SAFETY AND CORRIDOR STUDY Wallings Road

City of Broadview Heights, Cuyahoga County, Ohio



Prepared For:

City of Broadview Heights Office of Engineering 9543 Broadview Road Broadview Heights, OH 44147

Prepared By:

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March 2015







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I. Study Area:





II. Executive Summary

Purpose & Need:

At the request of the City of Broadview Heights, GPD Group was tasked with completing a Safety and Corridor Study for the Wallings Road corridor. This study will determine if any operational or safety deficiencies exist within the study area and what improvements are necessary to correct any that are identified. This corridor includes Wallings Road from the Broadview Road (State Route 176) intersection to the I-77 NB Ramps / Mill Road intersection.

Background:

In 2015, GPD Group completed a comprehensive tabulation of the crashes for the three (3) most recent crash years (2011 – 2013) along the Wallings Road corridor in the City of Broadview Heights, Ohio. This crash data showed a large number of crashes along the corridor, suggesting that there were safety and operational issues along the corridor and a more detailed analysis was needed to determine the extent of the problem(s) and what could be done to address them.

Brief Overview of Possible Causes:

A review of the crash patterns indicates that safety issues exist along the Wallings Road corridor. Large numbers of rear-end crashes are occurring at unsignalized intersections and driveways due to the absence of a center two-way left turn lane to separate left turning vehicles from thru vehicles. Motorists are unable to get around the left turning traffic occupying the only available thru lane in the two-lane section of Wallings Road, which causes congestion and rear-end related crashes along the corridor. Congestion is present at the I-77 / Wallings Road interchange on the east end of the project that is contributing to the rear-end crashes occurring on that section of the roadway.

Recommended Countermeasures and Related Costs:

This study has identified long-term improvement recommendations that would reduce the number of crashes occurring within the study area. The following list outlines these improvements:

Long Term Improvements:

- 1. Widen Wallings Road to accommodate a two-way left turn lane throughout the entire study area.
- 2. Construct a westbound right turn lane at the Wallings Road / McCreary Road intersection.
- 3. Construct a westbound right turn lane at the Wallings Road / Wright Road intersection.



- 4. Study the traffic signal currently located at the Wallings Road / Wright Road intersection for removal.
- 5. Construct an eastbound right turn lane at the Wallings Road / West Mill Road intersection.
- 6. Reconstruct the Wallings Road Bridge over I-77 to accommodate four (4) travel lanes.
- 7. Construct a second eastbound left turn lane at the Wallings Road / I-77 NB Ramps / Mill Road intersection.
- 8. Widen the I-77 NB entrance ramp to accommodate the proposed, dual left turn lane from Wallings Road.
- 9. Widen Mill Road to accommodate a northbound left turn lane at the Wallings Road / I-77 NB Ramps / Mill Road intersection.
- 10. Widen the I-77 SB exit ramp to accommodate a second right turn lane and construct a second westbound thru lane on Wallings Road to receive the traffic from these (2) lanes.
- 11. Widen Wallings Road from just east of West Mill Road to the I-77 NB entrance ramp.

The existing crash problem along Wallings Road points to the need for a two-way left turn lane to be constructed throughout the entire project area. A large portion of rear-end crashes along the study corridor are occurring at unsignalized intersections and driveways and involve a vehicle stopping in traffic to complete a left turn movement. The construction of a center two-way left turn lane will allow the left turning traffic to move out of the thru lanes, which will reduce congestion along the corridor and remove the conflict between left turning and thru vehicles.

The intersection of Wallings Road / McCreary currently meets the volume thresholds necessary for a westbound right turn lane to be constructed. This turn lane will remove turning traffic from the thru lane and reduce the conflicts between thru traffic and right turning traffic. Additionally, a westbound right turn lane should be constructed for the Wallings Road / Wright Road intersection and an eastbound right turn lane should be constructed at the Wallings Road / West Mill Road intersection to reduce these turning movement conflicts and improve operation.

The traffic signal at the Wallings Road / Wright Road intersection is not warranted based upon the Existing Year or Opening Year traffic volumes. For this reason it is recommended that the traffic signal at this intersection be studied for removal. The intersection should operate under two-way stop control once the safety improvements are constructed with Wright Road operating under stop control.

Based on future traffic volumes and capacity demands at the I-77 / Wallings Road interchange, the bridge over Wallings Road will need to be four (4) lanes wide in order to



accommodate the future demand at the interchange. Currently, the bridge is only two (2) lanes and does not provide any left turn lanes for traffic turning left onto I-77. The future configuration calls for dual eastbound left turn lanes for traffic trying to enter I-77 NB. Additionally, a single westbound left turn lane is also needed for left turning traffic onto I-77 SB. The geometry over the bridge calls for the outside eastbound left turn lane to be the entire length of the bridge while the inside eastbound left turn lane should be back-to-back with the proposed 150 foot westbound left turn lane.

In order to accommodate the recommended dual eastbound left turn lanes at the Wallings Road / I-77 NB Ramps / Mill Road intersection, the entrance ramp for I-77 NB will need to be widened. The second lane on the entrance ramp will need to be merged before the traffic enters I-77 mainline.

In order to service the demand for traffic exiting I-77 SB at Wallings Road, an additional lane needs to be added to the exit ramp. In addition to the existing southbound left and southbound right, an additional 225' southbound right turn lane needs to be constructed (creating dual right turn lanes) so the traffic can exit the highway more efficiently and the Wallings Road / I-77 SB Ramps intersection can operate with acceptable Levels-of-Service. Since Wallings Road currently only provides one (1) travel lane in each direction, Wallings Road will need to be widened to two (2) westbound travel lanes west of the interchange. This additional through lane should be merged west of the West Mill Road intersection.

Wallings Road should be widened from just east of West Mill Road to the I-77 NB Ramp / Mill Road intersection. This improvement is recommended to provide additional capacity through the Wallings Road / I-77 SB Ramps intersection as well as allowing traffic to move into the proper lane as the inside thru lane will become the outside dedicated left turn lane at the Wallings Road / I-77 SB Ramps intersection. The outside thru lane will be the thru lane for traffic wishing to continue eastbound on Wallings Road to travel southbound on Mill Road.

Based upon the capacity analysis along the Wallings Road corridor, Wallings Road needs to be widened to five (5) lanes to accommodate future traffic volumes. However, the decision was made not to pursue this option due to the extensive right-of-way and construction costs associated with a five (5) lane corridor. The estimated cost for the five (5) project is approximately 20.4 million dollars. The city viewed this cost as excessive. Additionally it was felt that simply completing the three (3) lane option will improve capacity somewhat.

The estimated cost for the three (3) lane improvements outlined above is approximately 15 million dollars (not including construction inspection or inflation).



III. Purpose and Need:

At the request of the City of Broadview Heights, GPD Group was tasked with completing a Safety and Corridor Study for the Wallings Road corridor. This study will determine if any operational or safety deficiencies exist within the study area and what improvements are necessary to correct any deficiencies that are identified. This corridor includes Wallings Road from the Broadview Road (State Route 176) intersection to the I-77 NB Ramps / Mill Road intersection.

IV. Existing Conditions:

The safety study area is located within the City of Broadview Heights and encompasses Wallings Road from Broadview Road (State Route 176) to the I-77 NB Ramps / Mill Road. The study area will include all intersections along the Wallings Road corridor. The land use surrounding the study area is mainly residential properties along Wallings Road with a couple of commercial properties located adjacent to the Wallings Road / Broadview Road intersection. Additionally, the Lawrence School is located along Wallings Road between Chestnut Boulevard and Overlook Avenue. See **Figure 1** for an aerial photograph of the study area.

The following is a description of the primary roadway traversing the study area as well as a summary of the corridor intersections:

Wallings Road is a two (2) lane asphalt roadway with one (1) lane for eastbound and westbound traffic with left turn lanes at the signalized intersections of Wallings Road / Wright Road, Wallings Road / Wyatt Road and Wallings Road / Broadview Road. The current posted speed limit for Wallings Road is 35 miles per hour throughout the study area. According to information obtained from the Ohio Department of Transportation's website, Wallings Road is classified as an Urban Minor Arterial. Wallings Road is an uncurbed roadway throughout the majority of the study area. Curb and closed drainage exists for approximately 500 feet east of the Broadview Road intersection on both sides of Wallings Road. Curb and closed drainage also exists for approximately 500 feet (250 feet east and 250 feet west) surrounding the Wyatt Road intersection. Additionally, curb and closed drainage is present on both sides of Wallings Road at the I-77 / Wallings Road interchange. The remaining project area is uncurbed with shallow storm sewers and yard drain inlets on both sides of Wallings Road. The existing right-of-way along the roadway varies between 60 feet and 80 feet throughout the corridor. Standard highway easements appear to be present throughout the majority of the corridor with traditional right-of-way present in some areas. Once this project moves forward, all standard highway easements should be converted to right-of-way. Street lighting is located sporadically throughout the study area. The I-77 / Wallings Road interchange is lighted and a single luminaire is present at the majority of study intersections.

The existing roadway geometries for the study intersections are detailed below. Refer to **Figures 2 through 9** for existing condition diagrams of the study area and see **Appendix A** for a site photo log.



Wallings Road / Broadview Road Intersection:

This intersection is currently signalized using span wire to support the traffic signal heads with signal poles located on all four (4) corners of the intersection. The intersection consists of four (4) approaches with the following lane configurations: EB Wallings Road – two (2) lanes (left, thru-right), WB Wallings Road – three (3) lanes (left, thru, right) and NB and SB Broadview Road – three (3) lanes (left, thru, right). This traffic signal operates with protected/permissive left turn signal phasing on all four (4) approaches to the intersection. It should be noted that the northbound and southbound left turn lanes on Broadview Road are not striped as dedicated left turn lanes, but instead they are shown as a center two-way left turn lane to the stop bar for the intersection. These unique pavement makings could be leading to traffic not using the left turn lane appropriately at the intersection and vehicles making a left turn from the thru lane.

Wallings Road / Elmhurst Drive Intersection:

This intersection is unsignalized with the SB Elmhurst Drive approach operating under stop control. The intersection consists of three (3) legs with the following lane configurations: EB Wallings Road – one (1) lane (left-thru), WB Wallings Road – one (1) lane (thru-right) and SB Elmhurst Drive – one (1) lane (left-right).

Wallings Road / Longview Road Intersection:

This intersection is unsignalized with the SB Longview Road approach operating under stop control. The intersection consists of three (3) legs with the following lane configurations: EB Wallings Road – one (1) lane (left-thru), WB Wallings Road – one (1) lane (thru-right) and SB Longview Road – one (1) lane (left-right).

Wallings Road / Chestnut Boulevard Intersection:

This intersection is unsignalized with the NB Chestnut Boulevard approach operating under stop control. The intersection consists of three (3) legs with the following lane configurations: EB Wallings Road – one (1) lane (thru-right), WB Wallings Road – one (1) lane (left-thru) and NB Chestnut Boulevard – one (1) lane (left-right).

Wallings Road / Overlook Avenue Intersection:

This intersection is unsignalized with the NB Overlook Avenue approach operating under stop control. The intersection consists of three (3) legs with the following lane configurations: EB Wallings Road – one (1) lane (thru-right), WB Wallings Road – one (1) lane (left-thru) and NB Overlook Avenue – one (1) lane (left-right).



Wallings Road / McCreary Road Intersection:

This intersection is unsignalized with the SB McCreary Road approach operating under stop control. The intersection consists of three (3) legs with the following lane configurations: EB Wallings Road – one (1) lane (left-thru), WB Wallings Road – one (1) lane (thru-right) and SB McCreary Road – one (1) lane (left-right).

Wallings Road / Wyatt Road Intersection:

This intersection is currently signalized using span wire to support the traffic signal heads with signal poles located on the northwest and southeast corners of the intersection. The intersection consists of three (3) approaches with the following lane configurations: EB Wallings Road – one (1) lane (thru-right), WB Wallings Road – two (2) lanes (left, thru) and NB Wyatt Road – one (1) lane (left -right). This traffic signal operates with protected/permissive left turn signal phasing on the westbound approach to the intersection.

Wallings Road / Majestic Oaks Trail Intersection:

This intersection is unsignalized with the SB Majestic Oakes Trail approach operating under stop control. The intersection consists of three (3) legs with the following lane configurations: EB Wallings Road – one (1) lane (left-thru), WB Wallings Road – one (1) lane (thru-right) and SB Majestic Oakes Trail – one (1) lane (left-right).

Wallings Road / Creekside Trace Intersection:

This intersection is unsignalized with the NB Creekside Trace approach operating under stop control. The intersection consists of three (3) legs with the following lane configurations: EB Wallings Road – one (1) lane (thru-right), WB Wallings Road – one (1) lane (left-thru) and NB Creekside Trace – one (1) lane (left-right).

Wallings Road / Joyce Road / Fire Station Drive Intersection:

This intersection is unsignalized with the NB Joyce Road and SB Fire Station Drive approach operating under stop control. The intersection consists of four (4) legs with the following lane configurations: All four (4) approaches – one (1) lane (left-thru-right).

Wallings Road / Marianna Boulevard Intersection:

This intersection is unsignalized with the NB Marianne Boulevard approach operating under stop control. The intersection consists of three (3) legs with the following lane configurations: EB Wallings Road – one (1) lane (thru-right), WB Wallings Road – one (1) lane (left-thru) and NB Marianna Boulevard – one (1) lane (left-right).



Wallings Road / Wright Road Intersection:

This intersection is currently signalized using span wire to support the traffic signal heads with signal poles located on the northeast and southwest corners of the intersection. The intersection consists of four (4) approaches with the following lane configurations: EB and WB Wallings Road – two (2) lanes (left, thru-right) and NB and SB Wright Road – one (1) lane (left-thru-right). This traffic signal operates with protected/permissive left turn signal phasing on the eastbound and westbound approaches to the intersection.

Wallings Road / Craig Lane Intersection:

This intersection is unsignalized with the NB Craig Lane approach operating under stop control. The intersection consists of three (3) legs with the following lane configurations: EB Wallings Road – one (1) lane (thru-right), WB Wallings Road – one (1) lane (left-thru) and NB Craig Lane – one (1) lane (left-right).

Wallings Road / Skyline Drive Intersection:

This intersection is unsignalized with the SB Skyline Drive approach operating under stop control. The intersection consists of three (3) legs with the following lane configurations: EB Wallings Road – one (1) lane (left-thru), WB Wallings Road – one (1) lane (thru-right) and SB Skyline Drive – one (1) lane (left-right).

Wallings Road / West Mill Road Intersection:

This intersection is unsignalized with the NB West Mill Road approach operating under stop control. The intersection consists of three (3) legs with the following lane configurations: EB Wallings Road – one (1) lane (thru-right), WB Wallings Road – one (1) lane (left-thru) and NB West Mill Road – one (1) lane (left-right).

Wallings Road / I-77 SB Ramps Intersection:

This intersection is currently signalized using span wire to support the traffic signal heads with signal poles located on the northwest and southeast corners of the intersection. The intersection consists of three (3) approaches with the following lane configurations: EB Wallings Road – one (1) lane (thru-right), WB Wallings Road – one (1) lane (left-thru) and SB I-77 Ramp – two (2) lanes (left, right). It should be noted that the fourth leg of the intersection exists as a southbound outbound only leg, which is the entrance ramp for I-77 southbound.

Wallings Road / I-77 NB Ramps / Mill Road Intersection:

This intersection is currently signalized using span wire to support the traffic signal heads with signal poles located on the northwest and southeast corners of the intersection. The intersection consists of three (3) approaches with the following lane configurations: EB Wallings Road – one (1) lane (left-thru), WB Wallings Road – one (1) lane (thru-right) and NB Mill Road – one (1) lane (left-thru-right). It should be noted that I-77 NB traffic exiting the highway onto Wallings Road, must use Mill



Road northbound to get to Wallings Road as the exit ramp dead-ends into Mill Road. Additionally, the fourth leg of the intersection exists as a northbound only leg, which is the entrance ramp for I-77 northbound.

Table 1 summarizes the results of the capacity analysis for the signalized intersections within the study area using Existing Year 2015 certified traffic volumes. The analysis is performed utilizing the computer program <u>HCS2010</u> which is developed by McTrans Corporation and based on the <u>2010 Highway Capacity Manual</u> and the <u>2009 Manual of Uniform Traffic Control Devices (MUTCD)</u>. Based on criteria established by ODOT, Highway Capacity Software (HCS) is used to determine the required number of lanes and the lane assignments at intersections (i.e. the needed intersection capacity). The analysis was performed for the intersection during the AM and PM peak hours. Existing traffic signal timings including cycle lengths, offsets and splits were obtained from the City of Broadview Heights and ODOT for use in the analysis. See **Appendix B** for the HCS Intersection Capacity Analysis printouts.



Table 1: HCS Intersection Capacity Analysis Summary – Existing Year 2015 Conditions - Signalized Intersections				
	AM	Peak	PM	Peak
Intersection / Movement	LOS	Delay (sec)	LOS	Delay (sec)
Wallings Road / Broadview Road				
Eastbound Left	D	39.5	D	38.4
Eastbound Thru-Right	F	346.2	E	78.3
Eastbound Approach	F	244.0	Ε	67.0
Westbound Left	С	25.0	D	36.6
Westbound Thru	D	37.8	F	170.1
Westbound Right	D	35.4	D	37.8
Westbound Approach	С	34.3	F	114.9
Northbound Left	С	32.4	D	38.5
Northbound Thru	F	198.6	E	63.8
Northbound Thru-Right	F	201.1	E	65.1
Northbound Approach	F	191.1	Е	59.6
Southbound Left	D	36.5	D	42.3
Southbound Thru	D	50.6	F	148.7
Southbound Thru-Right	D	50.9	F	150.9
Southbound Approach	D	47.8	F	129.5
Intersection Total	F	170.1	F	101.8
Wallings Road / Wyatt Road				
Eastbound Thru-Right	F	106.8	С	25.5
Eastbound Approach	F	106.8	С	25.5
Westbound Left	С	24.4	В	15.7
Westbound Thru	А	8.7	F	<u>88</u> .4
Westbound Approach	В	10.8	E	79.1
Northbound Left-Thru-Right	D	48.9	D	37.1
Northbound Approach	D	48.9	D	37.1
Intersection Total	Ε	74.9	E	<u>62.5</u>
Wallings Road / Wright Road				
Eastbound Left	А	8.1	В	18.0
Eastbound Thru-Right	F	226.4	С	22.9
Eastbound Approach	F	222.7	С	22.8
Westbound Left	В	18.0	В	10.7
Westbound Thru-Right	В	17.7	F	368.2
Westbound Approach	В	17.7	F	363.2
Northbound Left-Thru-Right	С	32.4	С	32.2
Northbound Approach	С	32.4	С	32.2
Southbound Left-Thru-Right	С	33.1	С	32.4
Southbound Approach	C	33.1	C	32.4
Intersection Total	F	164.9	F	255.6



Table 1: HCS Intersection Capacity Analysis Summary – Existing Year 2015 Conditions - Signalized Intersections				
	AM	Peak	PM	Peak
Intersection / Movement	LOS	Delay (sec)	LOS	Delay (sec)
Wallings Road / I-77 Southbound Ramps Intersection				
Eastbound Thru-Right	F	85.6	В	11.2
Eastbound Approach	F	85.6	В	11.2
Westbound Left-Thru	F	307.6	В	12.8
Westbound Approach	F	307.6	В	12.8
Southbound Left	С	26.5	С	30.5
Southbound Thru-Right	С	27.4	F	644.4
Southbound Approach	С	27.0	F	508.0
Intersection Total	F	110.4	F	261.1
Wallings Road / I-77 Northbound Entrance Ramp / Mill Road				
Eastbound Left-Thru-Right	F	243.9	В	13.5
Eastbound Approach	F	243.9	В	13.5
Westbound Left-Thru-Right	А	6.8	А	6.4
Westbound Approach	A	6.8	A	6.4
Northbound Left-Thru-Right	F	174.3	F	277.7
Northbound Approach	F	174.3	F	277.7
Intersection Total	F	180.0	F	101.3

As illustrated in **Table 1**, the Existing Year 2015 analysis indicates that all signalized intersections are operating at LOS E or F overall during both peak hours. The delay at the signalized intersections is caused by two (2) issues. The first issue, which occurs at the I-77 / Wallings Road interchange and the Wallings Road / Broadview Road intersection, is due to capacity issues at the intersection where additional lanes must be added to achieve acceptable Levels-of-Service. The second issue is at the Wallings Road / Wright Road and Wallings Road / Wyatt Road intersections where acceptable Levels-of-Service could be achieved with the existing lane geometries at the intersections if the existing signal timings and cycle lengths were modified.

Table 2 summarizes the results of the capacity analysis for the unsignalized intersections within the study area using Existing Year 2015 certified traffic volumes. See **Appendix B** for the HCS Intersection Capacity Analysis printouts.



Table 2: HCS Intersection Capacity Analysis Summary –				
AM Peak PM Pe			Peak	
Intersection / Movement	LOS	Delay (sec)	LOS	Delay (sec)
Wallings Road / Elmhurst Drive				
Eastbound Left	А	8.2	В	12.0
Southbound Left-Right	С	23.3	E	43.4
Southbound Approach	С	23.3	E	43.4
Wallings Road / Longview Road				
Eastbound Left	A	8.1	В	12.0
Southbound Left-Right	C	21.6	E	47.7
Southbound Approach	С	21.6	E	47.7
Wallings Road / Chestnut Boulevard				
Westbound Left	В	10.4	Α	8.9
Northbound Left-Right	D	26.5	E	44.0
Northbound Approach	D	26.5	E	44.0
Wallings Road / Overlook Avenue				
Westbound Left	В	10.4	А	8.8
Northbound Left-Right	С	23.8	D	33.5
Northbound Approach	С	23.8	D	33.5
Wallings Road / McCreary Road				
Eastbound Left	А	8.2	В	12.5
Southbound Left-Right	D	27.9	F	68.9
Southbound Approach	D	27.9	F	68.9
Wallings Road / Majestic Oaks Trail				
Eastbound Left	А	8.1	В	13.5
Southbound Left-Right	D	27.8	F	68.5
Southbound Approach	D	27.8	F	68.5
Wallings Road / Creekside Terrace				
Westhound Left	В	11 9	А	8.8
Northbound Left-Right	F	35.2	E	88.4
Northbound Approach	F	35.2	F	88.4
	-	33.2		



Table 2: HCS Intersection Capacity Analysis Summary – Existing Year 2015 Conditions – Unsignalized Intersections				
Existing real 2015 Conditions				Baak
Intersection / Movement	AM	Реак	P/M	Реак
menseenon / movement	LOS	(sec)	LOS	(sec)
Wallings Road / Joyce Road / Fire Station Drive				
Eastbound Left-Thru-Right	A	8.1	В	13.3
Westbound Left-Thru-Right	В	11.9	А	8.7
Northbound Left-Thru-Right	F	62.9	F	196.5
Northbound Approach	F	62.9	F	196.5
Southbound Left-Thru-Right	F	56.4	F	196.5
Southbound Approach	F	56.4	F	196.5
Wallings Road / Marianna Boulevard				
Westbound Left	В	11.9	А	8.8
Northbound Left-Right	E	36.2	F	53.4
Northbound Approach	E	36.2	F	53.4
Wallings Road / Craig Lane				
Westbound Left	В	12.1	А	8.8
Northbound Left-Right	E	38.9	F	58.3
Northbound Approach	E	38.9	F	58.3
Wallings Road / Skyline Drive				
Eastbound Left	A	8.1	В	13.5
Southbound Left-Right	D	31.2	F	72.0
Southbound Approach	D	31.2	F	72.0
Wallings Road / West Mill Road				
Westbound Left	В	12.2	A	8.8
Northbound Left-Right	E	35.9	F	55.4
Northbound Approach	E	35.9	F	55.4

As illustrated in **Table 2**, the Existing Year 2015 analysis indicates that all unsignalized intersections are currently operating with failing movements during the AM or PM peak hour, with the exception of the Wallings Road / Overlook Avenue intersection. These side street failing movements are due to high mainline traffic volumes and the lack of gaps in traffic for vehicles to turn onto Wallings Road.



V. Project Traffic Volumes:

Certified Traffic Volumes

For this study, manual turning movement traffic counts were performed at the seventeen (17) study intersections between Tuesday, January 27th, 2015 and Wednesday, January 28th, 2015. The turning movement counts were performed for thirteen (13) hours from 7:00 AM – 8:00 PM at the Broadview Road, McCreary Road, Wyatt Road, I-77 SB and I-77 NB intersections. The remaining counts were performed for four (4) hours from 7:00 AM – 9:00 AM and 4:00 PM and 6:00 PM.

The Existing Year 2015, Opening Year 2020 and Design Year 2040 certified traffic volumes along Wallings Road were developed by GPD Group for the project and submitted to ODOT on March 26th, 2015. These certified traffic volumes include traffic volumes at all intersections within the study area. See **Appendix C** for the certified traffic plates sent to the ODOT Office of Statewide Planning and Research. The certified traffic data includes the design designations, the Average Daily Traffic (ADT), the AM Design Hourly Volume (DHV) and the PM DHV.

Historic Growth Trends

Historic traffic volumes on Broadview Road (State Route 176) in the study area were obtained from ODOT's website. ODOT has been collecting traffic volumes on Broadview Road since 1980 and the Average Daily Traffic (ADT) volumes on this route during this time frame are available on the ODOT website. According to these volumes the City of Broadview Heights experienced a significant amount of growth from 1980 to the early 1990's. Traffic volumes began to level-off and remain steady from 2000 to present day. Due to this leveling off of traffic volumes it was determined that the growth rate should be calculated utilizing traffic volumes from 2000 to present day to avoid over-inflating future traffic volumes. Based on these historic traffic volumes, GPD Group developed a growth trend-line equation for the roadway. Based on the trend-line equation, traffic on Broadview Road has *increased* 0.24% per year (linearly) over the last fifteen (15) years. Based upon the perceived growth potential for traffic in the study area, a 0.50% growth rate has been applied to the traffic volumes. These growth rates were used when creating the certified traffic plates for this project.

Future Traffic Volumes

The proposed safety improvements are anticipated to be completed in 2020 which will serve as the 'Opening Year' for the study while the 'Design Year' will be 2040. In order to develop the projected future traffic volumes, the annual growth rate of 0.50% was applied linearly to the existing traffic volumes to compute the Opening Year 2020 as well as the Design Year 2040 traffic conditions. This increase in traffic accounts for 'background growth' which consists of additional traffic from non-specific development and general regional growth that could be expected to occur in the future. The Opening Year 2020 traffic incorporates a 2.50% increase in existing traffic (5 years of growth) while the Design Year 2040 traffic incorporates a 12.50% increase in existing traffic (25 years of growth).



