0	0	0	0	0

	%REDUCTION	0%			
Number of Crashes	0	0	0	0	0
	0	0	0	0	0
A-Injured or Killed Persons	0	0	0	0	0

	%REDUCTION	0%			
Number of Crashes	0	0	0	0	0
	0	0	0	0	0
A-Injured or Killed Persons	0	0	0	0	0

	%REDUCTION	0%			
Number of Crashes	0	0	0	0	0
	0	0	0	0	0
A-Injured or Killed Persons	0	0	0	0	0

# of A-injuries:	0	For reference only
# of Fatalities:	0	For reference only; "Q" accounts

		for the risk of a fatality.
PROJECT COST ESTIMATE :	\$1,394,613	If unknown, enter "0" (zero).
ADTb (before-volume)	1.0	You may change these
ADTa (after-volume)	1.1	default ADT values.
# OF YEARS OF DATA:	5.00	3 to 5 years should be used.
RATE OF INFLATION:	2.50%	
AREA TYPE:	Urban	"Rural", "Urban", or "Between"

REMARKS:

	Robert T Longway Blvd and Walnut Street Genesee County Roundabout Study 1497401, 1535107 0.4819510, 0.1104172 Roundabout
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COMPUTED BENEFITS DERIVED THROUGH CRASH REDUCTION

TOR 2021

Date **9-Jul-21**

Project: **Robert T Longway Blvd and Walnut Street**

City/Twp. **City of Flint**

Prepared By: **ROWE Professional Services Company**

County **Genesee County**

PR: **1497401, 1535107**

PR MP Range: **0.4819510, 0.1104172**

The method of evaluating crash costs, used below, is given on page 67 of Roy Jorgensen's report of Highway Safety Improvement Criteria, 1966 edition. This same method is given in the Bureau of Public Roads IM21-3-67. In 1994 we have adapted the Q formula to blend Fatalities and A-injuries only.

In the following analysis the costs provided by the National Safety Council are :

2019 NSC VALUES:

Death	\$1,659,000	=FATCOST
Disabling (A) injury:	\$96,200	=ACOST
B-injury:	\$27,800	=BCOST
PDO and/or Minor Injury Crash:	\$12,200	=PDOCOST

$$BTOTAL = ADTa / ADTb \times [(Q \times R1) + (BCOST \times R2) + (PDOCOST \times R3)]$$

WHERE:

BTOTAL =	Total Benefit in Dollars Over Years Used	\$53,546
ADTa =	Average traffic volume after the improvement	1.1
ADTb =	Average traffic volume before the improvement	1.0
R1 =	Reduction in fatalities and A-Injuries Combined.	0.0
R2 =	Reduction in B-Injury crashes:	0.0
R3 =	Reduction in PDO and C-injury crashes:	4.0
Q =	$[FATCOST + ((I/F) \times INJCOST)] / [1 + (I/F)]$	
=	$[1,659,000 + (6.10 \times 96,200)] / [1 + 6.10]$	\$316,400
	for AREA TYPE "Urban"	
I/F =		6.10

Q-Reference	Q	A-Inuries	Fatalities	I/F
RURAL	\$363,900	6,072	1,255	4.84
URBAN	\$316,400	9,902	1,624	6.10
BETWEEN	\$334,900	15,974	2,879	5.55

Data from Safety Programs Unit
5-Year Statewide Non-Trunkline Crash Figures Used.
(*From 1-1-2015 Through 12-31-2019).

Time of Return (T.O.R.) is based on 5 years of data.

NOINFB =No-Inflation Annual Benefit=BTOTAL/years \$10,709

With an inflation rate of 2.50%

B=Annual Benefit=Present Value (with Inflation) \$13,709

C = Project Cost \$1,394,613

TOR=C/B=COST/ANNUAL BENEFIT= **101.73**

L. Robert T. Longway and Walnut

1. [2045 AM Peak Hour No Build](#)
2. [2045 PM Peak Hour No Build](#)
3. [2045 AM Peak Hour Single Roundabout](#)
4. [2045 PM Peak Hour Single Roundabout](#)
5. [2045 AM Peak Hour Two-by-One Roundabout](#)
6. [2045 PM Peak Hour Two-by-One Roundabout](#)