VI. Safety Analysis:

Crash data was obtained from ODOT's GCAT for the calendar years of 2011 to 2013 for the entire study area. A total of 158 crashes occurred within the study area and have been analyzed as part of this study. These crashes include 125 rear-end, 11 angle, 7 sideswipe-passing, 6 left turn, 4 fixed object, 3 head-on and 2 pedestrian related crashes. 79% of all crashes occurred in daylight and 62% occurred on dry pavement. 75% of the crashes were property damage only and 25% of the crashes were injury crashes with no fatal crashes occurring during these three (3) years. See **Appendix D** for collision diagrams of the study corridor and **Appendix E** for crash data summary and charts.

The leading crash type within the study area is one hundred twenty-five (125) rear-end related crashes. These crashes appear to be occurring for two (2) distinct reasons. The first is the rear-end collisions that are occurring at the signalized intersections. These collisions are occurring during the peak hours when the signalized intersections within the study corridor experience significant congestion and long traffic queues. These crashes are occurring due to the congestion along the corridor as vehicles are constantly starting and stopping in traffic and routinely need to wait for several cycle signal lengths to pass through the traffic signals. Thirty (30) of these rear-end crashes are occurring at the Wallings Road / I-77 ramp terminal intersections. The proposed interchange improvements will address the current capacity issue that exists at the interchange and will alleviate the existing rear-end crash problem that exists. An additional forty-two (42) rear-end crashes occurred at the other signalized intersections within the study area. These rear-end crashes will be alleviated by the modification of the existing signal timings to provide better Levels-of-Service at the signalized intersection and by improving the existing signal visibility to motorists by reconstructing the signals and by installing backplates on the newly constructed signals.

Second, rear-end crashes are occurring at the unsignalized intersections and driveways due to the lack of left turn lanes at the intersections or a two-way left turn lane throughout the corridor. As vehicles have to wait for gaps in traffic to perform a left turn at the unsignalized intersections or driveways, thru traffic cannot effectively (or legally) go around the turning traffic leading to congestion and rear-end crashes. The remaining fifty-three (53) rear-end crashes occurred along the study corridor at either unsignalized intersection or driveways. These rear-end crashes will be alleviated by the addition of a center two-way left turn lane.

Typically, a field review of the corridor would show that traffic is passing motorists on the right shoulder to avoid the turning motorists. This would be found by looking for tire tread marks in the shoulder and excess pavement raveling on the shoulder. Field evidence does not exist to show that traffic is passing left turning motorists on the right should of the roadway. This is believed to be due to the fact that the shoulders on Wallings Road are currently approximately 3-4 foot wide, which does not give traffic sufficient space to pass turning vehicles on the right side of the roadway. The high instance of rear-ends throughout the corridor can further be attributed to the fact that traffic is unable to go around left turning traffic, leading to even more congestion than would typically be seen in a this type of a situation.



Crash Statistics

Using the 2011 to 2013 crash data and the existing traffic volumes, the Crash Frequency, Crash Rate, Relative Severity Index (RSI), Equivalent Property Damage Only (EPDO), and EPDO Rate, were calculated for the crashes occurring in the study area. See **Table 3** for the results of these calculations and **Appendix F** for the safety application which performs the necessary calculations.

Table 3: Crash Data Analysis Summary Chart						
Study Area Corridors	Number of Crashes	Expected Crash Frequency	Ratio Fatal and Serious Injuries to Total Crashes	RSI	EPDO Index	Volume to Capacity Ratio
Total Crashes	158	47.11	0.01	\$28,480	3.15	2.37

The expected crash frequency is calculated by the Economic Crash Analyst Tool (ECAT), which is calculated based upon the geometric conditions, traffic volumes (ADT) and observed crash frequency. See **Table 3** for the expected crash frequency and **Appendix F** for the safety application.

The Ratio of Observed Fatal and Serious Injuries to Observed Total Crashes is calculated by dividing the total number of fatal crashes and serious injury crashes by the total number of observed crashes. See **Table 3** for the ratio of fatal and serious injuries to total crashes and **Appendix F** for the safety application.

The Relative Severity Index (RSI) is a measure of the relative cost to society due to a particular type of crash. Each crash type is given a cost. The RSI is determined by multiplying the number of each type of crash with its associated cost to society. The RSI is the summation of the total cost for all crashes at an intersection or segment divided by the total number of crashes which occurred at the intersection or segment. The RSI reflects the severity of crashes at a location. See **Table 3** for the Relative Severity Index values and **Appendix F** for the safety application.

The Equivalent Property Damage Only (EPDO) index converts all the crashes at a location to an equivalent property damage value. The summation of the type of crash and multiplier results in the EPDO Value. The EPDO Value is divided by the Average Million Vehicles Entering the Intersection to determine the EPDO rate. See **Table 3** for the EPDO Index and **Appendix F** for the safety application.

The volume to capacity (V/C) ratio is a measure that reflects mobility and quality of travel of a facility. It compares roadway demand (vehicle volumes) with roadway supply (carrying capacity). For example, a V/C ratio of 1.00 indicates the roadway facility is operating at its capacity. See **Table 3** for the volumes to capacity ratio and see **Appendix F** for the safety application.



VII. Benefit to Cost Analysis:

Corridor Improvements

This study has identified long-term improvement recommendations that would reduce the number of crashes occurring within the study area. The following list outlines these improvements:

Long Term Improvements:

- 1. Widen Wallings Road to accommodate a two-way left turn lane throughout the entire study area.
- 2. Construct a westbound right turn lane at the Wallings Road / McCreary Road intersection.
- 3. Construct a westbound right turn lane at the Wallings Road / Wright Road intersection.
- 4. Study the traffic signal currently located at the Wallings Road / Wright Road intersection for removal.
- 5. Construct an eastbound right turn lane at the Wallings Road / West Mill Road intersection.
- 6. Reconstruct the Wallings Road Bridge over I-77 to accommodate four (4) travel lanes.
- 7. Construct a second eastbound left turn lane at the Wallings Road / I-77 NB Ramps / Mill Road intersection.
- 8. Widen the I-77 NB entrance ramp to accommodate the proposed, dual left turn lane from Wallings Road.
- 9. Widen Mill Road to accommodate a northbound left turn lane at the Wallings Road / I-77 NB Ramps / Mill Road intersection.
- 10. Widen the I-77 SB exit ramp to accommodate a second right turn lane and construct a second westbound thru lane on Wallings Road to receive the traffic from these (2) lanes.
- 11. Widen Wallings Road from just east of West Mill Road to the I-77 NB entrance ramp.

The existing crash problem along Wallings Road points to the need for a two-way left turn lane to be constructed throughout the entire project area. A large portion of rear-end crashes along the study corridor are occurring at unsignalized intersections and driveways and involve a vehicle stopping in traffic to complete a left turn movement. The construction of a center two-way left turn lane will allow the left turning traffic to move out



of the thru lanes, which will reduce congestion along the corridor and remove the conflict between left turning and thru vehicles.

The intersection of Wallings Road / McCreary currently meets the volume thresholds necessary for a westbound right turn lane to be constructed. This turn lane will remove turning traffic from the thru lane and reduce the conflicts between thru traffic and right turning traffic. Additionally, a westbound right turn lane should be constructed for the Wallings Road / Wright Road intersection and an eastbound right turn lane should be constructed at the Wallings Road / West Mill Road intersection to reduce these turning movement conflicts and improve operation.

The traffic signal at the Wallings Road / Wright Road intersection is not warranted based upon the Existing Year or Opening Year traffic volumes. For this reason it is recommended that the traffic signal at this intersection be studied for removal. The intersection should operate under two-way stop control once the safety improvements are constructed with Wright Road operating under stop control.

Based on future traffic volumes and capacity demands at the I-77 / Wallings Road interchange, the bridge over Wallings Road will need to be four (4) lanes wide in order to accommodate the future demand at the interchange. Currently, the bridge is only two (2) lanes and does not provide any left turn lanes for traffic turning left onto I-77. The future configuration calls for dual eastbound left turn lanes for traffic trying to enter I-77 NB. Additionally, a single westbound left turn lane is also needed for left turning traffic onto I-77 SB. The geometry over the bridge calls for the outside eastbound left turn lane to be the entire length of the bridge while the inside eastbound left turn lane should be back-to-back with the proposed 150 foot westbound left turn lane.

In order to accommodate the recommended dual eastbound left turn lanes at the Wallings Road / I-77 NB Ramps / Mill Road intersection, the entrance ramp for I-77 NB will need to be widened. The second lane on the entrance ramp will need to be merged before the traffic enters I-77 mainline.

In order to service the demand for traffic exiting I-77 SB at Wallings Road, an additional lane needs to be added to the exit ramp. In addition to the existing southbound left and southbound right, an additional 225' southbound right turn lane needs to be constructed (creating dual right turn lanes) so the traffic can exit the highway more efficiently and the Wallings Road / I-77 SB Ramps intersection can operate with acceptable Levels-of-Service. Since Wallings Road currently only provides one (1) travel lane in each direction, Wallings Road will need to be widened to two (2) westbound travel lanes west of the interchange. This additional through lane should be merged west of the West Mill Road intersection.

Wallings Road should be widened from just east of West Mill Road to the I-77 NB Ramp / Mill Road intersection. This improvement is recommended to provide additional capacity through the Wallings Road / I-77 SB Ramps intersection as well as allowing traffic to move into the proper lane as the inside thru lane will become the outside dedicated left turn lane at the Wallings Road / I-77 SB Ramps intersection. The outside thru lane will be the thru lane for traffic wishing to continue eastbound on Wallings Road to travel southbound on Mill Road.



Based upon the capacity analysis along the Wallings Road corridor, Wallings Road needs to be widened to five (5) lanes to accommodate future traffic volumes. However, the decision was made not to pursue this option due to the extensive right-of-way and construction costs associated with a five (5) lane corridor. The estimated cost for the five (5) project is approximately 20.4 million dollars. The city viewed this cost as excessive. Additionally it was felt that simply completing the three (3) lane option will improve capacity somewhat. See **Appendix G** for a cost estimate of the five (5) lane roadway improvement.

See **Figures 10-18** for the proposed 3 lane improvement exhibits for the corridor. These exhibits show the proposed future geometry of the corridor. The estimated cost for the three (3) lane improvements outlined above is approximately 15 million dollars (not including construction inspection or inflation). See **Appendix G** for a cost estimate for above listed improvements.

Benefit to Cost Analysis

The reduction of crashes within the State of Ohio is the top priority of ODOT's Highway Safety Program (HSP). In order to maximize the impacts of their limited funding allocations, a complex spreadsheet was developed which calculates the anticipated Benefit / Cost ratio for all safety improvement projects. This spreadsheet compares the anticipated construction cost of an improvement to the anticipated reduction in crashes of this improvement. The Benefit / Cost ratio for a safety improvement can then be compared to the anticipated Benefit / Cost ratio for all other safety improvement projects throughout the State. The benefit / cost ratio spreadsheet and all necessary rates and typical crash cost were obtained from the ODOT Highway Safety Program's website. The Estimates of Countermeasure Effectiveness Reduction Factors (CRF) utilized for this Safety Study are located in **Appendix H**.

Table 4 provides a summary of the Cost / Benefit Ratio for the recommended corridorimprovements. In order to adhere to ODOT's current procedures, the ECAT was used tocalculate the estimated reduction in excess crashes and Benefit / Cost ratio for theimprovements. The Benefit / Cost Analysis and Crash Modification Summary worksheetsare contained in Appendix I.

Table 4: Benefit to Cost Summary Chart				
Full Project Safety Request				
Benefit to Cost Results	0.48	1.22		

The Benefit / Cost Ratio analyses was performed based upon a cost of \$12,799,920 (which is the total cost of the Wallings Road corridor widening and interchange improvement project, not including construction inspection and inflation). This results in a 0.48 Benefit / Cost ratio. The Benefit / Cost Ratio was then computed based upon the \$5,000,000 being requested from the HSP Safety committee and the Benefit / Cost Ratio is 1.22. Based on the Benefit / Cost ratio of the safety request being greater than 1.00, the Wallings Road corridor widening interchange improvement project should be considered a fundable project and should receive the consideration of the funding committee.



VIII. Traffic Analyses:

Signal Warrant Analysis

Utilizing the existing and proposed traffic volumes, as specified in Section 402-2 of the ODOT <u>Traffic Engineering Manual (TEM)</u>, traffic signal warrant analyses were performed for the intersection. The nine (9) traffic signal warrants provided in the 2012 Ohio Manual of Uniform Traffic Control Devices (OMUTCD) define the minimum conditions under which installing traffic control signals is justified. Due to the availability of some thirteen (13) hour turning movement traffic count data, OMUTCD Warrant #'s 1-3 were deemed applicable for the Existing Year 2015 warrant analyses. The warrants are described as follows:

Warrant #1 Eight Hour Vehicular Volume

The Eight Hour Vehicular Volume warrant is intended for application where the volume of intersection traffic is the principal reason for consideration of the signal installation. Three (3) conditions are possible to satisfy this particular warrant. Condition A applies to specifically minimum vehicular volume requirements. Condition B deals with the interruption of continuous traffic flow. Condition C represents a combination of Conditions A and B being met at reduced volume requirements. When the 85th percentile speed of the major street traffic exceeds 40 mph in either an urban or rural area, or when the intersection lies within a built-up area of an isolated community having a population less than 10,000, the Eight Hour Vehicular Volume Warrant is seventy percent (70%) of the base requirements.

Warrant #2 Four Hour Vehicular Volume

The Four Hour Vehicular Volume warrant is satisfied when for four (4) hours of an average day, minimum volumes are reached on both the major street (total of both approaches) and the highest volume minor street approach (one direction only). When the 85th percentile speed of the major street traffic exceeds 40 mph or when the intersection lies within a built-up area of an isolated community having a population less than 10,000, the Four Hour Vehicular Volume requirements are reduced to seventy percent (70%) of the base values.

Warrant #3 Peak Hour Vehicular Volume

The Peak Hour Vehicular Volume warrant is intended for application when traffic conditions are such that for one hour of the day, minor street traffic suffers undue delay in entering or crossing the major street. The Peak Hour Vehicular Volume warrant is satisfied when the minimum required volumes on the major and highest volume minor approach are met for any one hour period (any four consecutive 15-minute periods) on an average day. When the 85th percentile speed of the major street traffic exceeds 40 mph or when the intersection lies within a built up area of an isolated community having a population less than 10,000, the Peak Hour Vehicular Volume warrants are reduced.



In order to determine whether the existing intersection meets a warrant based on the current traffic conditions, the existing traffic data was compared to the volume thresholds for each of the above warrants. The results of the Existing Year 2015 signal warrant analysis are shown in **Table 5**. See **Appendix J** for the traffic signal warrant analysis.

Table 5: Traffic Signal Warrant Analysis Summary –					
Existing Year 2015 Conditions					
		Signal Warrants	-		
Intersection	Warrant #1	Warrant #2	Warrant #3		
	Vehicular	Vehicular	Vehicular		
	Volume)	Volume)	Volume)		
Wallings Road / Broadview Road	Satisfied	Satisfied	Satisfied		
Wallings Road / Elmhurst Road*	N/A	Not Satisfied	Not Satisfied		
Wallings Road / Longview Road*	N/A	Not Satisfied	Not Satisfied		
Wallings Road / Chestnut Boulevard*	N/A	Not Satisfied	Not Satisfied		
Wallings Road / Overlook Avenue*	N/A	Not Satisfied	Not Satisfied		
Wallings Road / McCreary Road*	Not Satisfied	Not Satisfied	Not Satisfied		
Wallings Road / Wyatt Road	Not Satisfied	Not Satisfied	Not Satisfied		
Wallings Road / Majestic Oaks Trail*	N/A	Not Satisfied	Not Satisfied		
Wallings Road / Creekside Trace*	N/A	Not Satisfied	Not Satisfied		
Wallings Road / Joyce Road / Fire Station Drive*	N/A	Not Satisfied	Not Satisfied		
Wallings Road / Marianna Boulevard*	N/A	Not Satisfied	Not Satisfied		
Wallings Road / Wright Road	Not Satisfied	Not Satisfied	Not Satisfied		
Wallings Road / Craig Lane*	N/A	Not Satisfied	Not Satisfied		
Wallings Road / Skyline Drive*	N/A	Not Satisfied	Not Satisfied		
Wallings Road / West Mill Road*	N/A	Not Satisfied	Not Satisfied		
Wallings Road / I-77 SB Ramps	Satisfied	Satisfied	Satisfied		
Wallings Road / I-77 NB Ramps / Mill Road	Satisfied	Satisfied	Satisfied		

* - Intersection is currently unsignalized.

As shown in **Table 5**, all existing unsignalized intersections fail to meet the minimum volumes thresholds to warrant a traffic signal based on existing volumes. Additionally, the two (2) signalized intersections of Wallings Road / Wyatt Road and Wallings Road / Wright Road fail to meet a volume based signal warrant based on the existing volumes. It should be noted that Warrant #1 (Eight Hour Vehicular Volume) could not be analyzed for the majority of the traffic counts since only four (4) hour counts were performed.



Since the traffic volumes are anticipated to change in future years due to the traffic growth that is expected to occur along this corridor, the Opening Year 2020 traffic volumes at the study intersections were compared to the volume thresholds for the peak hour warrant (Warrant #3). Traffic signal warrants were once again evaluated for all study intersections. The results of the Opening Year 2020 'Build' traffic signal warrant analysis are shown in **Table 6**. See **Appendix J** for the traffic signal warrant analysis.

Table 6: Traffic Signal Warrant Analysis Summary – Opening Year 2020 'Build' Conditions				
	Signal Warrants			
Intersection	Warrant #3 (Peak Hour Vehicular Volume)			
Wallings Road / Broadview Road	Satisfied			
Wallings Road / Elmhurst Road*	Not Satisfied			
Wallings Road / Longview Road*	Not Satisfied			
Wallings Road / Chestnut Boulevard*	Not Satisfied			
Wallings Road / Overlook Avenue*	Not Satisfied			
Wallings Road / McCreary Road*	Not Satisfied			
Wallings Road / Wyatt Road	Satisfied			
Wallings Road / Majestic Oaks Trail*	Not Satisfied			
Wallings Road / Creekside Trace*	Not Satisfied			
Wallings Road / Joyce Road / Fire Station Drive*	Not Satisfied			
Wallings Road / Marianna Boulevard*	Not Satisfied			
Wallings Road / Wright Road	Not Satisfied			
Wallings Road / Craig Lane*	Not Satisfied			
Wallings Road / Skyline Drive*	Not Satisfied			
Wallings Road / West Mill Road*	Not Satisfied			
Wallings Road / I-77 SB Ramps	Satisfied			
Wallings Road / I-77 NB Ramps / Mill Road	Satisfied			

* - Intersection is currently unsignalized.

The Opening Year 2020 results are the same as the Existing Year 2015 results with the exception of the Wallings Road / Wyatt Road intersection. This intersection is currently signalized and a volume based traffic signal warrant has been satisfied under the Opening Year 2020 traffic volumes.

The only signalized intersection within the study are that did not meet a warrant is the Walling Road / Wright Road intersection. This signal is to be analyzed as unsignalized in the 'Build' conditions within this report, and will be recommended to be studied for removal.



Auxiliary Turning Lane Warrants

Utilizing the projected Design Year 2040 traffic volumes, auxiliary turn lane warrant analyses were performed for each unsignalized intersection within the study area under the Design Year 2040 'Build' traffic conditions. ODOT publishes the <u>State Highway Access</u> <u>Management Manual</u> which includes warrant charts for auxiliary turn lanes. These warrant charts were utilized to determine if auxiliary turn lanes will be required at the unsignalized intersections. The results of the auxiliary turn lane analyses for the Design Year 2040 'Build' traffic scenarios are summarized in **Table 7**. See **Appendix K** for the auxiliary turn lane warrant analysis.

Table 7: Auxiliary Turn Lane Warrant Analysis Summary –								
Design Year 2040 'Build' Conditions								
		Auxiliary Turn	Lane Warrants					
Intersection	Eastbound Left Turn Lane Warrant	Eastbound Right Turn Lane Warrant	Westbound Left Turn Lane Warrant	Westbound Right Turn Lane Warrant				
Wallings Road / Elmhurst Road	Satisfied	N/A	N/A	Not Satisfied				
Wallings Road / Longview Road	Satisfied	N/A	N/A	Not Satisfied				
Wallings Road / Chestnut Boulevard	N/A	Not Satisfied	Satisfied	N/A				
Wallings Road / Overlook Avenue	N/A	Not Satisfied	Satisfied	N/A				
Wallings Road / McCreary Road	Satisfied	N/A	N/A	Satisfied				
Wallings Road / Majestic Oaks Trail	Satisfied	N/A	N/A	Not Satisfied				
Wallings Road / Creekside Trace	N/A	Not Satisfied	Satisfied					
Wallings Road / Joyce Road / Fire Station Drive	Satisfied	Satisfied	Satisfied	Not Satisfied				
Wallings Road / Marianna Boulevard	N/A	Not Satisfied	Satisfied	N/A				
Wallings Road / Wright Road	Satisfied	Not Satisfied	Satisfied	Satisfied				
Wallings Road / Craig Lane	N/A	Not Satisfied	Satisfied	N/A				
Wallings Road / Skyline Drive	Satisfied	N/A	N/A	Not Satisfied				
Wallings Road / West Mill Road	N/A	Satisfied	Satisfied	N/A				

As shown in **Table 7**, multiple turn lane warrants are satisfied at the unsignalized intersections within the study area. As noted in the table, left turn lanes are warranted at all unsignalized intersections within the study area. Additionally, there are four (4) right turn lanes that are warranted within the study area. The first is a westbound right turn lane at the Wallings Road / McCreary Road intersection. Additionally, eastbound right turn lanes are warranted at the Wallings Road / Joyce Road / Fire Station Drive and Wallings Road / West Mill Road. Lastly, a westbound right turn lane is warranted at the Wallings Road / Wright Road intersection.



Intersection Capacity Analysis

Intersection capacity analyses were performed for the Opening Year 2020 and Design Year 2040 conditions in order to determine the operating conditions experienced by each intersection. The quality of the operating conditions experienced by an intersection is measured in terms of Level-of-Service (LOS). Levels-of-Service can range from LOS A to LOS F. Level-of-Service ratings of A, B, and C are considered to be in the acceptable range. Level-of-Service D is typically considered acceptable in urban areas (which the study area utilized for this project have been determined to be within). Levels-of-Service E and F are considered below average with significant levels of delay experienced by vehicles. The Level-of-Service thresholds vary for signalized and unsignalized intersections. The thresholds related to average control delay for both signalized and unsignalized intersections are as follows:

Level-of- Service	Delay Threshold – Signalized (Sec)	Delay Threshold – Unsignalized (Sec)
А	< 10	< 10
В	> 10 - 20	> 10 - 15
С	> 20 - 35	> 15 - 25
D	> 35 - 55	> 25 - 35
E	> 55 - 80	> 35 - 50
F	> 80	> 50

The analysis is performed utilizing the computer program <u>HCS2010</u> which is developed by McTrans Corporation and based on the <u>2010 Highway Capacity Manual</u> and the <u>2009</u> <u>Manual of Uniform Traffic Control Devices (MUTCD)</u>. Based on criteria established by ODOT, Highway Capacity Software (HCS) is used to determine the required number of lanes and the lane assignments at intersections (i.e. the needed intersection capacity). The analysis was performed for the intersection during the AM and PM peak hours. Existing traffic signal timings including cycle lengths, offsets, and splits were obtained from the City of Broadview Heights and ODOT for use in the analysis.

Opening Year 2020 Capacity Analyses

Table 8 summarizes the HCS Intersection Capacity Analysis and details the Levels-of-Service and delay experienced under the Opening Year 2020 'No-Build' and 'Build' traffic conditions at the signalized intersections within the study area. The 'Build' scenario incorporates all of the transportation improvements listed in Section VII. See **Appendix L** for the HCS Intersection Capacity Analysis printouts.



Table 8: HC	Table 8: HCS Intersection Capacity Analysis Summary -								
Opening Year 2020 N	IO-BUIIO	⁷ VS. ³ Bu		nditions	Signaliz	zea inte	rsection	S	
	ין	No-Build′	Conditio	ns	'Build' Conditions				
Intersection / Movement	AM	Peak	PM Peak		AM Peak		PM Peak		
	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	
Wallings Road / Broadview Road									
Eastbound Left	D	40.1	D	38.4	D	37.6	F	157.1	
Eastbound Thru-Right	F	357.4	F	82.8	D	54.6	C	30.3	
Eastbound Approach	F	250.5	E	70.5	D	48.8	E	65.4	
Westbound Left	С	25.0	D	40.6	С	34.6	D	50.7	
Westbound Thru	D	38.1	F	184.5	С	25.1	E	62.2	
Westbound Right	D	35.4	D	37.8	С	23.3	С	22.7	
Westbound Approach	С	34.6	F	124.7	С	26.8	D	53.9	
Northbound Left	С	32.4	D	38.5	С	24.6	F	112.1	
Northbound Thru	F	210.2	E	64.7	D	51.4	D	39.4	
Northbound Thru-Right	F	212.7	E	66.2	D	53.2	D	39.7	
Northbound Approach	F	202.3	E	60.5	D	50.9	D	52.8	
Southbound Left	D	36.5	D	44.0	С	32.8	F	97.8	
Southbound Thru	D	50.6	F	164.0	С	29.1	E	56.9	
Southbound Thru-Right	D	50.9	F	166.0	С	29.2	E	58.3	
Southbound Approach	D	47.8	F	141.9	С	29.9	E	65.3	
Intersection Total	F	176.9	F	110.0	D	44.2	E	58.7	
Wallings Road / Wyatt Road									
Eastbound Thru-Right	F	116.3	С	27.0	D	50.6	В	10.3	
Eastbound Approach	F	116.3	С	27.0	D	50.6	В	10.3	
Westbound Left	C	24.4	В	17.2	С	27.3	A	7.4	
Westbound Thru	А	8.7	F	99.3	А	7.5	C	34.2	
Westbound Approach	В	10.8	F	88.6	В	10.1	С	30.7	
Northbound Left-Thru-Right	D	50.9	D	37.1	D	54.6	D	41.2	
Northbound Approach	D	50.9	D	37.1	D	54.6	D	41.2	
Intersection Total	F	80.7	Ε	69.1	D	41.9	С	25.5	
	1								



Table 8: HC	Table 8: HCS Intersection Capacity Analysis Summary -								
Opening rear 2020 No-b				ons Sig	nanzeu	Intersec		ont.)	
	1.	√o-Build	Condition	15					
Intersection / Movement	AM	Peak	PM Peak		AM Peak		PM Peak		
	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	
Wallings Road / Wright Road									
Eastbound Left	А	8.2	В	18.0	N/A	N/A	N/A	N/A	
Eastbound Thru-Right	F	242.6	С	23.3	N/A	N/A	N/A	N/A	
Eastbound Approach	F	238.7	С	23.2	N/A	N/A	N/A	N/A	
Westbound Left	В	18.0	В	10.9	N/A	N/A	N/A	N/A	
Westbound Thru-Right	В	17.9	F	390.5	N/A	N/A	N/A	N/A	
Westbound Approach	В	17.9	F	385.3	N/A	N/A	N/A	N/A	
Northbound Left-Thru-Right	С	32.4	С	32.2	N/A	N/A	N/A	N/A	
Northbound Approach	С	32.4	С	32.2	N/A	N/A	N/A	N/A	
Southbound Left-Thru-Right	С	33.1	С	32.4	N/A	N/A	N/A	N/A	
Southbound Approach	С	33.1	С	32.4	N/A	N/A	N/A	N/A	
Intersection Total	F	176.5	F	271.8	N/A	N/A	N/A	N/A	
Wallings Road / I-77 Southbound Ramps Intersection									
Eastbound Thru	N/A	N/A	N/A	N/A	В	19.4	В	15.4	
Eastbound Thru-Right	F	97.7	В	11.3	В	19.7	В	15.4	
Eastbound Approach	F	97.7	В	11.3	В	19.5	В	15.4	
Westbound Left		200 5	D	12.4	С	32.3	В	18.9	
Westbound Thru	F	309.5	В	13.4	В	13.2	В	17.1	
Westbound Approach	F	309.5	В	13.4	В	17.3	В	17.3	
Southbound Left	С	26.5	С	31.1	D	20.0	D	12.6	
Southbound Thru	C	27.4	_	(70.1	D	20.0	D	13.0	
Southbound Right	C	27.4	F	679.1	В	19.1	В	18.7	
Southbound Approach	С	27.0	F	534.5	В	19.6	В	17.4	
Intersection Total	F	119.5	F	276.7	В	19.2	В	16.9	



Table 8: HCS Intersection Capacity Analysis Summary -									
Opening Year 2020 'No-B	Opening Year 2020 'No-Build' vs. 'Build' Conditions Signalized Intersections (Cont.)								
	1	No-Build'	Conditio	ns	'Build' Conditions				
Intersection / Movement	AM Peak		PM Peak		AM Peak		PM Peak		
	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	
Wallings Road / I-77									
Northbound Entrance Ramp / Mill Road									
Eastbound Left	-	265.0	D	14.6	С	33.2	С	34.9	
Eastbound Thru-Right	Г	265.8	D		В	14.5	С	31.3	
Eastbound Approach	F	265.8	В	14.6	С	28.9	С	32.5	
Westbound Left					D	39.0	С	28.6	
Westbound Thru	А	6.9	А	6.4	С	28.3	В	17.1	
Westbound Right					D	39.2	В	16.7	
Westbound Approach	Α	6.9	Α	6.4	D	36.1	В	17.3	
Northbound Left	E	107.2	-	200.0	С	29.6	D	36.8	
Northbound Thru-Right		197.2	-	290.0	D	39.6	В	19.8	
Northbound Approach	F	197.2	F	290.0	D	36.0	С	32.7	
Intersection Total	F	197.5	F	105.9	С	32.1	С	29.6	

The Opening Year 2020 'No-Build' results shows results similar to the Existing Year 2015 conditions. The 'Build' results show that all signalized intersections are now anticipated to operate with acceptable Levels-of-Service during both peak hours with the exception of the Wallings Road / Broadview Road intersection. It should be noted that the capacity issues at the Wallings Road / Broadview Road intersection aren't being addressed since this intersection already has a left turn lane for Wallings Road and no geometric improvements are being made. However, the overall intersection delay is improved by 75% in the AM peak hour and by 47% in the PM peak hour by simply optimizing the existing signal timings.

Table 9 summarizes the HCS Intersection Capacity Analysis and details the Levels-of-Service and delay experienced under the Opening Year 2020 'No-Build' and 'Build' traffic conditions at the unsignalized intersections within the study area.



Table 9: HCS Intersection Capacity Analysis Summary -								
Opening Year 2020 'No	-Build'	vs. 'Buil	d' Conc	ditions U	Jnsigna	lized Int	ersectio	ns
	1	No-Build'	Conditio	ns	Build' Conditions			
Intersection / Movement	AM	Peak	PM Peak		AM Peak		PM Peak	
	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)
Wallings Road / Elmhurst Drive								
Eastbound Left	A	8.2	В	12.2	А	8.2	В	12.2
Southbound Left-Right	С	24.1	E	47.0	С	24.1	E	47.0
Southbound Approach	С	24.1	E	47.0	С	24.1	E	47.0
Wallings Road / Longview Road								
Eastbound Left	А	8.2	В	12.2	А	8.2	В	12.2
Southbound Left-Right	С	22.2	F	52.1	В	22.2	F	52.1
Southbound Approach	С	22.2	F	52.1	В	22.2	F	52.1
Wallings Road / Chestnut Boulevard								
Westbound Left	В	10.5	А	9.0	В	10.4	А	9.0
Northbound Left-Right	D	27.5	E	47.7	D	27.5	E	47.7
Northbound Approach	D	27.5	Ε	47.7	D	27.5	Ε	47.7
Wallings Road / Overlook								
Avenue Westbound Left	B	10.5	A	89	B	10.5	A	89
Northbound Left-Right	C C	24.6	F	36.2	C C	24.2	F	36.2
Northbound Approach	C	24.6	E	36.2	C	24.2	E	36.2
Wallings Road / McCreary Road								
Eastbound Left	А	8.2	В	12.7	А	8.2	В	12.7
Southbound Left-Right	D	29.3	H	76.9	D	28.6	F	71.0
Southbound Approach	D	29.3	F	76.9	D	28.6	F	71.0
Wallings Road / Majestic Oaks Trail								
Eastbound Left	А	8.2	В	13.8	А	8.2	В	13.8
Southbound Left-Right	D	29.1	F	75.8	D	29.1	F	75.8
Southbound Approach	D	29.1	F	75.8	D	29.1	F	75.8



Table 9: HCS Intersection Capacity Analysis Summary -								
Opening Year 2020 'No-Bu	ild' vs. '	'Build' C	Conditio	ons Unsi	gnalize	d Interse	ections (Cont.)
	1	No-Build'	Conditio	ns		'Build' Co	onditions	
Intersection / Movement	AM	Peak	PM	Peak	AM	Peak	PM	Peak
	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)
Wallings Road / Creekside Terrace								
Westbound Left	В	12.1	А	8.8	В	11.9	А	8.8
Northbound Left-Right	E	37.7	F	100.7	E	38.3	F	100.7
Northbound Approach	E	37.7	F	100.7	Ε	38.3	F	100.7
Wallings Road / Joyce Road / Fire Station Drive								
Eastbound Left	А	8.1	В	13.7	А	8.1	В	13.7
Westbound Left	В	12.1	А	8.8	В	12.1	А	8.8
Northbound Left-Thru-Right	F	70.0	F	241.8	F	64.8	F	182.1
Northbound Approach	F	70.0	F	241.8	F	64.8	F	182.1
Southbound Left-Thru-Right	F	62.0	F	252.9	F	59.5	F	204.4
Southbound Approach	F	62.0	F	252.9	F	59.5	F	204.4
Wallings Road / Marianna Boulevard								
Westbound Left	В	12.1	А	8.8	В	12.0	А	8.8
Northbound Left-Right	E	38.6	F	58.3	E	38.6	F	58.3
Northbound Approach	E	38.6	F	58.3	E	38.6	F	58.3
Wallings Road / Wright Road								
Eastbound Left	N/A	N/A	N/A	N/A	А	8.1	В	13.7
Westbound Left	N/A	N/A	N/A	N/A	В	11.9	А	8.8
Northbound Left-Thru-Right	N/A	N/A	N/A	N/A	F	115.7	F	466.4
Northbound Approach	N/A	N/A	N/A	N/A	F	115.7	F	466.4
Southbound Left-Thru-Right	N/A	N/A	N/A	N/A	F	307.4	F	385.0
Southbound Approach	N/A	N/A	N/A	N/A	F	307.4	F	385.0
Wallings Road / Craig Lane								
Westbound Left	В	12.3	А	8.9	В	12.3	А	8.9
Northbound Left-Right	E	41.6	F	62.5	E	41.6	F	62.5
Northbound Approach	E	41.6	F	62.5	E	41.6	F	62.5



Table 9: HCS Intersection Capacity Analysis Summary -									
Opening Year 2020 'No-Build' vs. 'Build' Conditions Unsignalized Intersections (Cont.)									
	'No-Build' Conditions					'Build' Conditions			
Intersection / Movement	AM Peak		PM Peak		AM Peak		PM Peak		
	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	
Wallings Road / Skyline Drive									
Eastbound Left	А	8.2	В	13.8	А	8.2	В	13.8	
Southbound Left-Right	D	32.9	F	80.1	D	32.9	F	80.1	
Southbound Approach	D	32.9	F	80.1	D	32.9	F	80.1	
Wallings Road / West Mill Road									
Westbound Left	В	12.4	А	8.9	В	12.4	А	8.9	
Northbound Left-Right	E	38.1	F	60.8	D	33.3	F	60.8	
Northbound Approach	E	38.1	F	60.8	D	33.3	F	60.8	

The Opening Year 2020 'No-Build' results shows results similar to the Existing Year 2015 conditions. The 'Build' results show slight improvements at the unsignalized intersections within the study area. The improvements are seen on the mainline Wallings Road left turning movements as opposed to the side street movements. It should be noted that the delay shown above does not show the true capacity benefits of adding the center two-way left turn lane. The HCS 2010 program does not show the delay on the Wallings Road thru movement as it is a free-flow movement. However, moving the left turning traffic out of the thru lane reduces congestion to thru traffic since the left turners will no longer be blocking traffic as they make the left turn movement.

It should be noted that although the unsignalized intersection of Wallings Road / Wright Road is operating with high side street delay, the peak hour delay warrant is not satisfied at this intersection as Wright Road does not meet the minimum side street volume threshold (100 vehicles) to satisfy the peak hour delay warrant.

Additional traffic analysis was completed based upon the results of the 2020 build analysis in order to determine what improvements would be required to provide acceptable Levels of Service. Based upon additional intersection and segment analysis, Wallings Road would need to be widened to five (5) lanes in order to provide LOS D or higher on all movements. Based upon anticipated cost implications of a project of this size combined with the right of way impacts, the City has decided that a five (5) lane project on Wallings Road should not be completed. Additionally, there is also the possibility from a regional basis that traffic may shift away from Wallings Road in the near future once the SR 82 / I-77 Interchange and SR 82 widening west of I-77 are completed. There is the possibility that traffic is currently avoiding the SR 82 corridor and instead is utilizing Wallings Road due to the congestion on SR 82. Once the planned improvements on SR 82 are completed, congestion will be relieved and traffic can flow much more freely on SR 82. In order to prudently plan Capital Improvement Projects, the City of Broadview Heights believes that Wallings Road should only be widened to three (3) lanes at this time.



Design Year 2040 Capacity Analyses

Table 10 summarizes the HCS Intersection Capacity Analysis and details the Levels-of-Service and delay experienced under the Design Year 2040 'No-Build' and 'Build' traffic conditions at the signalized intersections within the study area. The 'Build' scenario incorporates all of the transportation improvements listed in Section VII. See **Appendix L** for the HCS Intersection Capacity Analysis printouts.

Table 10: HG	Table 10: HCS Intersection Capacity Analysis Summary - Design Year 2040 'No-Build' vs. 'Build' Conditions Signalized Intersections								
	/ በ	Vo. Build'	Condition	ne		'Build' C	onditions		
	AM	Peak	PM Peak		AM Peak		PM Peak		
Intersection / Movement	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	
<u> </u>	 	(sec)		(sec)		(sec)		(sec)	
Wallings Road / Broadview Road									
Eastbound Left	D	42.4	D	39.7	D	48.0	F	182.9	
Eastbound Thru-Right	F	438.4	F	102.5	E	69.7	D	41.0	
Eastbound Approach	F	306.4	F	84.4	E	62.5	F	81.9	
Westbound Left	С	25.2	E	55.4	E	78.0	D	52.5	
Westbound Thru	D	38.6	F	236.0	С	27.5	F	98.1	
Westbound Right	D	35.7	D	38.5	С	25.4	С	22.3	
Westbound Approach	С	34.9	F	159.2	D	38.4	E	75.3	
Northbound Left	С	32.7	D	39.8	С	28.0	F	190.8	
Northbound Thru	F	267.9	E	73.3	E	63.1	E	56.0	
Northbound Thru-Right	F	272.0	E	75.4	E	65.9	E	57.7	
Northbound Approach	F	256.9	E	67.8	E	62.4	F	82.2	
Southbound Left	D	36.8	D	51.8	D	51.0	E	60.0	
Southbound Thru	D	51.2	F	206.5	С	32.6	E	75.1	
Southbound Thru-Right	D	51.6	F	208.5	C	32.8	E	77.3	
Southbound Approach	D	48.3	F	177.6	D	36.5	E	73.1	
Intersection Total	F	217.3	F	136.3	E	55.8	E	76.9	
Wallings Road / Wyatt Road									
Fasthound Thru-Right	E	165.9	C	30.5	E	72.5	А	94	
Eastbound Approach	E	165.9		30.5	E	72.5	4	9.7	
Westhound Left	C	24.5	C	20.9	C	30.9	<u>А</u>	9. 4 8.1	
Westbound Thru		24.5	E	1/9/2		8.0		59.6	
Westbound Approach	R	11.2	F	133.1	R	11.2	D	53.2	
Northbound Left-Thru-Right	F	<i>11.∠</i>		37.7	E	72 2		53.2	
Northbound Approach	F	59.1		37.7	F	72.2		53.2	
	E	111 7	F	97.7 99 9	F	58.3		<i>J J J J J J J J J J</i>	
		111.7	-	JJ.J	-	50.5		41.1	

Note: Orange highlighted cells indicate a Level of Service E.

Red highlighted cells indicate a Level of Service F.



Table 10: HCS Intersection Capacity Analysis Summary - Design Year 2040 (No-Build' vs. 'Build' Conditions Signalized Intersections (Cont.)									
Design real 2040 NO-Du			Conditio				onditions	лп.)	
Intersection / Movement	AM	Реак	PM	Реак	AM	Реак	PM	Реак	
	LOS	(sec)	LOS	(sec)	LOS	(sec)	LOS	(sec)	
Wallings Road / Wright Road									
Eastbound Left	А	8.5	В	18.0	N/A	N/A	N/A	N/A	
Eastbound Thru-Right	F	313.0	С	26.8	N/A	N/A	N/A	N/A	
Eastbound Approach	F	308.5	С	26.7	N/A	N/A	N/A	N/A	
Westbound Left	В	18.0	В	12.5	N/A	N/A	N/A	N/A	
Westbound Thru-Right	В	18.6	F	468.5	N/A	N/A	N/A	N/A	
Westbound Approach	В	18.6	F	462.8	N/A	N/A	N/A	N/A	
Northbound Left-Thru-Right	С	32.4	С	32.2	N/A	N/A	N/A	N/A	
Northbound Approach	С	32.4	С	32.2	N/A	N/A	N/A	N/A	
Southbound Left-Thru-Right	С	33.5	С	32.4	N/A	N/A	N/A	N/A	
Southbound Approach	С	33.5	С	32.4	N/A	N/A	N/A	N/A	
Intersection Total	F	226.7	F	325.1	N/A	N/A	N/A	N/A	
Wallings Road / I-77 Southbound Ramps Intersection									
Eastbound Thru	N/A	N/A	N/A	N/A	С	20.3	В	15.6	
Eastbound Thru-Right	F	152.3	В	12.7	C	21.0	B	15.6	
Eastbound Approach	F	152.3	В	12.7	C	20.7	В	15.6	
Westbound Left					D	37.1	С	21.7	
Westbound Thru	F	419.3	С	24.6	В	12.5	С	31.1	
Westbound Approach	F	419.3	С	24.6	В	18.1	С	30.1	
Southbound Left	С	27.0	С	33.5	6				
Southbound Thru	-		_		C	21.3	В	14.9	
Southbound Right	C	28.0	F	771.5	С	20.3	С	35.0	
Southbound Approach	С	27.5	F	603.8	С	20.8	С	30.2	
Intersection Total	F	173.0	F	311.2	С	20.3	С	26.5	


Table 10: HCS Intersection Capacity Analysis Summary -								
Design Year 2040 'No-Bu	Design Year 2040 'No-Build' vs. 'Build' Conditions Signalized Intersections (Cont.)							
	1	No-Build'	Conditio	ns	'Build' Conditions			
Intersection / Movement	AM	Peak	PM	Peak	AM	Peak	PM	Peak
	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)
Wallings Road / I-77 Northbound Entrance Ramp / Mill Road								
Eastbound Left	-	369.2	С	21.6	D	40.4	D	37.6
Eastbound Thru-Right					В	14.9	D	48.3
Eastbound Approach	F	369.2	С	21.6	С	34.5	D	44.8
Westbound Left					D	39.0	С	28.6
Westbound Thru	А	7.1	А	6.6	С	28.6	В	17.4
Westbound Right					D	44.3	В	17.0
Westbound Approach	Α	7.1	А	6.6	D	39.6	В	17.6
Northbound Left	c	257.9	L	278.0	С	30.1	D	52.3
Northbound Thru-Right	•	237.0		370.0	D	45.5	С	20.1
Northbound Approach	F	257.8	F	378.0	D	39.9	D	44.4
Intersection Total	F	271.5	F	140.1	D	36.8	D	39.4

The Design Year 2040 'No-Build' results shows results similar to the Existing Year 2015 and Opening Year 2020 conditions. The 'Build' results show improvements at the majority of the intersection. The I-77 / Wallings Road interchange intersections are operating with acceptable Levels-of-Service in the Design Year while the other signalized intersections have had their average delay significantly decreased between the 'No-Build' and 'Build' scenarios. For example, although the Wallings Road / Broadview Road intersection is operating with a LOS E during both peak hours under the 'Build' conditions, the overall intersection delay has been reduced by 74% in the AM peak hour and by 44% in the PM peak hour.

Table 11 summarizes the HCS Intersection Capacity Analysis and details the Levels-of-Service and delay experienced under the Design Year 2040 'No-Build' and 'Build' traffic conditions at the unsignalized intersections within the study area.



Table 11: H	CS Inter	section	Capacit	y Analy	sis Sum	mary -		
Design Year 2040 'No-	Build' v	s. 'Build	Cond	itions U	nsignali	zed Inte	ersection	15
	1	No-Build'	Conditio	ns		'Build' C	I' Conditions	
Intersection / Movement	AM Peak PM Peak		AM Peak		PM Peak			
	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)
Wallings Road / Elmhurst Drive								
Eastbound Left	A	8.4	В	13.1	А	8.4	В	13.1
Southbound Left-Right	D	29.8	F	63.8	D	29.8	F	63.8
Southbound Approach	D	29.8	F	63.8	D	29.8	F	63.8
Wallings Road / Longview Road								
Eastbound Left	А	8.3	В	13.1	А	8.3	В	13.1
Southbound Left-Right	D	26.3	F	70.8	D	26.3	F	70.8
Southbound Approach	D	26.3	F	70.8	D	26.3	F	70.8
Wallings Poad / Chostnut								
Boulevard								
Westbound Left	В	11.0	А	9.3	В	10.9	А	9.3
Northbound Left-Right	D	34.3	F	67.4	D	34.3	F	67.4
Northbound Approach	D	34.3	F	67.4	D	34.3	F	67.4
Wallings Boad / Overloak								
Avenue								
Westbound Left	В	11.1	А	9.1	В	11.1	А	9.1
Northbound Left-Right	D	29.4	E	48.5	D	28.8	E	48.5
Northbound Approach	D	29.4	Ε	48.5	D	28.8	E	48.5
Wallings Road / McCreary Road								
Eastbound Left	А	8.3	В	13.8	А	8.3	В	13.8
Southbound Left-Right	E	35.9	F	215.4	E	35.1	F	188.9
Southbound Approach	E	35.9	F	215.4	E	35.1	F	188.9
Wallings Road / Majestic Oaks Trail								
Eastbound Left	А	8.3	С	15.2	А	8.3	С	15.2
Southbound Left-Right	E	36.2	F	112.3	E	36.2	F	112.3
Southbound Approach	E	36.2	F	112.3	Ε	36.2	F	112.3



Table 11: HCS Intersection Capacity Analysis Summary - Design Year 2040 (No-Build' vs. 'Build' Conditions Unsignalized Intersections (Cont.)					ont.)			
	10 V3. 1	No-Build'	Conditio	ns		'Build' Co	onditions	20111.)
Intervention (Management	AM Peak PM Peak		AM Peak PM Peak			Peak		
Intersection / Movement	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)
Wallings Road / Creekside Terrace								
Westbound Left	В	12.9	А	9.1	В	12.8	А	9.1
Northbound Left-Right	F	53.0	F	168.1	F	54.3	F	168.1
Northbound Approach	F	53.0	F	168.1	F	54.3	F	168.1
Wallings Road / Joyce Road / Fire Station Drive								
Eastbound Left-Thru-Right	A	8.3	В	14.9	А	8.2	В	14.9
Westbound Left-Thru-Right	В	13.0	А	9.0	В	13.1	А	9.0
Northbound Left-Thru-Right	F	108.6	*	*	F	98.7	F	357.4
Northbound Approach	F	108.6	*	*	F	98.7	F	357.4
Southbound Left-Thru-Right	F	98.7	*	*	F	88.6	F	377.4
Southbound Approach	F	98.7	*	*	F	88.6	F	377.4
Wallings Road / Marianna Boulevard								
Westbound Left	В	13.1	А	9.1	В	12.9	А	9.1
Northbound Left-Right	F	50.3	F	83.3	F	50.3	F	83.3
Northbound Approach	F	50.3	F	83.3	F	50.3	F	83.3
Wallings Road / Wright Road								
Eastbound Left	N/A	N/A	N/A	N/A	А	8.2	В	14.9
Westbound Left	N/A	N/A	N/A	N/A	В	12.9	А	9.1
Northbound Left-Thru-Right	N/A	N/A	N/A	N/A	F	203.7	F	956.9
Northbound Approach	N/A	N/A	N/A	N/A	F	203.7	F	956.9
Southbound Left-Thru-Right	N/A	N/A	N/A	N/A	F	735.6	F	787.1
Southbound Approach	N/A	N/A	N/A	N/A	F	735.6	F	787.1
Wallings Road / Craig Lane								
Westhound Left	В	13.4	А	91	В	13.4	А	91
Northbound Left-Right	E E	63.2	F	92.5	F	63.2	F	92.5
Northbound Approach	F	63.2	F	92.5	F	63.2	F	92.5
rtorthound Approach				52.5				52.5

*Results not reported by HCS



Table 11: HCS Intersection Capacity Analysis Summary -									
Design Year 2040 'No-Build' vs. 'Build' Conditions Unsignalized Intersections (Cont.)									
	1`	No-Build'	Conditio	ns		'Build' C	onditions		
Intersection / Movement	AM	Peak	PM	Peak	AM	AM Peak		PM Peak	
	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	
Wallings Road / Skyline Drive									
Eastbound Left	А	8.3	С	15.2	А	8.3	С	15.2	
Southbound Left-Right		43.2	F	122.0	E	43.2	F	122.0	
Southbound Approach	E	43.2	F	122.0	E	43.2	F	122.0	
Wallings Road / West Mill Road									
Westbound Left	В	13.6	А	9.2	В	13.6	А	9.1	
Northbound Left-Right F 57.		57.1	D	29.0	E	45.9	F	86.7	
Northbound Approach	F	57.1	D	29.0	E	45.9	F	86.7	

The Opening Year 2040 'No-Build' results shows results similar to the Existing Year 2015 and Opening Year 2020 conditions. The 'Build' results show slight improvements at the unsignalized intersections within the study area. The improvements are seen on the mainline Wallings Road left turning movements as opposed to the side street movements. It should be noted that the delay shown above does not show the true capacity benefits of adding the center two-way left turn lane. The HCS 2010 program does not show the delay on the Wallings Road thru movement as it is a free-flow movement. However, moving the left turning traffic out of the thru lane reduces congestion to thru traffic since the left turners will no longer be blocking traffic as they make the left turning movement.

Like in the Opening Year 2020 conditions, the unsignalized intersection of Wallings Road / Wright Road is operating with high side street delay, the peak hour delay warrant is not satisfied at this intersection as Wright Road does not meet the minimum side street volume threshold (100 vehicles) to satisfy the peak hour delay warrant.

Similar to the Opening Year 2020 conditions, the Design Year 2040 analysis also reveals the need for additional capacity on Wallings Road. However, based upon previous discussions, only three (3) lanes on Wallings Road will be proposed with this project.

Turn Lane Storage Length Recommendations

Storage length calculations are performed in order to determine the required length for each auxiliary turn lane based on the Design Year 2040 peak hour traffic volumes. The required storage length is a function of the signal cycle length (if a signalized intersection is being analyzed), lane assignments, and turning movement demand. The required storage length at a signalized intersection can be minimized by utilizing the shortest, most reasonable signal cycle length.



The ODOT Location and Design Manual, Volume I specifies that a storage length must provide enough storage to contain the number of vehicles per lane group per signal cycle. The manual states that turn lane storage lengths should be a minimum of 100 feet with a maximum of 600 feet for left turn lanes and 800 feet for right turn lanes.

The recommended lengths were determined based on these calculations, site conditions (i.e. the locations of existing private driveways), access management, location of overlapping left turn bays, and engineering judgment. See **Table 12** for a summary of the recommended storage lengths for the auxiliary turn lanes for intersections within the study corridor. All storage lengths shown in the table include the 50 feet diverging taper. See **Appendix M** for actual storage length calculations.

Table 12: Auxiliary Turn Lane Recommended Storage Lengths				
	Storage Length (ft)			
Intersection	Turn Lane Calculated Length	Thru Back- Up	Recommended	
Wallings Road / Broadview Road EB Left	425'	675′	425'	
Wallings Road / Broadview Road WB Left	450′	775′	450′	
Wallings Road / Broadview Road WB Right	250′	775′	250′	
Wallings Road / Broadview Road NB Left	250′	472.5′	250′	
Wallings Road / Broadview Road SB Left	325′	442.5'	325'	
Wallings Road / McCreary Road WB Right	150′	N/A	150′	
Wallings Road / Wyatt Road WB Left	225'	800′	225'	
Wallings Road / Wright Road WB Right	100′	N/A	100′	
Wallings Road / Joyce Road / Fire Station Drive	100′	N/A	100′	
Wallings Road / West Mill Road EB Right	200′	N/A	200′	
Wallings Road / I-77 SB Ramps WB Left	150′	525′	150′	
Wallings Road / I-77 SB Ramps SB Right	855' Total	375'	630′ / 225′	
Wallings Road / I-77 NB Ramps EB Left 1	525′	500′	525'	
Wallings Road / I-77 NB Ramps EB Left 2	475′	500′	475′	
Wallings Road / I-77 NB Ramps WB Left	100′	200′	100′	
Wallings Road / I-77 NB Ramps WB Right	325′	200′	325′	
Wallings Road / I-77 NB Ramps NB Left	500′	350′	500′	

As shown on **Table 12**, all of the turn lanes are recommended to be constructed at their calculated storage length. See **Figures 10 through 18** for the proposed roadway improvements along the Wallings Road corridor. These exhibits incorporate the recommended turn-lane lengths specified in **Table 12** to provide a visual representation of the proposed improvements.



IX. Pavement Condition Ratings:

Pavement Condition Ratings (PCR) are based on a visual inspection of pavement distress. The ability of pavement to carry traffic loads in a safe and smooth manner is adversely affected by observable distress in the pavement. When computing PCR, points are deducted for each type of observable distress. Perfect pavement is considered to have a PCR of 100. Overlaying and rehabilitation of roadways should be considered when the PCR drops below a score of 65. As with any physical infrastructure, the pavement of a roadway continues to degrade over time. The rate at which the pavement degrades is accepted as one (1) to three (3) points per year dependent on the number of vehicles and trucks travelling on the roadway.

The PCR for the study corridor was reviewed in 2012 by ODOT and their findings are summarized in **Table 13** on the following page.

Table 13: Pavement Condition Ratings (2012)						
Roadway Name	Beginning Log Point	End Log Point	Description	PCR		
Wallings Road	3.09	3.94	Broadview Road to Majestic Oaks Trail	75		
Wallings Road	3.94	4.83	Majestic Oaks Trail to I-77 SB Ramps	62		
Wallings Road	4.83	4.98	I-77 SB Ramps to I-77 NB Ramps	46		

The PCR for Walling Road varies between 42 and 75 depending on the location along the roadway. The pavement on the east end of the project limits is the worst and the pavement gradually gets better the farther west you travel along Wallings Road. Looking at the annual pavement degradation and the current PCR values, the stretch of Wallings Road that doesn't currently meet the threshold for resurfacing, will meet the thresholds by the Opening Year of this project. As such, the entire roadway section is proposed to be overlaid.



X. Conclusions and Recommendations:

At the request of the City of Broadview Heights, GPD Group was tasked with completing a Safety and Corridor Study for the Wallings Road corridor. This study has determined that operational and safety deficiencies exist within the study area and identified the necessary improvements to correct them. This corridor includes Wallings Road from the Broadview Road (State Route 176) intersection to the I-77 NB Ramps / Mill Road intersection.

The following conclusions and recommendations have resulted from this study.

- 1. A review of the crash patterns indicates that safety issues exist along the Wallings Road corridor. Large numbers of rear-end crashes are occurring at unsignalized intersections and driveways due to the absence of a center two-way left turn lane to separate left turning vehicles from thru vehicles. Motorists are unable to get around the left turning traffic occupying the only available thru lane in the two-lane section of Wallings Road, which causes congestion and rear-end related crashes along the corridor.
- 2. The Existing Year 2015 analysis indicates that all signalized intersections are operating at LOS E or F overall during both peak hours. The delay at the signalized intersections is caused by two (2) issues. The first issue, which occurs at the I-77 / Wallings Road interchange and the Wallings Road / Broadview Road intersection, is due to capacity issues at the intersection where additional lanes must be added to achieve acceptable Levels-of-Service. The second issue is at the Wallings Road / Wright Road and Wallings Road / Wyatt Road intersections where acceptable Levels-of-Service could be achieved with the existing lane geometries at the intersections if the existing signal timings and cycle lengths were modified.
- 3. The Existing Year 2015 analysis indicates that all unsignalized intersections are currently operating with failing movements during the AM or PM peak hour, with the exception of the Wallings Road / Overlook Avenue intersection. These side street failing movements are due to high mainline traffic volumes and the lack of gaps in traffic for vehicles to turn onto Wallings Road.
- 4. Crash data was obtained from ODOT's GCAT for the calendar years of 2011 to 2013 for the entire study area. A total of 158 crashes occurred within the study area and have been analyzed as part of this study. These crashes include 125 rear-end, 11 angle, 7 sideswipe-passing, 6 left turn, 4 fixed object, 3 head-on and 2 pedestrian related crashes. 79% of all crashes occurred in daylight and 62% occurred on dry pavement. 75% of the crashes were property damage only and 25% of the crashes were injury crashes with no fatal crashes occurring during these three (3) years.
- 5. The leading crash type within the study area is one hundred twenty-five (125) rearend related crashes. These crashes appear to be occurring for two (2) distinct reasons. The first is the rear-end collisions that are occurring at the signalized intersections. These collisions are occurring during the peak hours when the signalized intersections within the study corridor experience significant congestion



and long traffic queues. These crashes are occurring due to the congestion along the corridor as vehicles are constantly starting and stopping in traffic and routinely need to wait for several cycle signal lengths to pass through the traffic signal. Thirty (30) of these rear-end crashes are occurring at the Wallings Road / I-77 ramp terminal intersections. The proposed improvements will fix the current capacity issue that exists at the interchange and will alleviate the existing rear-end crash problem that exists. An additional forty-two (42) rear-end crashes occurred at the other signalized intersections within the study area. These rear-end crashes will be alleviated by the modification of the existing signal timings to provide better Levelsof-Service at the signalized intersection and by improving the existing signal visibility to motorists by reconstructing the signals and by installing backplates on the newly constructed signals. The rear-end crashes at the Wallings Road / Wright Road intersection will also be reduced due to the traffic signal being removed at that intersection.

- 6. Second, rear-end crashes are occurring at the unsignalized intersections and driveways due to the lack of left turn lanes at the intersections or a two-way left turn lane throughout the corridor. As vehicles have to wait for gaps in traffic to perform a left turn at the unsignalized intersections or driveways, thru traffic cannot effectively (or legally) go around the turning traffic leading to congestion and rear-end crashes. The remaining fifty-three (53) rear-end crashes occurred along the study corridor at either unsignalized intersection or driveways. These rear-end crashes will be alleviated by the addition of a center two-way left turn lane.
- 7. The existing crash problem along Wallings Road illustrates the need for a two-way left turn lane to be constructed throughout the entire project area. A large portion of rear-end crashes along the study corridor are occurring at unsignalized intersections and driveways and involve a vehicle stopping in traffic to complete a left turn movement. The construction of a center two-way left turn lane will allow the left turning traffic to move out of the thru lanes, which will reduce congestion along the corridor and remove the conflict between left turning and thru vehicles.
- 8. The intersection of Wallings Road / McCreary currently meets the volume thresholds necessary for a westbound right turn lane to be constructed. This turn lane will remove turning traffic from the thru lane and reduce the conflicts between thru traffic and right turning traffic. Additionally, a westbound right turn lane should be constructed for the Wallings Road / Wright Road intersection and an eastbound right turn lane should be constructed at the Wallings Road / West Mill Road intersection to reduce these turning movement conflicts.
- 9. The traffic signal at the Wallings Road / Wright Road intersection is not warranted based upon the Existing Year and Opening Year traffic volumes. For this reason it is recommended that the traffic signal at this intersection be studied for removal. The intersection should operate under two-way stop control once the safety improvements are constructed with Wright Road operating under stop control.
- 10. Based on future traffic volumes and capacity demands at the I-77 / Wallings Road interchange, the bridge over Wallings Road will need to be four (4) lanes wide in order to accommodate the future demand at the interchange. Currently, the bridge



is only two (2) lanes and does not provide any left turn lanes for traffic turning left onto I-77. The future configuration calls for dual eastbound left turn lanes for traffic trying to enter I-77 NB. Additionally, a single westbound left turn lane is also needed for left turning traffic onto I-77 SB. The geometry over the bridge calls for the outside eastbound left turn lane to be the entire length of the bridge while the inside eastbound left turn lane should be back-to-back with the proposed 150 foot westbound left turn lane.

- 11. In order to accommodate the recommended dual eastbound left turn lanes at the Wallings Road / I-77 NB Ramps / Mill Road intersection, the entrance ramp for I-77 NB will need to be widened. The second lane on the entrance ramp will need to be merged before the traffic enters I-77 mainline, that way only one (1) ramp lane is entering I-77 merging onto I-77 NB.
- 12. In order to service the demand exiting I-77 SB, an additional lane needs to be added to the exit ramp. In addition to the existing southbound left and southbound right turn lanes, an additional 225' southbound right turn lane needs to be constructed (creating dual right turn lanes) so the traffic can exit the highway efficiently and the Wallings Road / I-77 SB Ramps intersection can operate with acceptable Levels-of-Service. Since Wallings Road currently only provides one (1) travel lane in each direction, Wallings Road will need to be widened to two (2) westbound travel lanes west of the interchange. This additional through lane should be merged west of the West Mill Road intersection.
- 13. Wallings Road should be widened from just east of West Mill Road to the I-77 NB Ramp / Mill Road intersection. This improvement is recommended to provide additional capacity through the Wallings Road / I-77 SB Ramps intersection as well as allowing traffic to move into the proper lane as the inside thru lane will become the outside dedicated left turn lane at the Wallings Road / I-77 SB Ramps intersection. The outside thru lane will be the thru lane for traffic wishing to continue eastbound on Wallings Road to travel southbound on Mill Road.
- 14. Based upon the capacity analysis along the Wallings Road corridor, Wallings Road needs to be widened to five (5) lanes to accommodate future traffic volumes. However, the decision was made not to pursue this option due to the extensive right-of-way and construction costs associated with a five (5) lane corridor.
- 15. All existing unsignalized intersections fail to meet the minimum volumes thresholds to warrant a traffic signal based on existing volumes. Additionally, the two (2) signalized intersections of Wallings Road / Wyatt Road and Wallings Road / Wright Road fail to meet a volume based signal warrant based on the existing volumes. It should be noted that Warrant #1 (Eight Hour Vehicular Volume) could not be analyzed for the majority of the traffic counts since only four (4) hour counts were performed.
- 16. The Opening Year 2020 results are the same as the Existing Year 2015 results with the exception of the Wallings Road / Wyatt Road intersection. This intersection is currently signalized and a volume based traffic signal warrant has been satisfied under the Opening Year 2020 traffic volumes. The only signalized intersection



within the study are that did not meet a warrant is the Walling Road / Wright Road intersection. This signal was analyzed as unsignalized in the 'Build' conditions within this report.

- 17. The Opening Year 2020 'No-Build' results shows results similar to the Existing Year 2015 conditions. The 'Build' results show that all signalized intersections are now anticipated to operate with acceptable Levels-of-Service during both peak hours with the exception of the Wallings Road / Broadview Road intersection. It should be noted that the capacity issues at the Wallings Road / Broadview Road intersection aren't being addressed since this intersection already has a left turn lane for Wallings Road and no geometric improvements are being made. However, the overall intersection delay is improved by 75% in the AM peak hour and by 47% in the PM peak hour by simply optimizing the existing signal timings.
- 18. The Opening Year 2020 'No-Build' results shows results similar to the Existing Year 2015 conditions. The 'Build' results show slight improvements at the unsignalized intersections within the study area. The improvements are seen on the mainline Wallings Road left turning movements as opposed to the side street movements. It should be noted that the delay shown above does not show the true capacity benefits of adding the center two-way left turn lane. The HCS 2010 program does not show the delay on the Wallings Road thru movement as it is a free-flow movement. However, moving the left turning traffic out of the thru lane reduces congestion to thru traffic since the left turners will no longer be blocking traffic as they make the left turn movement.
- 19. The Design Year 2040 'No-Build' results shows results similar to the Existing Year 2015 conditions. The 'Build' results show improvements at the majority of the intersection. The I-77 / Wallings Road interchange intersections are operating with acceptable Levels-of-Service in the Design Year while the other signalized intersections have had their average delay significantly decreased between the 'No-Build' and 'Build' scenarios. For example, although the Wallings Road / Wyatt Road intersection is operating with a LOS F during both peak hours under the 'Build' conditions, the overall intersection delay has been reduced by 51% in the AM peak hour and by 65% in the PM peak hour.
- 20. The Opening Year 2040 'No-Build' results shows results similar to the Existing Year 2015 and Opening Year 2020 conditions. The 'Build' results show slight improvements at the unsignalized intersections within the study area. The improvements are seen on the mainline Wallings Road left turning movements as opposed to the side street movements. It should be noted that the delay shown above does not show the true capacity benefits of adding the center two-way left turn lane. The HCS 2010 program does not show the delay on the Wallings Road thru movement as it is a free-flow movement. However, moving the left turning traffic out of the thru lane reduces congestion to thru traffic since the left turners will no longer be blocking traffic as they make the left turning movement.
- 21. The PCR for Walling Road varies between 42 and 75 depending on the location along the roadway. The pavement on the east end of the project limits is the worst and the pavement gradually gets better the farther west you travel along Walling



Road. Looking at the annual pavement degradation and the current PCR values, the stretch of Wallings Road that doesn't currently meet the threshold for resurfacing, will meet the thresholds by the Opening Year of this project.

22. The Benefit / Cost Ratio analyses was performed based upon a cost of \$12,799,920 (which is the total cost of the Wallings Road corridor widening and interchange improvement project, not including construction inspection and inflation). This results in a 0.48 Benefit / Cost ratio. The Benefit / Cost Ratio was then computed based upon the \$5,000,000 being requested from the HSP Safety committee and the Benefit / Cost Ratio is 1.22. Based on the Benefit / Cost ratio of the safety request being greater than 1.00, the Wallings Road corridor widening interchange improvement project should be considered a fundable project and should receive the consideration of the funding committee.

Based on the results of the analysis contained in this report, GPD Group recommends the following:

- 1. The City of Broadview Heights should pursue the Wallings Road corridor widening and interchange improvement project outlined in this study.
- 2. The City of Broadview Heights should create a financial plan and apply for safety funding to secure funds for the construction of the proposed improvements. The funding plan should address the funding of the entire project.



FIGURES





EXISTING SIGNAL GPD GROUP. EXISTING SIGN Glaus, Pyle, Schomer, Burns & DeHaven, Inc. Copyright; Glaus, Pyle, Schomer, Burns & DeHaven, Inc. 2015 **EXISTING CANTILEVER** SIGN SUPPORT FIGURE 2 EXISTING SPAN WIRE EXISTING CONDITIONS DIAGRAM 1 OF 8 EXISTING TRUSS SIGN SUPPORT MARCH 2015







FIGURE 3

EXISTING CONDITIONS DIAGRAM 2 OF 8







0:\2014\2014383 2015 Time: 5:56



ile: 0:\2014\2014383\Traffic\Figures\Wallings Existing Conditions.dwg Layout:









- L

LEGEND
PROPOSED BRIDGE
EXISTING PAVEMENT
PROPOSED CURB AND GUTTER
PROPOSED SIDEWALK
PROPOSED PAVEMENT





CORRIDOR IMPROVEMENT RENDERING SHEET 2 OF 9







LEGEND
PROPOSED BRIDGE
EXISTING PAVEMENT
PROPOSED CURB AND GUTTER
PROPOSED SIDEWALK
PROPOSED PAVEMENT

Horizontal Scale in Feet



FIGURE 12

CORRIDOR IMPROVEMENT RENDERING SHEET 3 OF 9







LEGEND
PROPOSED BRIDGE
EXISTING PAVEMENT
PROPOSED CURB AND GUTTER
PROPOSED SIDEWALK
PROPOSED PAVEMENT

Horizontal Scale in Feet



FIGURE 13

CORRIDOR IMPROVEMENT RENDERING SHEET 4 OF 9



200



LEGEND
PROPOSED BRIDGE
EXISTING PAVEMENT
PROPOSED CURB AND GUTTER
PROPOSED SIDEWALK
PROPOSED PAVEMENT





FIGURE 14

CORRIDOR IMPROVEMENT RENDERING SHEET 5 OF 9





	LEGEND
- 	PROPOSED BRIDGE
Twist: 0	EXISTING PAVEMENT
83Viramov 7:52 am	PROPOSED CURB AND GUTTER
014/20143 5 Time:	PROPOSED SIDEWALK
File: 0:\2 pr 02, 201	PROPOSED PAVEMENT
Tech	nician: ddombrosky

Horizontal Scale in Feet



FIGURE 15

CORRIDOR IMPROVEMENT RENDERING SHEET 6 OF 9







LEGEND
PROPOSED BRIDGE
EXISTING PAVEMENT
PROPOSED CURB AND GUTTER
PROPOSED SIDEWALK
PROPOSED PAVEMENT





FIGURE 16

CORRIDOR IMPROVEMENT RENDERING SHEET 7 OF 9







LEGEND
PROPOSED BRIDGE
EXISTING PAVEMENT
PROPOSED CURB AND GUTTER
PROPOSED SIDEWALK
PROPOSED PAVEMENT

Horizontal Scale in Feet



nician: ddombrosk



MARCH 2015

CORRIDOR IMPROVEMENT RENDERING SHEET 8 OF 9

GPD GROUP, Glaus, Pyle, Schomer, Burns & DeHaven, Inc. Copyright; Glaus, Pyle, Schomer, Burns & DeHaven, Inc. 2015

FIGURE 17

MATCH LINE H



LEGEND
PROPOSED BRIDGE
EXISTING PAVEMENT
PROPOSED CURB AND GUTTER
PROPOSED SIDEWALK
PROPOSED PAVEMENT

Horizontal Scale in Feet



CORRIDOR IMPROVEMENT RENDERING SHEET 9 OF 9

APPENDIX A SITE PHOTO LOG



Looking north on Mill Road toward the Wallings Road intersection



Looking west on Wallings Road toward the Mill Road / I-77 NB Entrance Ramp intersection





Looking east on Wallings Road toward the Mill Road / I-77 NB Entrance Ramp intersection



Looking west on Wallings Road toward the I-77 SB Ramps intersection





Looking east on Wallings Road toward the I-77 SB Ramps intersection



Looking north on I-77 SB Exit Ramp toward the Wallings Road intersection





Looking north on West Mill Road toward the Wallings Road intersection



Looking east on Wallings Road toward the West Mill Road intersection





Looking west on Wallings Road toward the West Mill Road intersection



Looking south on Skyline Drive toward the Wallings Road intersection




Looking west on Wallings Road toward the Skyline Drive intersection



Looking east on Wallings Road toward the Skyline Drive intersection





Looking east on Wallings Road toward the Craig Lane intersection



Looking west on Wallings Road toward the Craig Lane intersection





Looking north on Craig lane toward the Wallings Road intersection



Looking west on Wallings Road toward the Wright Road intersection





Looking east on Wallings Road toward the Wright Road intersection



Looking south on Wright Road toward the Wallings Road intersection





Looking north on Wright Road toward the Wallings Road intersection



Looking east on Wallings Road toward the Marianna Boulevard intersection





Looking west on Wallings Road toward the Marianna Boulevard intersection



Looking north on Marianna Boulevard toward the Wallings Road intersection





Looking west on Wallings Road toward the Joyce Road intersection



Looking east on Wallings Road toward the Joyce Road intersection





Looking north on Joyce Road toward the Wallings Road intersection



Looking south on Fire Station Drive toward the Wallings Road intersection





Looking west on Wallings Road toward the Creekside Terrace intersection



Looking east on Wallings Road toward the Creekside Terrace intersection





Looking north on Creekside Terrace toward the Wallings Road intersection



Looking west on Wallings Road toward the Majestic Oaks Trail intersection





Looking east on Wallings Road toward the Majestic Oaks Trail intersection



Looking south on Majestic Oaks Trail toward the Wallings Road intersection





Looking east on Wallings Road toward the Wyatt Road intersection



Looking west on Wallings Road toward the Wyatt Road intersection





Looking north on Wyatt Road toward the Wallings Road intersection



Looking west on Wallings Road toward the McCreary Road intersection





Looking east on Wallings Road toward the McCreary Road intersection



Looking south on McCreary Road toward the Wallings Road intersection





Looking west on Wallings Road toward the Overlook Avenue intersection



Looking east on Wallings Road toward the Overlook Avenue intersection





Looking north on Overlook Avenue toward the Wallings Road intersection



Looking west on Wallings Road toward the Chestnut Boulevard intersection





Looking east on Wallings Road toward the Chestnut Boulevard intersection



Looking north on Chestnut Boulevard toward the Wallings Road intersection





Looking west on Wallings Road toward the Longview Road intersection



Looking east on Wallings Road toward the Longview Road intersection





Looking south on Longview Road toward the Wallings Road intersection



Looking west on Wallings Road toward the Elmhurst Drive intersection





Looking east on Wallings Road toward the Elmhurst Drive intersection



Looking south on Elmhurst Drive toward the Wallings Road intersection





Looking west on Wallings Road toward the Broadview Road intersection



Looking east on Wallings Road toward the Broadview Road intersection





Looking north on Broadview Road toward the Wallings Road intersection



Looking south on Broadview Road toward the Wallings Road intersection



APPENDIX B EXISTING HCS INTERSECTION CAPACITY ANALYSIS EXISTING YEAR 2015 CONDITIONS

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General Inform	nation								Inte	ersect	ion Inf	ormatic	on	2	4444	× L
Agency		GPD Group							Dura	ation,	h	0.25			4+4	
Analyst		BMF		Analys	is Da	te Mar 2	2, 2015		Area	а Туре	e	Other		4		⊂ 4
Jurisdiction		City of Broadview H	leights	Time F	Period	AM P	eak Ho	ur	PHF	F		0.92			W + E	
Intersection		Wallings Road/Broa	adview F	Analys	is Yea	ar 2015			Ana	alysis I	Period	1>7:0)0			* * -
File Name		1. Wallings Rd_Bro	adview	Rd_Exis	sting A	AM.xus									5.1¥	
Project Descrip	tion	Existing Year 2015	AM Pea	k Hour										1	4147	
Demand Inform	nation				EE	3	<u> </u>	V	/B		<u> </u>	NB		<u> </u>	SB	
Approach Move	ement			L	Т	R			T	R		T	R	L	T	R
Demand (v), ve	h/h			310	550) 70	80	1	90	80	50	550	370	70	190	80
Signal Informa	tion				ΙI											ĸ
Cycle s	154 4	Reference Phase	2	-	<u> </u>	1 643		_	R		<u> </u>		$\langle 2 \rangle$			
Offset, s	0	Reference Point	 End		\square		<u> </u>					_	1	2	3	4
Uncoordinated	Yes	Simult, Gap F/W	On	Green	22.0) 35.0	22.0	12	2.4	35.0	0.0	— l		-+-		-
Force Mode	Fixed	Simult, Gap N/S	On	Red	2.0	2.0	2.0	2.	0	2.0	0.0	_	5		7	$\mathbf{+}$
			•		1 0	1 = - •	1-10	ш — -	-	1-10	1			-		_
Timer Results				EBL	-	EBT	WE	BL	WE	BT	NBI	-	NBT	SBL	_	SBT
Assigned Phase	e			3		8	7		4	ł	1		6	5		2
Case Number				1.1		4.0	1.1		3.0	0	1.1		4.0	1.1		4.0
Phase Duration	l, S			27.6	;	40.6	45.	6	58.	.6	27.6	; ,	40.6	27.6	;	40.6
Change Period,	, (Y+Rc)	, S		5.6		5.6	5.6	6	5.0	6	5.6		5.6	5.6		5.6
Max Allow Head	ow Headway (<i>MAH</i>), s Clearance Time (<i>gs</i>), s			4.1		4.1	4.1		4.	.1	4.3		4.3	4.3		4.3
Queue Clearan	e Clearance Time (g_s) , s			24.0)	37.0	6.0)	14.	.8	5.1		37.0	6.4		12.9
Green Extensio	e Clearance Time (<i>g</i> s), s n Extension Time (<i>g</i> e), s			0.0		0.0	0.3	3	3.9	9	0.1		0.0	0.2		5.9
Phase Call Prol	The Clearance Time (g_s), s n Extension Time (g_e), s e Call Probability			1.00)	1.00	1.0	0	1.0	00	1.00)	1.00	1.00)	1.00
Max Out Proba	n Extension Time (g _e), s e Call Probability Out Probability			1.00		1.00	0.0	0	0.0	04	0.00		1.00	0.00)	0.11
Movement Gro		sulte			EB			\M/	R			NR	_		SB	_
Approach Move	Extension Time (<i>g</i> _e), s Call Probability Dut Probability ment Group Results ach Movement				Т	B		т Т	5	R	1	Т	B		Т	B
Assigned Move	ment			3	8	18	7	4	-	14	1	6	16	5	2	12
Adjusted Flow F	Rate (v)	veh/h		337	674	10	87	20	7	87	54	536	464	76	151	143
Adjusted Satura	ation Flo	w Bate (s) veh/h/ln		1792	1844	1	1757	184	5 1	563	1774	1863	1611	1774	1900	1712
Queue Service	Time (c			22.0	35.0)	4.0	12	8 (6.0	3.1	35.0	35.0	4.4	10.3	10.9
Cvcle Queue C	learanc	e Time (<i>a</i> c). s		22.0	35.0)	4.0	12.	8 (6.0	3.1	35.0	35.0	4.4	10.3	10.9
Green Ratio (<i>q</i> /	(C)	c (g ,) , c		0.37	0.23	3	0.50	0.3	4 0	0.34	0.37	0.23	0.23	0.37	0.23	0.23
Capacity (c), ve	, h/h			570	418		502	63	3 5	537	454	422	365	299	431	388
Volume-to-Capa	acity Ra	atio (X)		0.591	1.61	2	0.173	0.32	26 0.	.162	0.120	1.270	1.270	0.254	0.350	0.368
Available Capa	city (Ca)	, veh/h		570	418		502	63	3 5	537	454	422	365	299	431	388
Back of Queue	(<i>Q</i>), vel	h/In (50th percentile)		10.2	49.5	5	1.7	5.9)	2.3	1.4	32.9	28.7	2.0	5.0	4.8
Queue Storage	Ratio (RQ) (50th percentile)	2.57	0.00)	0.35	0.0	0 0	0.18	0.12	0.00	0.00	0.17	0.00	0.00
Uniform Delay ((d1), s/v	eh		37.8	59.7	7	24.8	37.	5 3	35.3	32.3	59.7	59.7	36.1	50.1	50.4
Incremental De	lay (<i>d2</i>),	, s/veh		1.6	286.	5	0.2	0.3	3 (0.1	0.1	138.9	141.4	0.4	0.5	0.6
Initial Queue De	elay (<i>d</i> 3)), s/veh		0.0	0.0		0.0	0.0) (0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/vel	h		39.5	346.	2	25.0	37.	8 3	35.4	32.4	198.6	201.1	36.5	50.6	50.9
Level of Service	e (LOS)			D	F		С	D		D	С	F	F	D	D	D
Approach Delay	, s/veh	/ LOS		244.	0	F	34.	3	С)	191.	1	F	47.8	3	D
Intersection De	lay, s/ve	eh / LOS				17	0.1							F		
															0.5	
Multimodal Re	sults	/1.00			EB			W	В			NB			SB	
Pedestrian LOS	Score	/ 105														
BICYCIE LOS SC	ore / LC	5														

General Inform	nation									Int	tersect	ion Inf	ormati	on		424	
Agency		GPD Group								Dι	uration,	h	0.25				
Analyst		BMF		Analys	is Da	ate N	Mar 2,	2015		Ar	еа Туре	Э	Othe	r	4		د. چ
Jurisdiction		City of Broadview H	leights	Time F	erio	A b	AM Pe	ak Hou	r	PH	HF		0.92		* *	w∔e s	
Intersection		Wallings Road/Wya	tt Road	Analys	is Ye	ar 2	2015			Ar	nalysis l	Period	1>7:	00			*
File Name		7. Wallings Rd_Wya	att Rd_E	Existing	AM.x	us										\$	
Project Descrip	tion	Existing Year 2015	AM Pea	k Hour												414	1 + 1
					_	_		1									
Demand Inform	nation				EI	B		<u> </u>	N	/B -		<u> </u>	NB			SB	
Approach Move	ement			L	T		R			T	R		T	R	L	Т	R
Demand (v), ve	h/h				95	60	10	50	32	20		40	0	230			
Signal Informa	tion							"									
Cvcle. s	121.8	Reference Phase	2			E.	→ È	·						<u> </u>	→		√
Offset, s	0	Reference Point	End		45	_								1	2	3	4
Uncoordinated	Yes	Simult. Gap E/W	On	Vellow	15.	0	<u>60.0</u> 3.6	30.0	0.0	0	0.0	0.0	_		\		
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	-	2.0	2.0	0.	0	0.0	0.0		5	6	7	8
					.11												
Timer Results				EBL	-	E	3T	WBI	-	٧	VBT	NBI	-	NBT	SBI	-	SBT
Assigned Phase	е					2	2	1			6			4			
Case Number	Resultsed PhaseJumberDuration, se Period, $(Y+Rc)$, slow Headway (MAH), sClearance Time (g_s) , sExtension Time (g_e) , sCall Probabilityut Probability					8.	.3	1.0		2	4.0			12.0			
Phase Duration	Results ied Phase Number Duration, s e Period, $(Y+Rc)$, s llow Headway (MAH), s e Clearance Time (g_s), s Extension Time (g_e), s Call Probability ut Probability ment Group Results ach Movement					65	5.6	20.6	;	8	86.2			35.6			
Change Period	Number Duration, s ge Period, $(Y+R_c)$, s llow Headway (<i>MAH</i>), s e Clearance Time (g_s), s Extension Time (g_e), s Call Probability					5.	.6	5.6		Ę	5.6			5.6			
Max Allow Head	e Duration, s ge Period, ($Y+R_c$), s Illow Headway (MAH), s e Clearance Time (g_s), s Extension Time (g_e), s e Call Probability					1.	.0	1.1		1	1.0			1.5			
Queue Clearan	nge Period, $(Y+R_c)$, s Allow Headway (<i>MAH</i>), s ue Clearance Time (g_s), s en Extension Time (g_e), s					62	2.0	3.5		1	1.8			22.5			
Green Extensio	Allow Headway (MAH), s ue Clearance Time (g_s), s en Extension Time (g_e), s se Call Probability					0.	.0	0.0		(0.0			0.0			
Phase Call Pro	Allow Headway (MAH), s ue Clearance Time (g_s), s en Extension Time (g_e), s se Call Probability					1.(00	1.00		1	.00			1.00			
Max Out Proba	bility					1.(00	0.00)	0	0.00			0.00			
Movement Gro		ulte	_		EE	2			\٨/٢	B			NB			SB	_
Approach Move	an informationa, s121.8Reference Phasea, s0Reference PointIordinatedYesSimult. Gap E/WIa ModeFixedSimult. Gap N/SIa ModeFixedSimult. Gap N/SIr ResultsIndex PhaseIned PhaseNumbere Duration, sIge Period, $(Y+R_c)$, sAllow Headway (MAH), sIie Clearance Time (g_s) , sn Extension Time (g_e) , se Call ProbabilityOut ProbabilityOut ProbabilityOut Probabilityach Movementaned Movementacted Flow Rate (v) , veh/hsted Flow Rate (v) , veh/hsted Saturation Flow Rate (s) , veh/h/lnie Service Time (g_s) , se Queue Clearance Time (g_c) , sin Ratio (g/C) city (c) , veh/hne-to-Capacity Ratio (X) able Capacity (c_a) , veh/hof Queue (Q) , veh/ln (50th percentile)ie Storage Ratio (RQ) (50th percentile)ir Delay (d_1) , s/veh				T	, 	B	1	T		R	1	Т	B		Т	B
Assigned Move	ment				2	+	12	1	6	+		7	4	14	<u> </u>	·	
Adjusted Flow I	Rate (v)	veh/h			104	3	12	54	348	R		,	293				
Adjusted Satura	ation Flo	w Rate (s), veh/h/ln			185	i9		1723	181	0			1605				
Queue Service	Time (a	s). S			60.	0		1.5	9.8	3			20.5				
Cvcle Queue C	learance	e Time (<i>a</i> c), s			60.	0		1.5	9.8	3			20.5				
Green Ratio (g/	(C)	(30), 0			0.4	9		0.63	0.6	6			0.25				
Capacity (c), ve	eh/h				916	3		271	119	7			395				
Volume-to-Cap	acity Ra	tio (<i>X</i>)			1.13	39		0.200	0.29	90			0.742				
Available Capa	city (<i>Ca</i>),	veh/h			916	3		271	119	7			395				
Back of Queue	(<i>Q</i>), veł	n/In (50th percentile)			44.	7		0.8	3.6	3			8.9				
Queue Storage	Ratio (RQ) (50th percentile)		0.0	0		0.20	0.0	0			0.00				
Uniform Delay	(<i>d</i> 1), s/ve	əh			30.	9		24.3	8.6	3			42.3				
Incremental De	lay (<i>d2</i>),	s/veh			75.	9		0.1	0.0)			6.5				
Initial Queue De	elay (<i>d₃</i>)	, s/veh			0.0)		0.0	0.0)			0.0				
Control Delay (tial Queue Delay (d3), s/ven ontrol Delay (d), s/veh				106	.8		24.4	8.7	7			48.9				
Level of Service	vel of Service (LOS)				F			С	Α				D				
Approach Delay	pproach Delay, s/veh / LOS			106.8	3	F	-	10.8	;		В	48.9)	D	0.0		
Intersection De	ersection Delay, s/veh / LOS						74.	.9							E		
Multimodal Re	sults	/1.00			EE	5			WE	В			NB			SB	
Pedestrian LOS	Score	/ LUS								_							
BICYCIE LOS SC	ore / LC	15															

General Inform	nation									Int	tersect	ion Inf	ormatio	on		14 24 44 1 ·	× L
Agency		GPD Group								Du	uration,	h	0.25			*	
Analyst		BMF		Analys	sis Da	te N	Mar 2,	2015		Are	еа Туре	Э	Other		4		4 . 1
Jurisdiction		City of Broadview H	leights	Time F	Perioc	A k	AM Pe	ak Hou	r	PH	ΗF		0.92			w‡e s	
Intersection		Wallings Road/Wrig	ht Road	Analys	sis Ye	ar 2	2015			An	nalysis I	Period	1> 7:0	00			7
File Name		12. Wallings Rd_Wr	right Rd	_Existin	ig AM	l.xus	;									\$	
Project Descrip	tion	Existing Year 2015	AM Pea	k Hour												* † * *	* /*
										<u> </u>					1		
Demand Inform	nation					3		<u> </u>		/B	_	<u> </u>	NB		<u> </u>	SB	
Approach Move	ement			L			R	L		1	R	L		R	L		R
Demand (v), ve	h/h			20	116	50	10	10	34	40	10	20	20	10	50	10	10
Signal Informa	tion						7	UR.									1
Cycle, s	98.4	Reference Phase	2	-	2	d.	28								2	•	小
Offset, s	0	Reference Point	End			_	<u> </u>			_			_	1	Y 2	3	4
Uncoordinated	Yes	Simult, Gap E/W	On	Green	15.0)	47.0	20.0	0.0	0	0.0	0.0	- 11		\rightarrow		-
Force Mode	Fixed	Simult, Gap N/S	On	Red	2.0		2.0	2.0	0.0	0	0.0	0.0		5	6	7	
			-				-	1 -	ш	-	1	1					
Timer Results				EBL	-	EE	ЗT	WBI	L	N	VBT	NBI		NBT	SBL	_	SBT
Assigned Phase	e			5		2	2	1			6			8			4
Case Number				1.1		4.	.0	1.1		4	4.0			8.0			8.0
Phase Duration	umber Duration, s Period, $(Y+Rc)$, s two Headway (MAH), s Clearance Time (g_s) , s Extension Time (a_s) s			20.6	3	52	2.6	20.6	;	5	2.6			25.2			25.2
Change Period,	Duration, s e Period, $(Y+R_c)$, s low Headway (<i>MAH</i>), s Clearance Time (g_s) , s Extension Time (q_e) , s			5.6		5.	.6	5.6		5	5.6			5.2			5.2
Max Allow Head	ge Period, $(Y+R_c)$, s Ilow Headway (<i>MAH</i>), s e Clearance Time (g_s) , s Even size Time (g_s) s			3.1		6.	.0	3.1		6	6.0			4.3			4.3
Queue Clearan	Allow Headway (<i>MAH</i>), s ue Clearance Time (g_s), s on Extension Time (a_e), s			2.5		49	0.0	2.2		1	5.6			4.4			6.2
Green Extensio	Allow Headway (<i>MAH</i>), s ue Clearance Time (g_s), s en Extension Time (g_e), s se Call Probability			0.0		0.	.0	0.0		2	3.6			0.3			0.3
Phase Call Prol	Allow Headway ($MA(h)$, s ue Clearance Time (g_s), s en Extension Time (g_e), s se Call Probability Out Probability			1.00)	1.0	00	1.00)	1.	.00			1.00			1.00
Max Out Proba	tue Clearance Time (g_s) , s en Extension Time (g_e) , s se Call Probability c Out Probability			0.00)	1.(00	0.00)	0	.69			0.00			0.00
No.		- 14 -	_			`			14/5	۰ ۲					_	0.0	
Movement Gro	en Extension Time (g_e) , s se Call Probability Out Probability ement Group Results roach Movement				EB	5	_	1		3		1				5B 	
Approach Move	ment			E	1	+	H 10	L	6	+	н 16	L 2	- 1	10 10		1	14
Adjusted Flow		vob/b		5	107	0	12	-1-1	200		10	3	0	10	1	4	14
Adjusted Flow r	Hale (V)	, ven/n		1774	100	2	_	1740	101	, ,	_		1601			1440	
				0.5	100	0	_	0.2	101	0			1621			1442	
	loarano	(a_i)		0.5	47.0	2		0.2	12	6			0.0			1.7	
Groop Patio (g				0.5	47.0) 2		0.2	0.4	0			2.4			4.2	
Capacity (c) ye	b/h			662	9.40	2		338	869	2			3.20			356	
Volume-to-Cap	acity Ra	tio (X)		0.02	1 / 3	, 		0.032	0.43	20			0 1/3			0.214	
Available Capa	$city(c_{2})$			662	885	2		338	868	2			381			356	
Back of Oueue	(O) vel	/In (50th percentile)	_	0.2	68 4	5	_	0.1	5.5	5			1 1			1.6	
Queue Storage	Batio (BO (50th percentile))	0.04	0.00	2		0.1	0.0	0			0.00			0.00	
Uniform Delay ($(d_1) s/v$	eh	/	8.1	25	7		18.0	17	0			32.2			32.8	
Incremental De	a_{1}, a_{2}	s/veh		0.1	200	7		0.0	07	7			02.2			02.0	
Initial Queue De	ay (dz),	s/veh	_	0.0	0.0			0.0	0.7	,			0.0			0.0	
Control Delay	a) s/vel	1		81	226	4		18.0	17	7			32.4			33.1	
Level of Service	e (LOS)			A	0.	-		.0.0 B	- / . R	-			C			C	
Approach Delay	. s/veh	/ LOS		222	7	F	-	17.7	,		В	32.4	1	С	33 1		С
Intersection Del	lay. s/ve	h / LOS					164	1.9			-			-	F		-
	ersection Delay, s/ven / LOS							-									
Multimodal Re	sults				EB	3			WE	3			NB			SB	
Pedestrian LOS	Score	/ LOS															
Bicycle LOS Sc	ore / LC	DS															

				3 -					-			-	,				
General Inform	nation									Ini	tersect	ion Info	ormatio	on	2	4144)	× L
Agency		GPD Group								Du	uration.	h	0.25			44	
Analvst		BMF		Analys	sis Da	ate N	Mar 2.	2015		Ar	rea Type)	Othe				۲. ۲.
Jurisdiction		Citv of Broadview H	leiahts	Time F	Period	d A	AM Pe	ak Hou	r	PH	HF		0.92		*	w∳e	•
Intersection		Wallings Road / I-77	7 SB	Analys	sis Ye	ar 2	2015			Ar	nalysis I	Period	1>7:	00			 ∀
File Name		16. Wallings Rd I-7	7 SB E	xistina /	AM.xi	us											
Project Descrip	tion	Existing Year 2015	AM Pea	k Hour												4 1 4 Y 1	* *
, ,		5													1		
Demand Inform	nation				E	В			N	٧B			NB			SB	
Approach Move	ement			L	Т	-	R	L	-	Т	R	L	Т	R	L	Т	R
Demand (v), ve	h/h				93	0	210	60	2	10					140	10	150
					-11				lí		_						
Signal Informa	tion					≤ 1	216										
Cycle, s	90.0	Reference Phase	2		₿.	6.1								1		3	4
Offset, s	0	Reference Point	End	Green	54.5	5	24.5	0.0	0.	0	0.0	0.0			_		I
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	3.6	:	3.0	0.0	0.	0	0.0	0.0				•	Φ
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.9		2.5	0.0	0.	0	0.0	0.0		5	6	7	8
																_	
Timer Results				EBL	-	EE	3T	WBL	-	V	VBT	NBL	<u> </u>	NBT	SBL	-	SBT
Assigned Phase	9				_	2	2				6						8
Case Number						8.	.0			3	8.0						10.0
Phase Duration	, S					60	.0			6	6.0						30.0
Change Period,	Period, $(Y+R_c)$, s ow Headway (<i>MAH</i>), s Clearance Time (a_c) s					5.	.5			5	5.5						5.5
Max Allow Head	low Headway (MAH), s Clearance Time (g_s), s					2.	.3			2	2.3					_	4.2
Queue Clearan	Illow Headway (MAH), s e Clearance Time (g_s), s Extension Time (q_e), s					56	5.5			5	6.5						10.2
Green Extensio	e Clearance Time (g_s) , s n Extension Time (g_e) , s					0.	.0			(0.0					_	1.0
Phase Call Prol	oability					1.0	00			1	.00						1.00
Max Out Proba	bility					1.0	00			1	.00						0.01
Movement Gro	un Res	ults	_		FP	3			W	R			NB	_		SB	_
Approach Move	ement				Т		R		т		B	1	Т	B		Т	B
Assigned Move	ment				2	+	12	1	6	+		-	<u> </u>		3	8	18
Adjusted Flow F	Rate (v)	veh/h			123	9			29	3					152	174	
Adjusted Satura	ation Flo	w Rate (s), veh/h/ln			182	1			230	0					1740	1563	
Queue Service	Time (a	(s). S			54.	5			0.0	2 7					6.3	8.2	
Cycle Queue C	learance	e Time (a_c) s			54 !	5			54	5					6.3	8.2	
Green Batio (a)	(C)	(go), c	_		0.6	1			0.6	1					0.27	0.27	
Capacity (c), ve	eh/h				110	3			188	8					474	426	
Volume-to-Cap	acitv Ra	tio (X)			1.12	24			1.56	60					0.321	0.409	
Available Capa	city (Ca)	veh/h			110	3			188	8					474	426	
Back of Queue	(<i>Q</i>), veł	n/In (50th percentile)			39.7	7			17.	3					2.6	3.0	
Queue Storage	Ratio (RQ) (50th percentile)		0.00	0			0.0	0					0.00	0.00	
Uniform Delay (d1). s/ve	eh	,		17.8	8			31.	4					26.1	26.8	
Incremental De	lav (<i>d</i> ₂).	s/veh			67.9	9			276	.2					0.4	0.6	
Initial Queue De	elay (da)	, s/veh			0.0)			0.0	2					0.0	0.0	
Control Delay (d), s/veł	1			85.6	6			307	.6					26.5	27.4	
Level of Service	e (LOS)				F				F						C	С	
Approach Delay	, s/veh	/ LOS		85.6	;	F	-	307.6	3		F	0.0			27.0		С
Intersection Del	lay, s/ve	h / LOS					110).4		-					F		-
	-,, -, - 0																
Multimodal Re	sults				EB	3			W	В			NB			SB	
Pedestrian LOS	Score	/ LOS															
Bicycle LOS Sc	ore / LC	DS															

				-								-				
General Inform	nation								Inte	rsect	ion Infe	ormatio	on		444	la la
Agency		GPD Group							Dura	ation,	h	0.25		1		
Analyst		BMF		Analys	is Date	e Mar 2,	2015		Area	a Type	;	Other		4		<u>د</u>
Jurisdiction		City of Broadview H	leights	Time F	eriod	AM Pe	ak Hou	r	PHF	:		0.92		*	W + E	
Intersection		Wallings Road/I-77	NB/Mill	Analys	is Yea	r 2015			Ana	lysis I	Period	1>7:	00			7 7
File Name		17. Wallings Rd_I-7	7 NB_N	1ill Rd_E	Existing	g AM.xus	;								\$	
Project Descrip	tion	Existing Year 2015	AM Pea	k Hour											4144	* *
					==						1			1		
Demand Inform	nation				EB			W	/B		<u> </u>	NB		<u> </u>	SB	
Approach Move	ement			L	170	R	L			R	L	1	R 70	L L		R
Demand (V), Ve	n/n			820	170	80	20			250	160	220	70			
Signal Informa	tion					2										
Cycle, s	90.0	Reference Phase	2		B.	- 🔄 🖥		7						4		- V
Offset, s	0	Reference Point	End	Groon		50.7	10.7		_	0.0	0.0		1	Y 2	3	4
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	4.0	3.6	3.0	0.0	5	0.0	0.0		▶ .	\rightarrow		
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.9	1.7	2.3	0.0	5	0.0	0.0		5	6	7	8
			1													
Timer Results				EBL		EBT	WBI	-	WE	3T	NBL	-	NBT	SBL	-	SBT
Assigned Phase	Э			5		2			6				4			
Case Number				0.0		14.0			8.3	3			12.0			
Phase Duration	, S			0.0		65.0			65.	.0			25.0			
Change Period,	(Y+Rc)	, S		6.9		5.3			5.3	3			5.3			
Max Allow Head	dway (<i>N</i>	<i>IAH</i>), s		0.0		2.7			2.7	7			5.2			
Queue Clearan	Inestitis Inestitis Inestitis Number Duration, s e Period, (Y_+R_c) , s Ilow Headway (MAH), s e Clearance Time (g_s) , s Extension Time (g_e) , s Call Probability ut Probability Interference Time Transformer Ach Movement Interference Time Transformer					61.7			11.	.9			21.7			
Green Extensio	ge Period, $(Y+R_c)$, s Allow Headway (<i>MAH</i>), s e Clearance Time (g_s), s h Extension Time (g_e), s e Call Probability Dut Probability			0.0		0.0			2.4	4			0.0			
Phase Call Prol	Allow Headway (MAH), s le Clearance Time (g_s), s n Extension Time (g_e), s le Call Probability Out Probability					1.00			1.0	0			1.00			
Max Out Proba	bility					1.00			0.3	33			1.00			
Movement Gro	up Res	ults			EB			WE	3			NB			SB	_
Approach Move	ement		_	L	T	R	L	Т		R	L	T	R	L	T	R
Assigned Move	The Clearance Time (g_s) , s In Extension Time (g_e) , s In E			5	2	12	1	6	-	16	7	4	14			
Adjusted Flow F	Rate (v).	, veh/h			1163			413	3			489				
Adjusted Satura	ation Flo	w Rate (s), veh/h/ln			1074			175	1			1764				
Queue Service	Time (g	s), S			6.0			0.0)			19.7				
Cycle Queue C	learance	e Time (<i>g</i> c), s			59.7			9.9)			19.7				
Green Ratio (g/	(C)				0.66			0.6	6			0.22				
Capacity (c), ve	h/h				783			120	4			386				
Volume-to-Capa	acity Ra	tio (<i>X</i>)			1.485			0.34	3			1.267				
Available Capa	city (<i>c</i> a),	veh/h			783			120	4			386				
Back of Queue	(<i>Q</i>), veł	n/In (50th percentile))		64.4			2.9)			23.3				
Queue Storage	Ratio (I	RQ) (50th percentile)		0.00			0.0	0			0.00				
Uniform Delay ((d1), s/ve	əh			18.6			6.8	3			35.2				
Incremental De	lay (<i>d2</i>),	s/veh			225.2			0.1				139.2				
Initial Queue De	elay (<i>d</i> 3)	, s/veh			0.0			0.0)			0.0				
Control Delay (d), s/veł	1			243.9			6.8	3			174.3				
Level of Service	e (LOS)				F			A				F				
Approach Delay	/, s/veh	/ LOS		243.9	9	F	6.8		A		174.	3	F	0.0		
Intersection De	ay, s/ve	h / LOS				18	0.0							F		
Multimental D					55			14/5	2						05	
Multimodal Re	sults	/1.02			EB			WE	5			NB			SB	
Peuestrian LOS	score	100														
BICYCIE LOS SC	ore / LC	15														

	тw	O-WAY STOP	CONTR	OL S	UMM	ARY			
General Informatio	า		Site I	nform	nation				
Analyst	BMF		Interse	ection			Wallings I	Road/Elm	nhurst
Agency/Co.	GPD Gro	ир	luried	iction			City of Br	oodview	Joights
Date Performed	3/2/2015				r		2015	Jauview I	leiginis
Analysis Time Period	AM Peak	Hour					2013		
Project Description Wa	allings Road Sa	fety & Corridor St	udy						
East/West Street: Wallin	ngs Road		North/S	South S	Street:	Elmhurs	st Drive		
Intersection Orientation:	East-West		Study	Period	(hrs):	0.25			
Vehicle Volumes ar	nd Adjustme	nts							
Major Street		Eastbound					Westbou	nd	
Movement	1	2	3			4	5		6
	L	Т	R			L	Т		R
Volume (veh/h)	50	940					340		10
Peak-Hour Factor, PHF	0.92	0.92	1.00)	1.	.00	0.92		0.92
Hourly Flow Rate, HFR (veh/h)	54	1021	0			0	369		10
Percent Heavy Vehicles	2					0			
Median Type				Undi	vided				
RT Channelized			0						0
Lanes	0	1	0			0	1		0
Configuration	LT								TR
Upstream Signal		0					0		
Minor Street		Northbound					Southbou	ind	
Movement	7	8	9			10	11		12
	L	Т	R			L	Т		R
Volume (veh/h)	_					10			10
Peak-Hour Factor, PHF	1.00	1.00	1.00)	0.	.92	1.00		0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0			10	0		10
Percent Heavy Vehicles	0	0	0			0	0		0
Percent Grade (%)		0					0		
Flared Approach		N					N	ľ	
Storage		0					0		
RT Channelized			0						0
Lanes	0	0	0			0	0		0
Configuration							LR		
Delay, Queue Length, a	nd Level of Se	rvice							
Approach	Eastbound	Westbound		Northb	ound		s	outhbour	ıd
Movement	1	4	7	8		9	10	11	12
Lane Configuration	LT							LR	
v (veh/h)	54							20	
C (m) (veh/h)	1179							217	
v/c	0.05							0.09	
95% queue lenath	0.00							0.00	
Control Dolou (aluah)	0.17							0.00	
	0.2							23.3	
	A							C	
Approach Delay (s/veh)								23.3	
Approach LOS								С	

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	тw	O-WAY STOP	CONTR	OL SU	MMARY			
General Informatio	າ		Site I	nforma	ation			
Analyst	BMF		Interse	ection		Wallings I Road	Road/Long	view
Agency/Co.	GPD Gro	ир	lurisdi	ction		City of Br	nadview H	eiahts
Date Performed	3/2/2015			is Vear		2015		eigints
Analysis Time Period	AM Peak	Hour				2010		
Project Description Wa	allings Road Sa	fety & Corridor Stu	Jdy			•		
East/West Street: Walling	ngs Road		North/S	South St	reet: <i>Longv</i>	iew Road		
Intersection Orientation:	East-West		Study I	Period (I	hrs): 0.25			
Vehicle Volumes ar	nd Adjustme	nts						
Major Street		Eastbound				Westbou	nd	
Movement	1	2	3		4	5		6
	L	Т	R		L	Т		R
Volume (veh/h)	30	920				340		10
Peak-Hour Factor, PHF	0.92	0.92	1.00		1.00	0.92		0.92
Hourly Flow Rate, HFR (veh/h)	32	999	0		0	369		10
Percent Heavy Vehicles	2				0			
Median Type		•	•	Undivi	ided	•		
RT Channelized			0				1	0
Lanes	0	1	0		0	1		0
Configuration	LT							TR
Upstream Signal		0				0		
Minor Street		Northbound				Southbou	ind	
Movement	7	8	9		10	11		12
	L	Т	R		L	Т		R
Volume (veh/h)					10			10
Peak-Hour Factor, PHF	1.00	1.00	1.00		0.92	1.00		0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0		10	0		10
Percent Heavy Vehicles	0	0	0		0	0		0
Percent Grade (%)		0				0	I	
Flared Approach		N				N		
Storage		0				0		
RT Channelized			0					0
Lanes	0	0	0		0	0		0
Configuration						LR		
Delay, Queue Length, a	nd Level of Se	rvice						
Approach	Eastbound	Westbound		Northbo	und	S	outhbound	
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	32						20	
C (m) (veh/h)	1179						237	
v/c	0.03						0.08	
95% queue length	0.08						0.27	
Control Delav (s/veh)	8.1					1	21.6	
108	A			<u> </u>			С	
Approach Delay (s/veh)				I		+	21.6	
Approach LOS						+	<u> </u>	
							<u> </u>	

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	TW	O-WAY STOP	CONTR	OL SU	ЛММ	ARY				
General Informatio	n		Site I	nform	atio	n				
Analyst	BMF		Interse	ection			Wallings	Rd/Ch	estnı	ıt Blvd
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadvie	w He	ights
Date Performed	3/2/2015	•	Analys	sis Year			2015			
Analysis Time Period	AM Peak	Hour								
Project Description Wa	allings Road Sa	fety & Corridor St	tudy							
East/West Street: Walli	ngs Road		North/S	South St	treet:	Chestn	ut Boulevar	ď		
Intersection Orientation:	East-West		Study I	Period (hrs):	0.25				
Vehicle Volumes ar	nd Adjustme	ents								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5			6
	L	T	R			L	Т			R
Volume (veh/h)		920	10			10	330			
Peak-Hour Factor, PHF	0.92	0.92	0.92	<u>'</u>	0).92	0.92		0	.92
Hourly Flow Rate, HFR (veh/h)	0	999	10			10	358			0
Percent Heavy Vehicles	2					4				
Median Type				Undivi	ided					
RT Channelized			0							0
Lanes	0	1	0			0	1			0
Configuration			TR			LT				
Upstream Signal		0					0			
Minor Street		Northbound					Southbou	ind		
Movement	7	8	9			10	11			12
	L	Т	R			L	Т			R
Volume (veh/h)	20		30							
Peak-Hour Factor, PHF	0.92	0.92	0.92		C).92	0.92		C	.92
Hourly Flow Rate, HFR	21	0	32			0	0			0
Percent Heavy Vehicles	0	0	0			0	0			0
Percent Grade (%)	-	0	-			-	0			-
Flared Approach		N	1				N			
Storage	-	0					0			
RT Channelized			0				<u> </u>			0
	0	0	0			0	0			0
Configuration		I R				0				0
Approach	Eastbound	Westbound		Northbo	und		<u> </u>	outhb	bund	
Movement		4	7	8		9	10	1	Junu 1	12
Lane Configuration		I T		IR		-			-	
v (veh/h)		10		53						
C (m) (veh/h)		679		220						
v/c		0.01		0.24						
95% queue lenath		0.04		0.91						
Control Delav (s/veh)		10.4		26.5						
LOS		В		ח						
Annroach Delay (s/yeh)				26.5						
Annroach LOS			L	<u>כ.0 ב</u> ת						

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	TW	O-WAY STOP	CONTR	OL SI	JMN	IARY				
General Information	า		Site I	nform	atio	on				
Analyst	BMF		Interse	ection			Wallings	Rd/Ov	rerloo	k Ave
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadvie	w He	eights
Date Performed	3/2/2015	,	Analys	is Year	r		2015			<u> </u>
Analysis Time Period	AM Peak	Hour								
Project Description Wa	allings Road Sa	fety & Corridor Si	tudy							
East/West Street: Walli	ngs Road		North/S	South S	tree	t: Overloc	k Avenue			
Intersection Orientation:	East-West		Study I	Period ((hrs)	: 0.25				
Vehicle Volumes ar	nd Adjustme	ents								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5			6
	L	Т	R			L	Т			R
Volume (veh/h)		940	10			10	330			
Peak-Hour Factor, PHF	0.88	0.92	0.92			0.92	0.92		0	.86
Hourly Flow Rate, HFR (veh/h)	0	1021	10			10	358			0
Percent Heavy Vehicles	2					2				
Median Type				Undiv	ided	1				
RT Channelized			0							0
Lanes	0	1	0			0	1			0
Configuration			TR			LT				
Upstream Signal		0					0			
Minor Street		Northbound					Southbor	ind		
Movement	7	8	9			10	11			12
		Т	R			10	т			R
Volume (veh/h)	10	· · ·	30			-				
Peak-Hour Factor, PHF	0.92	1.00	0.92			0.67	1.00		C	.67
Hourly Flow Rate, HFR	10	0	32			0	0			0
(Ven/n) Dereent Heevy Vehicles	1					0	0			0
	4		4			0	0			0
Percent Grade (%)		0	-				0			
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0							0
Lanes	0	0	0			0	0			0
Configuration		LR								
Delay, Queue Length, a	nd Level of Se	ervice								
Approach	Eastbound	Westbound	1	Northbo	bund		S	outhbo	ound	
Movement	1	4	7	8		9	10	1'	1	12
Lane Configuration		LT		LR						
v (veh/h)		10		42						
C(m)(veh/h)		674		233						
		0.01		233	,					
		0.01		0.78)					
95% queue length		0.05		0.64	•					
Control Delay (s/veh)		10.4		23.8	}					
LOS		В		С						
Approach Delay (s/veh)				23.8	}					
Approach LOS				С						

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	TW	O-WAY STOP	CONTR	OL SI	JMN	IARY			
General Informatio	n		Site I	nform	atio	on			
Analvst	BMF		Interse	ection			Wallings	Rd/McCrea	rv Rd
Agency/Co.	GPD Gro	up	Jurisdi	ction			City of Br	oadview H	eights
Date Performed	3/2/2015	1	Analys	is Year	r		2015		
Analysis Time Period	AM Peak	Hour							
Project Description W	allings Road Sa	fetv & Corridor Si	tudv						
East/West Street: Walli	ngs Road		North/S	South S	tree	t: McCrea	ry Road		
Intersection Orientation:	East-West		Study I	Period ((hrs)	: 0.25			
Vehicle Volumes aı	nd Adjustme	ents							
Major Street		Eastbound					Westbou	nd	
Movement	1	2	3			4	5		6
	L	Т	R			L	Т		R
Volume (veh/h)	30	940					330		30
Peak-Hour Factor, PHF	0.92	0.92	0.89			0.82	0.92	().92
Hourly Flow Rate, HFR (veh/h)	32	1021	0			0	358		32
Percent Heavy Vehicles	2					2			
Median Type		•		Undiv	rided				
RT Channelized			0						0
Lanes	0	1	0			0	1		0
Configuration	LT								TR
Upstream Signal		0					0		
Minor Street		Northbound					Southbou	Ind	
Movement	7	8	9			10	11		12
		Т	R				Т		R
Volume (veh/h)						20			10
Peak-Hour Factor, PHF	0.57	1.00	0.57			0.92	1.00	().92
Hourly Flow Rate, HFR	0	0	0			21	0		10
(VEII/II) Percent Heavy Vehicles	1	0	1			0	0		0
Percent Grade (%)			7			U	0		
Flared Approach							N		
Storage		0					0		
RT Channelized			0						0
						0	0		0
Configuration			- ·			0			0
							LI		
Delay, Queue Length, a	and Level of Se			I			0		
Approacn Movement	Eastbound	Vvestbound	7		buna	0	10		12
	1			0		5	10		12
	LI								
v (veh/h)	32							31	
C (m) (veh/h)	1169							188	
v/c	0.03							0.16	
95% queue length	0.08							0.58	
Control Delay (s/veh)	8.2							27.9	
LOS	А							D	
Approach Delay (s/veh)								27.9	
Approach LOS							L		

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	тw	O-WAY STOP	CONTR	OL SU	MMARY			
General Informatio	า		Site I	nforma	ation			
Analyst	BMF		Interse	ection		Wallings I Tr	Rd/Majesti	c Oaks
Agency/Co.	GPD Gro	ир	lurisdi	ction		City of Br	oadview H	eiahts
Date Performed	3/2/2015			is Vear		2015		eiginis
Analysis Time Period	AM Peak	Hour				2010		
Project Description Wa	allings Road Sa	fety & Corridor Stu	Jdy					
East/West Street: Walling	ngs Road		North/S	South St	reet: <i>Majes</i> i	tic Oaks Trai	1	
Intersection Orientation:	East-West		Study I	Period (I	hrs): 0.25			
Vehicle Volumes ar	nd Adjustme	nts						
Major Street		Eastbound				Westbou	nd	
Movement	1	2	3		4	5		6
	L	Т	R		L	Т		R
Volume (veh/h)	10	1170				360		10
Peak-Hour Factor, PHF	0.92	0.92	0.89		0.82	0.92		0.92
Hourly Flow Rate, HFR (veh/h)	10	1271	0		0	391		10
Percent Heavy Vehicles	2				2			
Median Type		•	•	Undivi	ided	•		
RT Channelized			0					0
Lanes	0	1	0		0	1		0
Configuration	LT							TR
Upstream Signal		0				0		
Minor Street		Northbound	•			Southbou	ind	
Movement	7	8	9		10	11		12
	L	Т	R		L	Т		R
Volume (veh/h)					10			10
Peak-Hour Factor, PHF	0.57	1.00	0.57	·	0.92	1.00		0.92
Hourly Flow Rate, HFR	0	0	0		10	0		10
Percent Heavy Vehicles	4	0	4		0	0		0
Percent Grade (%)		0			•	0		-
Flared Approach		N				N		
Storage		0				0		
RT Channelized			0					0
Lanes	0	0	0		0	0		0
Configuration						LR		
 Delay, Queue Length, a	nd Level of Se	rvice						
Approach	Eastbound	Westbound		Northbo	und	S	outhbound	
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	10						20	
C (m) (veh/h)	1158						178	
v/c	0.01						0.11	
95% gueue length	0.03						0.37	
Control Delav (s/veh)	8.1						27.8	
108	A			<u> </u>			D	
Approach Delay (s/yeh)						1	27.8	
Annroach I OS								

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	TW	O-WAY STOP	CONTR	OL SI	JMN	IARY				
General Informatio	า		Site I	nform	atio	on				
Analyst	BMF		Interse	ection			Wallings	Rd/Cree	eksia	le Trce
Agency/Co.	GPD Grou	лр	Jurisdi	ction			City of Br	oadviev	v He	ights
Date Performed	3/2/2015		Analys	is Year	ſ		2015			
Analysis Time Period	AM Peak	Hour								
Project Description Wa	allings Road Saf	ety & Corridor St	udy							
East/West Street: Wallin	ngs Road		North/S	South S	treet	: Creeksi	de Terrace			
Intersection Orientation:	East-West		Study F	Period ((hrs):	: 0.25				
Vehicle Volumes ar	nd Adjustme	nts								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5			6
	L	T	R			L	T			R
Volume (veh/h)		1170	10			10	360	-+		70
Peak-Hour Factor, PHF	0.80	0.92	0.92			0.92	0.92		0	.76
(veh/h)	0	1271	10			10	391			0
Percent Heavy Vehicles	2					4				
Median Type				Undiv	vided					
RT Channelized			0							0
Lanes	0	1	0			0	1			0
Configuration			TR			LT				
Upstream Signal		0					0			
Minor Street						Southbou	ind			
Movement	7	8	9			10	11			12
	L	Т	R			L	Т			R
Volume (veh/h)	10		40							
Peak-Hour Factor, PHF	0.92	1.00	0.92			0.70	1.00		0	.70
Hourly Flow Rate, HFR (veh/h)	10	0	43			0	0			0
Percent Heavy Vehicles	3	0	3			0	0			0
Percent Grade (%)		0					0			
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0							0
Lanes	0	0	0			0	0			0
Configuration		LR								
Delay, Queue Length, a	nd Level of Se	rvice								
Approach	Eastbound	Westbound	I	Northbo	ound		S	outhbo	und	
Movement	1	4	7	8		9	10	11		12
Lane Configuration		LT		LR						
v (veh/h)		10		53						
C (m) (veh/h)		535		171						
v/c		0.02		0.31	1					
95% queue length		0.06		1 24	1					
Control Delay (s/veh)		11.9		35.2	,					
		B		- 50.2 F	-				-+	
Approach Delay (s/yeb)				25.0	, ,					
Approach LOS				55.2 E	_					
				E						

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	тw	O-WAY STOP	CONTR		IMARY			
General Informatio	า		Site Ir	nformat	ion			
Analyst	BMF		Interse	ection		Wallings I Rd/Eirebo	Rd/Joyce	
Agency/Co.	GPD Gro	ир	Jurisdi	ction		City of Br	nadview H	eiahts
Date Performed	3/2/2015		Analys	is Year		2015		eiginto
Analysis Time Period	AM Peak	Hour				2010		
Project Description Wa	allings Road Sa	fety & Corridor St	udy					
East/West Street: Wallin	ngs Road		North/S	South Stre	et: Joyce R	load/Fireho	use	
Intersection Orientation:	East-West		Study F	Period (hrs	s): 0.25			
Vehicle Volumes ar	nd Adjustme	nts						
Major Street		Eastbound				Westbou	nd	
Movement	1	2	3		4	5		6
	L	Т	R		L	Т		R
Volume (veh/h)	10	1170	30		10	350		10
Peak-Hour Factor, PHF	0.92	0.92	0.92		0.92	0.92		0.92
Hourly Flow Rate, HFR (veh/h)	10	1271	32		10	380		10
Percent Heavy Vehicles	2				1			
Median Type				Undivide	ed			
RT Channelized			0					0
Lanes	0	1	0		0	1		0
Configuration	LTR				LTR			
Upstream Signal		0				0		
Minor Street		Northbound				Southbound		
Movement	7	8	9		10	11		12
	L	Т	R		L	Т		R
Volume (veh/h)	10	10	10		10	10		10
Peak-Hour Factor, PHF	0.92	0.92	0.92		0.92	0.92		0.92
Hourly Flow Rate, HFR	10	10	10		10	10		10
Percent Heavy Vehicles	0	0	0		0	0		0
Percent Grade (%)						0		<u> </u>
Flared Approach		N N				Ň		
Storage		0				0		
DT Channelized	_		-					0
		1			0	1		0
Lanes	0		0		0			0
						LIR		
Delay, Queue Length, a	Level of Se	rvice		lanthhaun	d		outh hours	
Approach	Eastbound	vvestbound	-			5		
Movement	1	4	1	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (veh/h)	10	10		30			30	
C (m) (veh/h)	1169	535		91			99	
v/c	0.01	0.02		0.33			0.30	
95% queue length	0.03	0.06		1.27			1.15	
Control Delay (s/veh)	8.1	11.9		62.9	T		56.4	
LOS	А	В		F			F	
Approach Delay (s/veh)				62.9	-		56.4	<u> </u>
Approach LOS				F			F	

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	TW	O-WAY STOP	CONTR	OL SU	MMAR	Y				
General Informatio	า		Site I	nform	ation					
Analyst	BMF		Interse	ction			Wallings	Rd/Mar	ianna	Blvd
Agency/Co.	GPD Grou	ир	Jurisdi	ction			City of Br	oadviev	v Heig	ghts
Date Performed	3/2/2015	-	Analys	is Year			2015		-	
Analysis Time Period	AM Peak	Hour								
Project Description Wa	allings Road Saf	fety & Corridor St	udy							
East/West Street: Walli	ngs Road		North/S	South St	treet: M	arianı	na Boulevar	d		
Intersection Orientation:	East-West		Study F	Period (hrs): 0.2	25				
Vehicle Volumes ar	nd Adjustme	nts								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3		4		5			6
	L	T	R		<u> </u>		T			२
Volume (veh/h)		1180	10		10		360			
Peak-Hour Factor, PHF	0.80	0.92	0.92		0.92		0.92		0.1	76
Hourly Flow Rate, HFR (veh/h)	0	1282	10		10		391		C)
Percent Heavy Vehicles	2				3				-	-
Median Type				Undivi	ided					
RT Channelized			0						C)
Lanes	0	1	0		0		1		C)
Configuration			TR		LT					
Upstream Signal		0					0			
Minor Street		Northbound					Southbou	ind		
Movement	7	8	9		10		11	l l	1	2
	L	Т	R		L		Т		I	२
Volume (veh/h)	10		10							
Peak-Hour Factor, PHF	0.92	1.00	0.92		0.70		1.00		0.1	70
Hourly Flow Rate, HFR (veh/h)	10	0	10		0		0		C)
Percent Heavy Vehicles	0	0	0		0		0		0)
Percent Grade (%)		0					0			
Flared Approach		N					N	1		
Storage		0					0			
RT Channelized			0						C)
Lanes	0	0	0		0		0		C)
Configuration		LR								
Delay, Queue Length, a	Ind Level of Sei	rvice					•			
Approach	Eastbound	Westbound	1	Northbo	und		S	outhbo	und	
Movement	1	4	7	8		9	10	11		12
Lane Configuration		LT		LR						
v (veh/h)		10		20						
C (m) (veh/h)		533		135						
v/c		0.02		0.15						
95% queue length		0.06		0.50						
Control Delay (s/veh)		11.9		36.2						
LOS		B		E					-+	
Approach Delay (s/veh)	veh)			36.2				I		
Approach LOS				50.2 F			1			
				L						

HCS+TM Version 5.3

	TW	O-WAY STOP	CONTR	OL SU	MMARY			
General Information	า		Site I	nforma	ation			
Analyst	BMF		Interse	ection		Wallings	Rd/Craia	Ln
Agency/Co.	GPD Gro	ир	Jurisdi	ction		City of Br	oadview	Heights
Date Performed	3/2/2015	1	Analys	is Year		2015		
Analysis Time Period	AM Peak	Hour						
Project Description Wa	allings Road Sa	fety & Corridor S	tudy					
East/West Street: Walli	ngs Road		North/S	South St	reet: Craig	Lane		
Intersection Orientation:	East-West		Study I	Period (I	nrs): 0.25			
Vehicle Volumes ar	nd Adjustme	ents						
Major Street		Eastbound				Westbou	nd	
Movement	1	2	3		4	5		6
	L	Т	R		L	Т		R
Volume (veh/h)		1210	10		10	350		
Peak-Hour Factor, PHF	0.80	0.92	0.92		0.92	0.92		0.76
Hourly Flow Rate, HFR (veh/h)	0	1315	10		10	380		0
Percent Heavy Vehicles	2				3			
Median Type				Undivi	ded			
RT Channelized			0					0
Lanes	0	1	0		0	1		0
Configuration			TR		LT			-
Upstream Signal		0				0		
Minor Street		Northbound				Southbor	ind	
Movement	7	8	9		10	11		12
		<u>т</u>	R		1	Т		R
Volume (veh/h)	10	· ·	40					
Peak-Hour Factor, PHF	0.92	1.00	0.92		0.70	1.00		0.70
Hourly Flow Rate, HFR	10	0	43		0	0		0
(Venini) Percent Heavy Vehicles	7	0	7		0	0		0
Percent Crade (%)	,		/		U	0		0
	-		1					
		^				N		
Storage		0				0		-
RT Channelized			0					0
Lanes	0	0	0		0	0		0
Configuration		LR						
Delay, Queue Length, a	nd Level of Se	ervice						
Approach	Eastbound	Westbound	1	Vorthbo	und	S	outhbour	nd
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
v (veh/h)		10		53				
C. (m) (veh/h)		518		158				
		0.02		0.24		_		
V/C		0.02		4.07		-		_
so% queue length		0.00		1.37				
Control Delay (s/veh)		12.1		38.9				
LOS		В		E				
Approach Delay (s/veh)			38.9					
Approach LOS				E				

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	TW	O-WAY STOP	CONTR	OL SU	MMARY			
General Informatio	n		Site I	nforma	ation			
Analvst	BMF		Interse	ection		Wallings	Rd/Skvline	Dr
Agency/Co.	GPD Gro	ир	Jurisdi	ction		City of Br	oadview He	eights
Date Performed	3/2/2015		Analys	is Year		2015		<u> </u>
Analysis Time Period	AM Peak	Hour						
Project Description W	allings Road Sa	fetv & Corridor St	tudv					
East/West Street: Walli	ngs Road		North/S	South St	reet: Skylir	ne Drive		
Intersection Orientation:	East-West		Study I	Period (h	nrs): 0.25			
Vehicle Volumes aı	nd Adjustme	ents						
Major Street		Eastbound				Westbou	nd	
Movement	1	2	3		4	5		6
	L	Т	R		L	Т		R
Volume (veh/h)	20	1230				350		10
Peak-Hour Factor, PHF	0.92	0.92	0.81		0.78	0.92	().92
Hourly Flow Rate, HFR (veh/h)	21	1336	0		0	380		10
Percent Heavy Vehicles	1				3			
Median Type				Undivid	ded			
RT Channelized			0					0
lanes	0	1	0		0	1		0
Configuration	17				-			TR
Upstream Signal		0				0		
Minor Stroot		Northbound		<u> </u>		Southbou		
Minor Street Movement	7		9		10	11		12
		т	R		10	т		R
Volume (veh/h)	<u> </u>	· ·			10	· ·		10
Peak-Hour Factor PHF	0.63	1.00	0.63		0.92	1.00	(102
Hourly Flow Rate HFR	0.00	1.00	0.00		0.32	1.00		
(veh/h)	0	0	0		10	0		10
Percent Heavy Vehicles	7	0	7		4	0		4
Percent Grade (%)		0				0		
Flared Approach		N				N		
Storage		0				0		
RT Channelized			0					0
Lanes	0	0	0		0	0		0
Configuration			-		-	LR		-
Delay, Queue Length, a	nd Level of Se	ervice						
Approach	Eastbound	Westbound		Northbou	und	s	outhbound	
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	21						20	
C (m) (veh/h)	1174						157	
v/c	0.02						0.13	
95% queue lenath	0.05						0.43	
Control Delay (s/veh)	8.1						31.2	
LOS	A						D	
Approach Delay (s/veh)					1		31.2	
Approach LOS							D	
r.r							-	

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	TW	O-WAY STOP	CONTR	OL SI	JMN	MARY				
General Information	n		Site I	nform	atio	on				
Analvst	BMF		Interse	ection			Wallings	Rd/W	' Mill F	Rd
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadvi	ew He	eights
Date Performed	3/2/2015		Analys	sis Yea	r		2015			<u> </u>
Analysis Time Period	AM Peak	Hour								
Project Description W	allings Road Sa	fety & Corridor Si	tudy							
East/West Street: Walli	ngs Road		North/S	South S	Stree	t: West M	lill Road			
Intersection Orientation:	East-West		Study I	Period	(hrs)	: 0.25				
Vehicle Volumes ar	nd Adjustme	ents								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5			6
	L	Т	R			L	Т			R
Volume (veh/h)		1090	150			10	350			
Peak-Hour Factor, PHF	0.92	0.92	0.92			0.92	0.92		(0.92
Hourly Flow Rate, HFR (veh/h)	0	1184	163			10	380			0
Percent Heavy Vehicles	1					3				
Median Type				Undiv	videa	1				
RT Channelized			0							0
Lanes	0	1	0			0	1			0
Configuration			TR			LT				
Upstream Signal		0					0			
Minor Street		Northbound					Southbou	Ind		
Movement	7	8	9			10	11			12
	L	Т	R			L	Т			R
Volume (veh/h)	10		50							
Peak-Hour Factor, PHF	0.92	0.92	0.92			0.92	0.92		().92
Hourly Flow Rate, HFR (veh/h)	10	0	54			0	0			0
Percent Heavy Vehicles	2	0	2			4	0			4
Percent Grade (%)		0					0			
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0							0
Lanes	0	0	0			0	0			0
Configuration		LR	-			-	-			-
Delay, Queue Length, a	nd Level of Se	ervice		-						
Approach	Eastbound	Westbound		Northbo	ound		s	outhb	ound	
Movement	1	4	7	8		9	10	1	1	12
Lane Configuration		LT		LR						
v (veh/h)		10		64						
C (m) (veh/h)		508		179)					
		0.02		0.36	, 3					
V/C		0.02		1.50	,					
		0.00		1.51	1					
Control Delay (s/ven)		12.2		35.9	1					
LOS		В		E						
Approach Delay (s/veh)			35.9	9						
Approach LOS				Е						

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General Inform	nation									Int	tersect	ion Infe	ormatio	on	1	*	× L
Agency		GPD Group								Dι	uration,	h	0.25			444	
Analyst		BMF		Analys	is Da	te N	/lar 2,	2015		Ar	еа Тур	e	Other		4		4
Jurisdiction		City of Broadview H	leights	Time F	erioc	I P	PM Pe	ak Hou	r	PH	HF		0.92			w∔e s	↓ ↓ ↓
Intersection		Wallings Road/Broa	dview F	Analys	is Ye	ar 2	2015			Ar	nalysis	Period	1>7:	00			بة الأ
File Name		1. Wallings Rd_Bro	adview	Rd_Exis	ting	PM.x	us			л						ን † ቅ	
Project Descrip	tion	Existing Year 2015	PM Pea	ık Hour												ब † क 1 71	* (*
				_				1							ļ.		
Demand Inform	nation				EE	3			N	/B	1		NB			SB	
Approach Move	ement			L	Т		R	L		Г	R	L	Т	R	L	Т	R
Demand (v), ve	h/h			130	23	0	100	350	72	20	160	130	430	140	200	600	260
Cignel Informe	tion			1		5	115	1	-	щ							T
Signal Informa	tion	Deferrer Dhase	0	÷	15	<u>ه</u> د	2454			- 8	H .a }		F			~	\rightarrow
Cycle, s	154.4	Reference Phase	2 Final		٦	ſ	- 517			E.	E,	2		1	2	3	4
Offset, s	0	Reference Point	Ena	Green	22.0) 3	35.0	22.0	12	2.4	35.0	0.0					
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	3.6	- 3	3.6	3.6	3.	6	3.6	0.0			$\mathbf{\Psi}$	_	÷
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	Ż	2.0	2.0	2.	0	2.0	0.0		5	6	7	8
Timor Booulto			_	EDI		ED	т	\//D		10		NDI		NDT	<u>CDI</u>		CDT
Accigned Phase	0					0		7		v			-	6	500	-	2
Caso Number	5			11	+	0	0				4 2 0			4.0	11		2
Phase Duration	. e			27.6	-	4.0	6	45.6	:	5	3.0 8.6	27.6	:	4.0	27.6		4.0
Change Period	$(V_{\perp}B_{\alpha})$	c		5.6		0.	6	5.6	,	5	5.6	5.6	,		5.6		5.6
Max Allow Hear	, (17110) dwav (N	, 3 1ΔΗΛ ς		J.U		<u>م</u>	1	J.0	-		1 1	13		13	4.3		13
	ce Time	(<i>a</i> s) s), s), s		+	32	1	24.8	2	5	5.0	10.4		27.3	15.6		37.0
Green Extensio	n Time	ne (<i>gs</i>), s e (<i>ge</i>), s		0.3	-	1	7	1 2	,	0	n n	0.3		<u>4</u> 1	0.4		0.0
Phase Call Pro	hability	Fine (g_e) , s		1.00	+	1.0	,)0	1.00	,	1	00	1.00		1.00	1.00		1.00
Max Out Proba	bility		_	0.00	-	1.0	00	0.01	·	1	.00	0.00)	0.72	0.25		1.00
Max Out 1100a	onity			0.00		1.0	,0	0.01		,	.00	0.00	•	0.72	0.20		1.00
Movement Gro	oup Res	ults			EB	;			W	3			NB			SB	
Approach Move	ement			L	Т		R	L	Т		R	L	Т	R	L	Т	R
Assigned Move	ment			3	8		18	7	4		14	1	6	16	5	2	12
Adjusted Flow I	Rate (v)	, veh/h		141	359)		380	783	3	174	141	322	298	217	493	442
Adjusted Satura	ation Flo	w Rate (s), veh/h/ln		1792	178	4		1757	184	5	1563	1774	1863	1706	1774	1900	1704
Queue Service	Time (g	s), S		8.3	30.	1		22.8	53.	0	12.7	8.4	24.9	25.3	13.6	35.0	35.0
Cycle Queue C	learance	e Time (<i>g</i> c), s		8.3	30.	1		22.8	53.	0	12.7	8.4	24.9	25.3	13.6	35.0	35.0
Green Ratio (g/	′C)			0.37	0.23	3		0.50	0.3	4	0.34	0.37	0.23	0.23	0.37	0.23	0.23
Capacity (c), ve	eh/h			302	404			534	633	3	537	299	422	387	340	431	386
Volume-to-Cap	acity Ra	tio (<i>X</i>)		0.468	0.88	7		0.712	1.23	36	0.324	0.472	0.762	0.770	0.640	1.144	1.144
Available Capa	city (<i>c</i> a),	veh/h		302	404			534	633	3	537	299	422	387	340	431	386
Back of Queue	(<i>Q</i>), veł	n/In (50th percentile)		3.8	15.8	3		9.6	45.	2	5.0	3.8	12.8	12.0	6.4	27.6	25.0
Queue Storage	Ratio (I	RQ) (50th percentile)	0.95	0.00)		1.96	0.0	0	0.39	0.32	0.00	0.00	0.54	0.00	0.00
Uniform Delay	(<i>d</i> 1), s/ve	eh		37.3	57.8	3		32.2	50.	7	37.5	37.3	55.8	55.9	38.3	59.7	59.7
Incremental De	lay (<i>d2</i>),	s/veh		1.1	20.5	5		4.4	119	.4	0.3	1.2	8.0	9.2	4.0	89.0	91.2
Initial Queue De	əlay (<i>d</i> 3)	, s/veh		0.0	0.0			0.0	0.0)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veł	1		38.4	78.3	3		36.6	170	.1	37.8	38.5	63.8	65.1	42.3	148.7	150.9
Level of Service	e (LOS)			D	Е			D	F		D	D	E	E	D	F	F
Approach Delay	, s/veh	/ LOS		67.0		E		114.9	9		F	59.6	;	E	129.	5	F
Intersection De	lay, s/ve	h / LOS					101	.8							F		
Multimodal Re	sults				EB				WE	3			NB			SB	
Pedestrian LOS	Score	/ LOS															
Bicycle LOS Sc	ore / LC	DS .															

General Inform	nation									Int	tersect	ion Inf	ormati	on		4 4 4	1 b L	
Agency		GPD Group								Du	iration,	h	0.25					
Analyst		BMF		Analys	is Da	te Mar	2,	2015		Are	ea Type	Э	Othe	r	4			
Jurisdiction		City of Broadview H	leights	Time F	erioc	I PM	Pe	ak Hou	r	PH	ΗF		0.92		* *	w∔ s		↓ ↓
Intersection		Wallings Road/Wya	tt Road	Analys	is Ye	ar 201	5			An	alysis I	Period	1>7:	00				
File Name		7. Wallings Rd_Wya	att Rd_E	Existing	PM.x	us										*		
Project Descrip	tion	Existing Year 2015	PM Pea	ık Hour												1 1 1 4	ኘትሰ	
												1						
Demand Inform	nation				EE	3			N	/B	<u> </u>		NB			SE	3	
Approach Move	ement			L	Т	F	{	L		Т	R	L	Т	R		Т		R
Demand (v), ve	h/h				52	0 5	0	180	12	240		50	0	50				
Signal Informa	tion							•										
Cvcle. s	121.8	Reference Phase	2	-		FL.	Ē	· .	_						<u> </u>			∇
Offset, s	0	Reference Point	End							_				1	Y 2		3	4
Uncoordinated	Yes	Simult, Gap E/W	On	Green	15.0) 60.	0	30.0	0.	0	0.0	0.0	_		\			
Force Mode	Fixed	Simult, Gap N/S	On	Red	2.0	2.0		2.0	0.	0	0.0	0.0	_	5	6		7	8
	1 1/100		•			12.0		1.0			10.0	0.0						
Timer Results				EBL	-	EBT	Т	WBL	-	W	VBT	NB		NBT	SB	L	SE	3T
Assigned Phase	e					2	T	1			6			4				
Case Number						8.3	T	1.0		4	4.0			12.0				
Phase Duration	I, S					65.6	T	20.6	;	8	6.2			35.6				
Change Period	, (Y+Rc)	, S				5.6		5.6		5	5.6			5.6				
Max Allow Head	dway (<i>N</i>	<i>IAH</i>), s				1.0		1.1		1	0.1			1.4				
Queue Clearan	arance Time (g_s) , s					33.5	4	7.7		8	2.6			8.4				
Green Extensio	n Time	(<i>g</i> e), s				0.0	4	0.0		C).0			0.0				
Phase Call Pro	bability					1.00	4	1.00		1.	.00			1.00				
Max Out Proba	bility		_			0.00		0.00)	1.	.00			0.00				
Movement Gro	oup Res	ults			FB		Т		W	B			NB			SF	3	
Approach Move	ement		_	L	T	R	t	L	Т	- 	R	L	Т	R	L	T		R
Assigned Move	ment				2	12	1	1	6	+		7	4	14				
Adjusted Flow I	Rate (v)	, veh/h			620	1	T	196	134	8			109					
Adjusted Satura	ation Flo	w Rate (s), veh/h/ln			1834	4	1	1723	181	0			1671					
Queue Service	Time (g	/s), S			31.5	5	T	5.7	80.	6			6.4	1				
Cycle Queue C	learance	e Time (<i>g</i> _c), s			31.5	5	1	5.7	80.	6			6.4					
Green Ratio (g/	(C)				0.49)	T	0.63	0.6	6			0.25	1				
Capacity (c), ve	eh/h				903	;	1	453	119	7			411					
Volume-to-Cap	acity Ra	tio (X)			0.68	6	T	0.432	1.12	26			0.264					
Available Capa	city (<i>c</i> a),	veh/h			903	;		453	119	7			411					
Back of Queue	(<i>Q</i>), veł	n/In (50th percentile)			13.6	3		2.1	52.	1			2.7					
Queue Storage	Ratio (RQ) (50th percentile)		0.00)		0.54	0.0	0			0.00					
Uniform Delay ((<i>d</i> 1), s/ve	əh			23.7	7		15.5	20.	6			37.0					
Incremental De	lay (<i>d2</i>),	s/veh			1.8			0.2	67.	8			0.1					
Initial Queue De	elay (<i>d</i> 3), s/veh				0.0			0.0	0.0)			0.0					
Control Delay (d), s/veł	1			25.5	5		15.7	88.	4			37.1					
Level of Service	e (LOS)	LOS)			С			В	F				D					
Approach Delay	y, s/veh	veh / LOS		25.5		С		79.1			E	37.1		D	0.0			
Intersection De	elay, s/veh / LOS					62.	.5							E				
Multime et al D									14/							05	,	
Nultimodal Re	SUITS	/1.08			EB	1	+		VVE	5			NB			SE)	
Pieuestnan LOS							+											
BICYCIE LOS SC	ole / LC	13																

General Inform	nation									Int	tersect	ion Inf	ormatio	on		4241	bi L
Agency		GPD Group								Du	uration,	h	0.25		┓┛	*	
Analyst		BMF		Analys	is Da	te Ma	r 2,	2015		Are	еа Туре	Э	Other		4		۲ ب ب
Jurisdiction		City of Broadview H	leights	Time F	Period	PM	Pe	ak Hou	ır	PH	ΗF		0.92			w∔e s	
Intersection		Wallings Road/Wrig	ht Roac	Analys	is Yea	ar 201	15			An	nalysis I	Period	1> 7:	00	4		7 2
File Name		12. Wallings Rd_Wr	right Rd	_Existin	g PM	.xus										*	
Project Descrip	tion	Existing Year 2015	PM Pea	ık Hour												* 1 * *	1
.								1		(D					1	0.0	
Demand Inform	nation				EE	3		<u> </u>	VV	'B	_	<u> </u>	NB		<u> </u>	SB	
Approach Move	ement			L			۲ م	L	10	70	R	L		R	L		R
Demand (v), ve	h/h			10	550	J 1	0	20	13	70	30	20	10	10	20	10	20
Signal Informa	tion						7										
Cvcle. s	98.4	Reference Phase	2	e la		<u>~3</u>	÷	- eva							2	1	小
Offset, s	0	Reference Point	End			Ň	_	<u> </u>	ŰL.	_				1	Y 2	3	4
Uncoordinated	Yes	Simult, Gap E/W	On	Green	15.0) 47	.0	20.0	0.0	<u>)</u>	0.0	0.0	_	x	\rightarrow		r † 1
Force Mode	Fixed	Simult, Gap N/S	On	Red	2.0	2.0	,)	2.0	0.0))	0.0	0.0		5	6	7	
			-					1 -	1 -	-	1	<u> </u>					
Timer Results				EBL	-	EBT		WB	L	N	VBT	NB		NBT	SBI	-	SBT
Assigned Phase	e			5		2		1			6			8			4
Case Number				1.1		4.0		1.1		4	4.0			8.0			8.0
Phase Duration	, S			20.6	;	52.6		20.6	3	5	2.6			25.2			25.2
Change Period,	(Y+Rc)	, S		5.6		5.6		5.6		5	5.6			5.2			5.2
Max Allow Head	dway (<i>N</i>	<i>1AH</i>), s		3.1		6.0		3.1		6	6.0			4.3			4.3
Queue Clearan	ance Time (g_s) , s			2.2		27.1		2.5		4	9.0			4.0			4.6
Green Extensio	Clearance Time (<i>gs</i>), s Extension Time (<i>ge</i>), s			0.0		19.0		0.0		C	0.0			0.2			0.2
Phase Call Prol	oability			1.00)	1.00		1.00)	1.	.00			1.00			1.00
Max Out Proba	bility			0.00)	0.96		0.00)	1.	.00			0.00			0.00
No.		- 14 -	_		50				14/5	`						00	
Movement Gro	oup Res	SUITS			EB		-	1		5	_	1		D		SB	
Approach Move	ment			E	1	10 10		L 4	6	+	10	L 2	0	10 10		1	R 14
Adjusted Flow		vob/b			2	12		1	150	~	10	3	40	10	/	4	14
Adjusted Flow r	Hale (V)	, ven/n		1774	105	7	-	1740	102	2	_		43	<u> </u>	<u> </u>	1520	$\left \right $
				0.2	1657	/		0.5	102				1549			1539	
	loarano	(a_i)		0.2	25.1		-	0.5	47.0		_		2.0			2.6	
Groop Patio (g				0.2	23.1	,		0.5	47.0	5			2.0			2.0	
Capacity (c) ye	b/h			344	887)	-	100	860	2	_		370			364	
Volume-to-Cap	acity Ra	tio (X)		0.032	0.68	6		499	1 75	,			0 118			0 1/0	
Available Capa	$city(c_{2})$			344	887		-	499	860	2			370			364	$\left \right $
Back of Oueue	(O) vel	/In (50th percentile)	_	01	10.8	2	-	+33 0.2	101	, २	_		0.9			1 1	
Queue Storage	Batio (BO (50th percentile))	0.03	0.00)		0.05	0.00	<u>n</u>	_		0.0			0.00	
Uniform Delay ($(d_1) s/v$	eh	/	18.0	20.0)		10.6	25	7	_		32.0			32.3	
Incremental De	a_{1}, a_{2}	s/veh		0.0	29	,	-	0.0	342	5	_		01	<u> </u>		02.0	
Initial Queue De	ay (dz),	s/veh	_	0.0	0.0			0.0	0.0		_		0.0			0.0	
Control Delay	a) s/vel	1		18.0	22 0)		10.7	368	2			32.2			32.4	
Level of Service	e (LOS)			.0.0 B	<u></u>		-	, B	- 5555. F	+			C			C	
Approach Delay	. s/veh	/ LOS		22.8		C	╡	363	2		F	32 2		С	32.4		C
Intersection Del	lay. s/ve	h / LOS		0			255	5.6				0 = 11		-	F		-
	.,, .,							-									
Multimodal Re	sults				EB				WE	3			NB			SB	
Pedestrian LOS	Score	/ LOS															
Bicycle LOS Sc	ore / LC	DS															

				J -							,				
General Inform	nation								Intersed	tion In	forma	tion		424+1	× L
Agency		GPD Group							Duration	. h	0.2	5	┤▁┛	4 L	
Analyst		BMF		Analys	is Da	te Mar 2	. 2015	_	Area Tvi) De	Oth	er	-* -*		₹_
Jurisdiction		City of Broadview H	leiahts	Time F	Period	PM Pe	ak Hou	r	PHF		0.92	2		W + E	• <u>-</u> ≁
Intersection		Wallings Road / I-77	7 SB	Analys	is Yea	ar 2015			Analysis	Period	1>	7:00			+ ₹
File Name		16. Wallings Rd I-7	7 SB E	xisting I	PM.xu	IS			,						
Project Descrip	tion	Existing Year 2015	PM Pea	ık Hour										141471	* (*
, ,		5													
Demand Inform	nation				EB	}		W	'B		N	В		SB	
Approach Move	ement			L	Т	R	L	Т	r R	L	Т	- R	L	Т	R
Demand (v), ve	h/h				470) 110	60	52	20				260	10	900
					1		-	_		_				_	
Signal Informa	tion			-		<u> </u>									
Cycle, s	90.0	Reference Phase	2		R	E						1		3	4
Offset, s	0	Reference Point	End	Green	54.5	24.5	0.0	0.0	0.0	0.0					I
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	3.6	3.0	0.0	0.0	0.0	0.0	_			Ľ	$\mathbf{\Phi}$
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.9	2.5	0.0	0.0) 0.0	0.0		5	6	7	8
Timor Posulte			-	EDI		ERT	W/PI		WRT		1	NRT	CPI		CRT
Assigned Phase				LDL	-	2	VVDI	-	6	INE			30	-	8
Case Number	5					2			8.0		-				10.0
Phase Duration	ç		_			60.0		-	60.0						30.0
Change Period	$(Y+B_c)$	S				5.5		-	5.5		-				5.5
Max Allow Head	dwav (<i>N</i>	, o 1AH). s	_			2.2			2.2						4.3
Queue Clearan	ce Time	(<i>q</i> s), S				20.8			28.8		-				26.5
Green Extensio	n Time	(ge), s				1.0			1.0						0.0
Phase Call Prol	oability					1.00			1.00						1.00
Max Out Proba	bility					0.00			0.00						1.00
	-							11							
Movement Gro	oup Res	sults			EB			WE	3		NE	3		SB	
Approach Move	ement			L	Т	R	L	Т	R	L	Т	R	L	Т	R
Assigned Move	ment				2	12	1	6			<u> </u>	_	3	8	18
Adjusted Flow F	Rate (<i>v</i>)	, veh/h			630			630)		<u> </u>	_	283	989	
Adjusted Satura	ation Flo	w Rate (s), veh/h/ln			1819)		152	0		<u> </u>		1740	1551	
Queue Service	Time (g	(s), S			18.8			8.0			<u> </u>		12.7	24.5	
	learance	e Time (<i>gc</i>), s			18.8			26.8	3	<u> </u>		_	12.7	24.5	
Green Ratio (g/	(C)				0.61			0.6			-	_	0.27	0.27	
Valume to Con		tia (M			0.57	2		965) 				4/4	422	
	aury na				1100	-		0.00	;			_	171	2.343 199	
Reack of Queue	(O) vot	ven/n			66	-		60	,			-	5.4	422 80 5	
Queue Storage	Batio (BO (50th percentile)			0.0			0.9	2				0.00	0.0	
Uniform Delay (d_1 s/v	h)		10.7			11 6	3		-		28.5	32.8	
Incremental De	lav (d)	s/veh			0.5			1.3				_	20	611.6	
	alav (da)	s/veh			0.0			0.0					0.0	0.0	
Control Delay (d), s/vet	1			11 2			12.8	3				30.5	644 4	
Level of Service	e (LOS)				B			B					C	F	
Approach Delay	, s/veh	/ LOS		11.2		В	12.8		В	0.0)		508	0	F
Intersection De	lay, s/ve	h / LOS				26	1.1		_				F		
	,,														
Multimodal Re	sults				EB			WE	3		NE	3		SB	
Pedestrian LOS	Score	/ LOS													
Bicycle LOS Sc	ore / LC	DS													

General Inform	nation								Inte	rsect	ion Infe	ormatio	on		424	la la
Agency		GPD Group							Dura	ation,	h	0.25				
Analyst		BMF		Analys	is Dat	e Mar 2	2015		Area	а Туре	;	Other		4		 ▲
Jurisdiction		City of Broadview H	leights	Time F	eriod	PM Pe	ak Hou	r	PHF	=		0.92			w ‡ e	
Intersection		Wallings Road/I-77	NB/Mill	Analys	is Yea	r 2015			Ana	lysis I	Period	1> 7:0	00			* *
File Name		17. Wallings Rd_I-7	7 NB_N	1ill Rd_E	Existin	g PM.xus	3			-					*	
Project Descrip	tion	Existing Year 2015	PM Pea	k Hour											114Y	14
				I.							1			- N		
Demand Inform	nation				EB			W	/B			NB			SB	
Approach Move	ment			L	Т	R	L		г	R	L	Т	R	L	Т	R
Demand (v), ve	h/h			240	360	130	10	18	30	120	400	70	60			
	41 a m			1	1				1						_	
Signal Informa		Deferrer Dhase	0	-	La -		=							~		sta
Cycle, s	90.0	Reference Phase	2		R	R	1 - Stř	2					1	\$ 2	3	4
Offset, s	0	Reference Point	Ena	Green	0.0	59.7	19.7	0.0	2	0.0	0.0		_	<u> </u>		
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	4.0	3.6	3.0	0.0	2	0.0	0.0				_	
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.9	1./	2.3	0.0)	0.0	0.0		5	6	7	8
Timer Deculto			_			ГРТ			١٨/٢	דר	NDI		NDT	CDI		CDT
Assigned Deser				EBL	-	EBI	VVBI	-	VVE	51	INBL	-		581		5B1
Assigned Phase	5			5		2			0	2			4	<u> </u>	\rightarrow	
Case Number				0.0	-	14.0 65.0			65	3		_	12.0	<u> </u>		
Change Duration	, 5 (V, D)	<u> </u>		0.0	-	5.0	<u> </u>		- 65. 5 (.0 2			23.0	<u> </u>		
Max Allow Hoor	(<i>T+Hc</i>), s lway (<i>MAH</i>), s			0.9	-	0.0			0.0	ა ი			5.5			
	/ Headway (<i>MAH</i>), s earance Time (<i>gs</i>), s			0.0	+	2.3			2.	ა ი			0.0 01.7		\rightarrow	
Groop Extensio	The Clearance Time (g_s) , s			0.0	-	1 1			9.4	1			21.7			
Bhase Call Prol		(<i>ge</i>), 5		0.0		1.00			1.0	1			1.00		+	
Max Out Proba						0.00			0.0				1.00	<u> </u>		
Max Out Floba	Jiily					0.00			0.0)Z			1.00			
Movement Gro	up Res	ults			EB			WE	3			NB			SB	
Approach Move	ment			L	Т	R	L	Т		R	L	Т	R	L	Т	R
Assigned Move	ment			5	2	12	1	6		16	7	4	14			
Adjusted Flow F	Rate (v)	, veh/h			793			337	7			576				
Adjusted Satura	ation Flo	w Rate (s), veh/h/ln			1487			173	7			1743				
Queue Service	Time (g	s), S			6.0			0.0)			19.7				
Cycle Queue C	learance	e Time (<i>g</i> c), s			31.0			7.2	2			19.7				
Green Ratio (g/	(C)				0.66			0.6	6			0.22				
Capacity (c), ve	h/h				1042			119	3			382				
Volume-to-Capa	acity Ra	tio (<i>X</i>)			0.762	2		0.28	32			1.510				
Available Capa	city (<i>c</i> a),	veh/h			1042			119	3			382				
Back of Queue	(<i>Q</i>), veł	n/In (50th percentile)			9.5			2.2	2			33.9				
Queue Storage	Ratio (I	RQ) (50th percentile)		0.00			0.0	0			0.00				
Uniform Delay (d1), s/ve	əh			10.5			6.3	3			35.2				
Incremental De	lay (<i>d2</i>),	s/veh			3.0			0.0)			242.6				
Initial Queue De	elay (<i>d</i> 3)	, s/veh			0.0			0.0)			0.0				
Control Delay (d), s/veł	1			13.5			6.4				277.7				
Level of Service	e (LOS)				В			Α				F				
Approach Delay	/, s/veh	/ LOS		13.5		В	6.4		A		277.	7	F	0.0		
Intersection De	ay, s/ve	h / LOS				10	1.3							F		
					_					11					-	
Multimodal Re	Iltimodal Results				EB			WE	3			NB			SB	
Pedestrian LOS	Score	/ LOS														
Bicycle LOS Sc	ore / LC)S														

	TW	O-WAY STOP	CONTR	OL SI	JMN	IARY			
General Informatio	า		Site I	nform	atio	n			
Analyst	BMF		Interse	ection			Wallings I	Road/Elm	hurst
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	nadview H	leiahts
Date Performed	3/2/2015		Analys	is Year	r		2015	Jauview I	leigints
Analysis Time Period	PM Peak	Hour			1		2010		
Project Description Wa	allings Road Sa	fety & Corridor St	udy						
East/West Street: Wallin	ngs Road		North/S	South S	Street	: Elmhurs	t Drive		
Intersection Orientation:	East-West		Study I	Period ((hrs):	0.25			
Vehicle Volumes ar	nd Adjustme	nts							
Major Street		Eastbound					Westbou	nd	
Movement	1	2	3			4	5		6
	L	Т	R			L	Т		R
Volume (veh/h)	10	560					1210		10
Peak-Hour Factor, PHF	0.92	0.92	1.00			1.00	0.92		0.92
Hourly Flow Rate, HFR (veh/h)	10	608	0			0	1315		10
Percent Heavy Vehicles	1					0			
Median Type		1		Undiv	/ided				
RT Channelized			0						0
Lanes	0	1	0			0	1		0
Configuration	LT								TR
Upstream Signal		0					0		
Minor Street		Northbound					Southbound		
Movement	7	8	9			10	11		12
	L	Т	R			L	Т		R
Volume (veh/h)						10			20
Peak-Hour Factor, PHF	1.00	1.00	1.00			0.92	1.00		0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0			10	0		21
Percent Heavy Vehicles	0	0	0			0	0		0
Percent Grade (%)		0					0		
Flared Approach		N					N		
Storage		0					0		
RT Channelized			0						0
lanes	0	0	0			0	0		0
Configuration						•	LR		•
Delay, Queue Length, a	nd Level of Se	rvice							
Approach	Fastbound	Westbound		Northbo	ound		s	outhboun	d
Movement	1	4	7	8		9	10	11	12
Lane Configuration	LT					-		LR	
v (veh/h)	10							31	
C (m) (veh/h)	525							124	
	0.02							0.25	
V/C	0.02						0.20		
	0.00							0.93	
Control Delay (s/ven)	s/ven) 12.0							43.4	╉───┥
LOS	B							E	
Approach Delay (s/veh)	y (s/veh)							43.4	
Approach LOS								Е	

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	TW	O-WAY STOP	CONTR	OL SI	JMN	IARY			
General Informatio	า		Site I	nform	atio	n			
Analyst	BMF		Interse	ection			Wallings I Road	Road/Lon	gview
Agency/Co.	GPD Gro	ир	luriedi	ction			City of Br	oodview k	loights
Date Performed	3/2/2015		Analys	is Year	r		2015	Jauview I	leiginis
Analysis Time Period	PM Peak	Hour			1		2010		
Project Description Wa	allings Road Sa	fety & Corridor St	udy						_
East/West Street: Walling	ngs Road	-	North/S	South S	Street	: Longvie	w Road		
Intersection Orientation:	East-West		Study I	Period	(hrs):	0.25			
Vehicle Volumes ar	nd Adjustme	nts							
Major Street		Eastbound					Westbou	nd	
Movement	1	2	3			4	5		6
	L	Т	R			L	Т		R
Volume (veh/h)	10	560					1210		10
Peak-Hour Factor, PHF	0.92	0.92	1.00			1.00	0.92		0.92
Hourly Flow Rate, HFR (veh/h)	10	608	0			0	1315		10
Percent Heavy Vehicles	1					0			
Median Type				Undiv	/ided				
RT Channelized			0						0
Lanes	0	1	0			0	1		0
Configuration	LT								TR
Upstream Signal		0					0		
Minor Street		Northbound					Southbou	ind	
Movement	7	8	9			10	11		12
	L	Т	R			L	Т		R
Volume (veh/h)						10			10
Peak-Hour Factor, PHF	1.00	1.00	1.00			0.92	1.00		0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0			10	0		10
Percent Heavy Vehicles	0	0	0			0	0		0
Percent Grade (%)		0					0		
Flared Approach		N					N		
Storage		0					0		
RT Channelized			0						0
lanes	0	0	0			0	0		0
Configuration						-	LR		
Delay, Queue Length, a	nd Level of Se	rvice		ľ					
Approach	Eastbound	Westbound		Northbo	ound		s	outhboun	d
Movement	1	4	7	8		9	10	11	12
Lane Configuration	LT					-		LR	
v (veh/h)	10							20	
C (m) (veh/h)	525							104	
v/c	0.02							0.19	
95% queue length	0.02							0.73	
Control Dolou (chich)	engin <i>0.0</i> 6							0.07 47 7	
Control Delay (s/ven)	Delay (s/veh) 12.0							41.1	
	S B							E	
Approach Delay (s/veh)	s/veh)							47.7	
Approach LOS								Е	

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	тw	O-WAY STOP	CONTR	OL SI	JMMAR	Y					
General Information	า		Site I	nform	ation						
Analyst	BMF		Interse	ection			Wallings	Rd/Che	estni	ıt Blvd	
Agency/Co.	GPD Gro	up	Jurisdi	ction			City of Br	oadvie	w He	eights	
Date Performed	3/2/2015	1	Analys	sis Year			2015			Ŭ	
Analysis Time Period	PM Peak	Hour									
Project Description Wa	allings Road Sa	afety & Corridor S	tudy								
East/West Street: Walli	ngs Road		North/S	South S	treet: C	hestn	ut Boulevar	ď			
Intersection Orientation:	East-West		Study I	Period ((hrs): 0.	25					
Vehicle Volumes ar	nd Adjustme	ents									
Major Street		Eastbound					Westbou	nd			
Movement	1	2	3		4		5			6	
	L	Т	R		L		Т			R	
Volume (veh/h)		540	30		40		1210				
Peak-Hour Factor, PHF	0.88	0.92	0.92		0.92		0.92		0	.86	
Hourly Flow Rate, HFR (veh/h)	0	586	32	32 43		1315			0		
Percent Heavy Vehicles	2			1							
Median Type			-	Undivided			-				
RT Channelized			0	0						0	
Lanes	0	1	0	0 0		1			0		
Configuration			TR	TR LT					-		
Upstream Signal		0				0					
Minor Street		Northbound					Southbor	Ind			
Movement	7	8	9		10		11			12	
					т			R			
Volume (veh/h)	10	· · ·	10				•				
Peak-Hour Factor, PHF	0.92	1.00	0.92		0.67		1.00		0	.67	
Hourly Flow Rate, HFR	10	0	10		0					0	
(veh/h)	10	0	10		0		0			0	
Percent Heavy Vehicles	0	0	0		0		0			0	
Percent Grade (%)		0					0				
Flared Approach		N					Ν				
Storage		0					0				
RT Channelized			0							0	
Lanes	0	0	0		0		0			0	
Configuration		LR									
Delay, Queue Length, a	nd Level of Se	ervice	-								
Approach	Eastbound	Westbound		Northbo	ound		S	outhbo	und		
Movement	1	4	7	8		9	10	11		12	
Lane Configuration		LT		LR							
v (veh/h)		43		20							
C (m) (veh/h)		967		112							
v/c		0.04		0.18	2						
95% queue length		0.14		0.62	,						
Control Delay (s/veh)		8.9		44 0	,						
		Δ		F7.0							
Approach Dolou (a/uah)											
Approach Delay (s/ven)				44.0							
Approach LOS				E							

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	тw	O-WAY STOP	CONTR	OL SU	MMARY			
General Information	า		Site I	nform	ation			
Analyst	BMF		Interse	ection		Wallings	Rd/Overlo	ok Ave
Agency/Co.	GPD Gro	ир	Jurisdi	ction		City of Br	oadview F	leights
Date Performed	3/2/2015	,	Analys	is Year		2015		
Analysis Time Period	PM Peak	Hour						
Project Description Wa	allings Road Sa	fety & Corridor Si	tudy					
East/West Street: Walli	ngs Road		North/S	South St	reet: Ove	rlook Avenue		
Intersection Orientation:	East-West		Study I	Period (hrs): 0.25			
Vehicle Volumes ar	nd Adjustme	ents						
Major Street		Eastbound				Westbou	ind	
Movement	1	2	3		4	5		6
	L	Т	R		L	Т		R
Volume (veh/h)		540	10		30	1240		
Peak-Hour Factor, PHF	0.88	0.92	0.92		0.92	0.92		0.86
Hourly Flow Rate, HFR (veh/h)	0	586	10	10 32		1347		0
Percent Heavy Vehicles	2		1					
Median Type			Undivided					
RT Channelized			0	0				0
Lanes	0	1	0	0 0		1		0
Configuration			TR	TR LT				
Upstream Signal		0				0		
Minor Street		Northbound				Southbo	Ind	
Movement	7	8	9		10	11		12
		Т	R		10	т		R
Volume (veh/h)	10	· · ·	20		-			
Peak-Hour Factor, PHF	0.92	1.00	0.92		0.67	1.00		0.67
Hourly Flow Rate, HFR	10	0	21		0	0		0
(ven/n)					0			0
	0		0		0	0		0
Percent Grade (%)	_	0				0		
Flared Approach		N				N		
Storage		0				0		
RT Channelized			0					0
Lanes	0	0	0		0	0		0
Configuration		LR						
Delay, Queue Length, a	nd Level of Se	ervice						
Approach	Eastbound	Westbound	1	Northbo	und	S	Southbound	b
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
v (veh/h)		.32		.31				
C(m)(yeh/h)		085		157		_		
		300					┨──┤	
		0.03		0.20				
95% queue length		0.10		0.71	_			
Control Delay (s/veh)		8.8		33.5				
LOS		A		D				
Approach Delay (s/veh)				33.5				
Approach LOS				D				

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	TW	O-WAY STOP	CONTR	OL SU	MMARY	,				
General Information	n		Site I	nforma	ation					
Analyst	BMF		Interse	ection		Wallings	Rd/McCrea	ry Rd		
Agency/Co.	GPD Gro	ир	Jurisdi	ction		City of Br	oadview He	eights		
Date Performed	3/2/2015	•	Analys	sis Year		2015				
Analysis Time Period	PM Peak	Hour								
Project Description W	allings Road Sa	fety & Corridor St	udy							
East/West Street: Walli	ngs Road		North/S	South St	reet: Mc	Creary Road				
Intersection Orientation:	East-West		Study I	Period (I	hrs): 0.25	5				
Vehicle Volumes ar	nd Adjustme	ents								
Major Street		Eastbound				Westbou	Ind			
Movement	1	2	3		4	5		6		
	L	Т	R		L	Т		R		
Volume (veh/h)	10	550				1230		60		
Peak-Hour Factor, PHF	0.92	0.92	0.89	0.89 0.82		0.92	().92		
Hourly Flow Rate, HFR (veh/h)	10	597	0 0		0	1336		65		
Percent Heavy Vehicles	1		2							
Median Type			Undivided			-				
RT Channelized			0					0		
Lanes	0	1	0 0		1		0			
Configuration	LT				-			TR		
Upstream Signal		0				0				
Minor Street		Northbound				Southbo	Ind			
Movement	7	8	9		10	11		12		
		Т	R		10	т		R		
Volume (veh/h)		· ·			20	· ·		40		
Peak-Hour Factor, PHF	0.57	1.00	0.57		0.92	1.00	().92		
Hourly Flow Rate, HFR	0	0	0		21	0		43		
(Ven/n) Percent Heavy Vehicles		0	1					0		
Dereent Crede (9/)			7		0	0		0		
	_		1			0				
Flared Approach	_	N				N N				
Storage		0				0				
RT Channelized			0					0		
Lanes	0	0	0		0	0		0		
Configuration						LR				
Delay, Queue Length, a	and Level of Se	ervice								
Approach	Eastbound	Westbound	1	Northbo	und	S	Southbound			
Movement	1	4	7	8	9	10	11	12		
Lane Configuration	LT						LR			
v (veh/h)	10						64			
C (m) (veh/h)	491						116			
v/c	0.02						0.55			
95% quoue longth	0.06					2.62				
Control Dolou (s/ush)	10.00						2.03			
Control Delay (s/ven)	12.5						08.9			
LOS	В						F			
Approach Delay (s/veh)							68.9			
Approach LOS							F			

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	тw	O-WAY STOP	CONTR	OL SU	JMMA	RY				
General Information	า		Site I	nform	ation					
Analyst	BMF		Interse	ection			Wallings I	Rd/Maje	stic (Daks
Agency/Co.	GPD Gro	ир	lurisdi	ction			City of Br	nadview	Hoir	nhts
Date Performed	3/2/2015			is Year	-		2015	Jauview	TIEI	<i>jnts</i>
Analysis Time Period	PM Peak	Hour					2010			
Project Description Wa	allings Road Sa	fety & Corridor St	udy							
East/West Street: Wallin	ngs Road		North/S	South S	treet:	Majestic	: Oaks Trail			
Intersection Orientation:	East-West		Study I	Period ((hrs):	0.25				
Vehicle Volumes ar	nd Adjustme	nts								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5		6	
	L	T	R			L	T			R
Volume (veh/h)	10	560					1410		1	0
Peak-Hour Factor, PHF	0.92	0.92	0.89		0.0	82	0.92		0.	92
(veh/h)	10	608	0		0)	1532		1	0
Percent Heavy Vehicles	1				2	2			-	-
Median Type				Undivided						
RT Channelized			0	0					()
Lanes	0	1	0		()	1		()
Configuration	LT								T	R
Upstream Signal		0					0			
Minor Street		Northbound					Southbou	ind		
Movement	7	7 8			1	10	11		1	2
	L	Т	R			L	Т			R
Volume (veh/h)					1	0				0
Peak-Hour Factor, PHF	0.57	1.00	0.57	·	0.9	92	1.00			92
Hourly Flow Rate, HFR (veh/h)	0	0	0		1	0	0	1		0
Percent Heavy Vehicles	4	0	4		()	0	0)
Percent Grade (%)		0					0			
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0						()
Lanes	0	0	0		()	0		()
Configuration							LR			
Delay, Queue Length, a	nd Level of Se	rvice								
Approach	Eastbound	Westbound		Northbo	ound		S	outhbou	nd	
Movement	1	4	7	8		9	10	11		12
Lane Configuration	LT							LR		
v (veh/h)	10			-				20		
C (m) (veh/h)	433							76		
v/c	0.02					0.26				
95% queue length	0.07					0.94				
Control Delay (s/veh)	13.5							68.5		
LOS	В							F		
Approach Delay (s/veh)								68.5		
Approach LOS					F					

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	TW	O-WAY STOP	CONTR	OL SU	JMN	IARY				
General Informatio	า		Site Ir	nform	atic	on				
Analyst	BMF		Interse	ction			Wallings	Rd/Cre	eksi	de Trce
Agency/Co.	GPD Grou	ıp	Jurisdi	ction			City of Br	oadvie	w He	eights
Date Performed	3/2/2015		Analys	is Year	•		2015			
Analysis Time Period	PM Peak	Hour								
Project Description Wa	allings Road Saf	ety & Corridor St	udy							
East/West Street: Walling	ngs Road		North/S	South S	treet	: Creeksi	de Terrace			
Intersection Orientation:	East-West		Study F	Period ((hrs)	0.25				
Vehicle Volumes ar	<u>nd Adjustme</u> i	nts								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5			6
	L	500	R			L				R
Volume (ven/n) Dook Hour Footor, DHE	0.80	560	10			10	1400			76
Hourly Flow Rate HFR	0.00	0.92	0.92			0.92	0.92	1.92		.70
(veh/h)	0	608	10			10	1521			0
Percent Heavy Vehicles	2		1							
Median Type		Undivided								
RT Channelized			0							0
Lanes	0	1	0			0	1			0
Configuration			TR	2 LT						
Upstream Signal		0					0			
Minor Street		Northbound Southbou			Southbou	ind				
Movement	7	8	9			10	11			12
	L	Т	R		L		Т			R
Volume (veh/h)	20		10							
Peak-Hour Factor, PHF	0.92	1.00	0.92			0.70	1.00		0).70
Hourly Flow Rate, HFR (veh/h)	21	0	10			0	0			0
Percent Heavy Vehicles	5	0	5		0 0				0	
Percent Grade (%)		0					0			
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0							0
Lanes	0	0	0			0	0			0
Configuration		LR								
Delay, Queue Length, a	nd Level of Sei	vice								
Approach	Eastbound	Westbound	1	Vorthbo	ound		S	outhb	ound	
Movement	1	4	7	8		9	10	1.	1	12
Lane Configuration		LT		LR						
v (veh/h)		10		31						
C (m) (veh/h)		967		72						
v/c		0.01		0.43	}					
95% queue length		0.03		1.70						
Control Delay (s/veh)		8.8		88.4	L					
LOS		A		F				1		
Approach Delay (s/veh)				88.4	1			•		
Approach LOS				F						

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	тw	O-WAY STOP	CONTR	OL SUMI	MARY			
General Information	า		Site II	nformatio	on			
Analyst	BMF		Interse	ection		Wallings I Rd/Eirebo	Rd/Joyce	
Agency/Co.	GPD Gro	ир	Jurisdi	ction		City of Br	oadview H	eiahts
Date Performed	3/2/2015		Analys	is Year		2015	oddinowin	Jiginto
Analysis Time Period	PM Peak	Hour						
Proiect Description Wa	allinas Road Sa	fetv & Corridor St	udv					
East/West Street: Wallin	ngs Road	.,	North/S	South Stree	et: Joyce R	oad/Fireho	use	
Intersection Orientation:	East-West		Study F	Period (hrs)): 0.25			
Vehicle Volumes ar	nd Adiustme	nts						
Major Street	j	Eastbound				Westbou	nd	
Movement	1	2	3		4	5		6
	L	Т	R		L	Т		R
Volume (veh/h)	10	550	10		10	1390		10
Peak-Hour Factor, PHF	0.92	0.92	0.92		0.92	0.92		0.92
Hourly Flow Rate, HFR (veh/h)	10	597	10	10 10		1510		10
Percent Heavy Vehicles	1			1				
Median Type				Undivided				
RT Channelized			0	0				0
Lanes	0	1	0	0 0		1		0
Configuration	LTR				LTR			
Upstream Signal		0				0		
Minor Street	Northbound So				Southbou	ind		
Movement	7	8	8 9		10	11		12
	L	Т	R		L	Т		R
Volume (veh/h)	10	10	10		10	10		10
Peak-Hour Factor, PHF	0.92	0.92	0.92		0.92	0.92	(0.92
Hourly Flow Rate, HFR (veh/h)	10	10	10		10	10		10
Percent Heavy Vehicles	0	0	0		0	0		0
Percent Grade (%)		0				0		
Flared Approach		N				N		
Storage		0				0		
RT Channelized			0					0
Lanes	0	1	0		0	1		0
Configuration		LTR				LTR		
 Delay, Queue Length, a	nd Level of Se	rvice						
Approach	Eastbound	Westbound	1	Northbound	k k k k k k k k k k k k k k k k k k k	l s	outhbound	
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (veh/h)	10	10		30			.30	
$C_{\rm m}$ (veh/h)	442	976		43			43	
	0.02	0.01	43			0.70		
V/C	0.02	0.07		0.70			0.70	
	0.07	0.03		2.04			2.04	
Control Delay (s/ven)	13.3	<u> </u>		196.5	 		196.5	┞───┤
LOS	В	A		F				
Approach Delay (s/veh)				196.5			196.5	
Approach LOS				F		F		

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	TW	O-WAY STOP	CONTRO	OL SI	JMN	IARY					
General Informatio	า		Site Ir	nform	atio	on					
Analyst	BMF		Interse	ction			Wallings I	Rd/Mai	riann	a Blvd	
Agency/Co.	GPD Grou	р	Jurisdi	ction			City of Br	oadvie	w He	ights	
Date Performed	3/2/2015	-	Analys	is Yea	r		2015			-	
Analysis Time Period	PM Peak	Hour									
Project Description Wa	allings Road Saf	ety & Corridor St	udy								
East/West Street: Wallin	ngs Road		North/S	South S	Stree	t: <i>Mariann</i>	nna Boulevard				
Intersection Orientation:	East-West		Study F	Period (hrs): 0.25							
Vehicle Volumes ar	nd Adjustme	nts									
Major Street		Eastbound					Westbound				
Movement	1	2	3			4	5			6	
	L	1	R			L				R	
Volume (ven/n)	0.00	560	10			10	1400			70	
Peak-Hour Factor, PHF	0.80	0.92	0.92			0.92	0.92		0	.70	
(veh/h)	0	608	10			10	1521			0	
Percent Heavy Vehicles	2			1							
Median Type		Undivided									
RT Channelized			0							0	
Lanes	0	1	0	0 0		1			0		
Configuration			TR	TR LT							
Upstream Signal		0		0							
Minor Street		Northbound					Southbou	Ind			
Movement	7	8	9			10	11			12	
	L	Т	R	R L		Т			R		
Volume (veh/h)	10		10								
Peak-Hour Factor, PHF	0.92	1.00	0.92			0.70	1.00		0	.70	
Hourly Flow Rate, HFR (veh/h)	10	0	10			0	0			0	
Percent Heavy Vehicles	0	0	0			0	0			0	
Percent Grade (%)		0	•				0				
Flared Approach		N	1				N				
Storage		0					0				
RT Channelized			0							0	
Lanes	0	0	0			0	0			0	
Configuration		LR									
Delay, Queue Length, a	nd Level of Sei	rvice									
Approach	Eastbound	Westbound	١	Northbo	ound		S	outhbo	ound		
Movement	1	4	7	8		9	10	11		12	
Lane Configuration		LT		LR							
v (veh/h)		10		20							
C (m) (veh/h)		967		94							
v/c		0.01		0.21	1						
95% queue length		0.03		0.21							
Control Delay (s/veh)		8.8		53 4	4				-+		
		Δ		- 50. F	•						
Approach Delay (s/ych)				<u> </u>	1						
Approach LOC				- 55.4	T						
Approach LOS				F							

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	TW	O-WAY STOP	CONTR	OL SI	JMN	MARY				
General Information	n		Site I	nform	atio	on				
Analyst	BMF		Interse	ection			Wallings	Rd/Cr	aig Li	n
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadvie	ew He	eights
Date Performed	3/2/2015		Analys	is Yea	r		2015			
Analysis Time Period	PM Peak	Hour								
Project Description W	allings Road Sa	fety & Corridor Si	tudy							
East/West Street: Walli	ngs Road		North/S	South S	Stree	t: Craig L	ane			
Intersection Orientation:	East-West		Study I	Period	(hrs)	: 0.25				
Vehicle Volumes ar	nd Adjustme	ents								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5			6
	L	Т	R			L	Т			R
Volume (veh/h)		570	10		10		1410			
Peak-Hour Factor, PHF	0.80	0.92	0.92			0.92	0.92		(0.76
Hourly Flow Rate, HFR (veh/h)	0	619	10	10 10		1532			0	
Percent Heavy Vehicles	2			3						
Median Type				Undivided						
RT Channelized			0							0
Lanes	0	1	0	0 0		1			0	
Configuration			TR	TR LT						
Upstream Signal		0				0				
Minor Street		Northbound					Southbou	ind		
Movement	7	7 8				10	11			12
	L	Т	R			L	Т			R
Volume (veh/h)	10		10							
Peak-Hour Factor, PHF	0.92	1.00	0.92			0.70	1.00		().70
Hourly Flow Rate, HFR (veh/h)	10	0	10			0	0			0
Percent Heavy Vehicles	7	0	7			0	0	0		0
Percent Grade (%)		0					0			
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0							0
Lanes	0	0	0			0	0			0
Configuration		LR								
Delay, Queue Length, a	nd Level of Se	ervice	-	I						
Approach	Eastbound	Westbound		Northbo	ound		S	outhb	ound	
Movement	1	4	7	8		9	10	1	1	12
Lane Configuration		LT		LR						
v (veh/h)		10		20						
C (m) (veh/h)		948		87						
v/c		0.01		0.22	2					
95% quoue length		0.07		0.20	, ,					
Control Dolou (chuch)		0.03		U.02	-					
Control Delay (s/ven)		δ.δ		58.3	>		ļ			
LOS		A		F			ļ			
Approach Delay (s/veh)				58.3	3		ļ			
Approach LOS				F						

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	TW	O-WAY STOP	CONTR	OL SU	MMAR	Y				
General Information	n		Site I	nforma	ation					
Analyst	BMF		Interse	ection			Wallings	Rd/Skyline	Dr	
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadview He	eights	
Date Performed	3/2/2015	•	Analys	sis Year			2015			
Analysis Time Period	PM Peak	Hour								
Project Description W	allings Road Sa	fety & Corridor St	udy							
East/West Street: Walli	ngs Road		North/S	South St	reet: S	kyline	Drive			
Intersection Orientation:	East-West		Study I	Period (I	hrs): 0.2	25				
Vehicle Volumes ar	nd Adjustme	ents								
Major Street		Eastbound					Westbou			
Movement	1	2	3		4		5		6	
	L	Т	R		L		Т		R	
Volume (veh/h)	10	570					1410		10	
Peak-Hour Factor, PHF	0.92	0.92	0.81		0.78		0.92	().92	
Hourly Flow Rate, HFR (veh/h)	10	619	0 0		1532		10			
Percent Heavy Vehicles	1		3							
Median Type		_	Undivided							
RT Channelized			0						0	
Lanes	0	1	1 0 0		1		0			
Configuration	LT								TR	
Upstream Signal		0					0			
Minor Street		Northbound		<u> </u>			Southbou	ind		
Movement	7	8	9		10		11		12	
		T	R		1		Т		R	
Volume (veh/h)		-			10				10	
Peak-Hour Factor, PHF	0.63	1.00	0.63		0.92		1.00	().92	
Hourly Flow Rate, HFR	0	0	0		10		0	0		
(Ven/n) Percent Heavy Vehicles	7	0	7		1		0		1	
Dereent Crede (%)	/		/		7		0		7	
	_		1							
Flared Approach	_	N					N			
Storage		0					0			
RT Channelized			0						0	
Lanes	0	0	0		0		0		0	
Configuration							LR			
Delay, Queue Length, a	and Level of Se	ervice								
Approach	Eastbound	Westbound	1	Northbo	und		S	outhbound		
Movement	1	4	7	8		9	10	11	12	
Lane Configuration	LT							LR		
v (veh/h)	10							20		
C (m) (veh/h)	433							73		
v/c	0.02							0.27		
95% quoue longth	0.02							0.27		
Control Dolou (s/ush)	10.07							70.0		
Control Delay (s/ven)	13.5							72.0		
LOS	В						ļ	F		
Approach Delay (s/veh)							72.0			
Approach LOS							F			

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	TW	O-WAY STOP	CONTR		UMN	MARY				
General Information	n		Site I	nform	natio	on				
Analyst	BMF		Interse	ection			Wallings	Rd/W	Mill F	Rd
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadvie	w He	eights
Date Performed	3/2/2015	•	Analys	sis Yea	r		2015			-
Analysis Time Period	PM Peak	Hour								
Project Description W	allings Road Sa	fety & Corridor Si	tudy							
East/West Street: Walli	ngs Road		North/S	South S	Stree	t: West M	lill Road			
Intersection Orientation:	East-West		Study I	Period	(hrs)	: 0.25				
Vehicle Volumes ar	nd Adjustme	ents								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5			6
	L	Т	R			L				R
Volume (veh/h)		570	10			10	1410			
Peak-Hour Factor, PHF	0.80	0.92	0.92	<u> </u>		0.92	0.92		(0.63
Hourly Flow Rate, HFR (veh/h)	0	619	10	10 10		1532			0	
Percent Heavy Vehicles	1			3						
Median Type			_	Undivided			-			
RT Channelized			0							0
Lanes	0	1	0	0 0		1			0	
Configuration			TR	TR LT						
Upstream Signal		0				0				
Minor Street		Northbound					Southbou	ind		
Movement	7	7 8 9				10	11			12
	L	Т	R			L	Т			R
Volume (veh/h)	10		10							
Peak-Hour Factor, PHF	0.92	1.00	0.92			0.79	1.00		0	0.79
Hourly Flow Rate, HFR (veh/h)	10	0	10			0	0			0
Percent Heavy Vehicles	2	0	2			4	0	0		4
Percent Grade (%)		0					0			
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0							0
Lanes	0	0	0			0	0			0
Configuration		LR								
Delay, Queue Length, a	nd Level of Se	ervice	•	I						
Approach	Eastbound	Westbound		Northbo	ound		S	outhb	ound	
Movement	1	4	7	8		9	10	1	1	12
Lane Configuration		1 T		IR		-				
v (veh/h)		10		20						
C(m)(vch/h)		048		01						
		940		91	<u> </u>					
		0.01		0.22	2					
95% queue length		0.03		0.78	5					
Control Delay (s/veh)		8.8		55.4	4					
LOS		A		F						
Approach Delay (s/veh)				55.4	4					
Approach LOS				F						

HCS+TM Version 5.3 Generated: 3/18/2015 3:14 PM

APPENDIX C CERTIFIED TRAFFIC PLATES



Drowing Flet. C. V2014/2014383/Torfic.Ucourneria/Certified Troffic Request/Figures/Plate 1.dwg Layout Date: Mer 23, 2013 Time: 4:15 pm Twist. -1.57079633



←1390 I-77 NB EXIT RAMP 2110 –♪ 550 –√







←100 I-77 NB EXIT RAMP





Drowing File: Cr. 2014/2014383/Traffs/Documents/Certified Traffic Request/Figures/Plate 3.dwg Layout Date: Mer 23, 2015 Time: 417 Jun Twet: -1.57079633







Drowing Flar 0.12014.2014.383.71rdfio.Documenta/Oerlifed Traffic Request/Figures/Plate 4.4wg Layou Date: Mer 23, 2015 Time: 2:12 pm i wist: -1.57079633

Technician: bferrell







Documents/Certified Twist: -1.57079633 Detering File: Cr. 2015 Time: 2:14 pm Deter: Mor 2:3, 2015 Time: 2:14 pm Technician: pter-



Drowing Filer Cr.Y.2014.383.Traffe/Documents/Certified Traffic Request/Figures/Picte 6.dwg Layo Dote: Mer 23, 2015 Time: 4:18 pm "Weit. --1.57079633



APPENDIX D COLLISION DIAGRAMS




REAR END HEAD ON LEFT TURN SIDESWIPE ANGLE

MATCH LINE A

WALLINGS ROAD

CRASH DIAGRAM 1 OF 8









REAR END HEAD ON LEFT TURN \rightarrow - ANGLE

WALLINGS ROAD

CRASH DIAGRAM 2 OF 8









REAR END HEAD ON ← control LEFT TURN \rightarrow - ANGLE

WALLINGS ROAD

CRASH DIAGRAM 4 OF 8









REAR END HEAD ON ← control LEFT TURN \mathcal{T} - ANGLE

WALLINGS ROAD

CRASH DIAGRAM 6 OF 8















REAR END HEAD ON ← ∞ OUT OF CONTROL LEFT TURN \rightarrow

- ANGLE

WALLINGS ROAD

CRASH DIAGRAM 8 OF 8

APPENDIX E COLLISION DATA SUMMARY & CHARTS













Frequency of Crashes by Hour

From // to // - - (-)















Frequency of Crashes by Contributing Factor 1







APPENDIX F SAFETY APPLICATION



General Project Information			
Project Sponsoring Agency	City of Broadview Heights		
Project Name	Wallings Road Safety and Corridor Study		
PID	Safety and Corridor Study		
Project Manager	Mr. Eugene Esser, P.E., P.S.		
Contact Phone	(440) 838-4705		
Contact Email	epesser@broadview-heights.org		
Project Name PID Project Manager Contact Phone Contact Email	Wallings Road Safety and Corridor Study Safety and Corridor Study Mr. Eugene Esser, P.E., P.S. (440) 838-4705 epesser@broadview-heights.org		

Location Information						
ODOT District	12	CUY				
Route Number	CR-57	Road Name	Wallings Road			
Begin Logpoint	3.090	End Logpoint	4.940			
Begin Latitude	41.345	Begin Longitude	-81.685			
End Latitude	41.345	End Longitude	-81.649			

Project Description

Summary of Crash Patterns

A review of the crash patterns indicates that safety issues exist along the Wallings Road corridor. Large numbers of rear-end crashes are occurring at unsignalized intersections and driveways due to the absence of a center two-way left turn lane to separate left turning vehicles from thru vehicles. Motorists are unable to get around the left turning traffic occupying the only available thru lane in the two-lane section of Wallings Road, which causes congestion and rear-end related crashes along the corridor. Congestion is present at the I-77 / Wallings Road interchange on the east end of the project that is contributing to the rear-end crashes occurring on that section of the roadway.

Summary of Recommended Countermeasures

1. Widen Wallings Road to accommodate a two-way left turn lane throughout the entire study area.

- 2. Construct a westbound right turn lane at the Wallings Road / McCreary Road intersection.
- 3. Construct a westbound right turn lane at the Wallings Road / Wright Road intersection.
- 4. Remove the traffic signal currently located at the Wallings Road / Wright Road intersection.
- 5. Construct an eastbound right turn lane at the Wallings Road / West Mill Road intersection.
- 6. Reconstruct the Wallings Road Bridge over I-77 to accommodate four (4) travel lanes.
- 7. Construct a second eastbound left turn lane at the Wallings Road / I-77 NB Ramps / Mill Road intersection.
- 8. Widen the I-77 NB entrance ramp to accommodate the proposed, dual left turn lane from Wallings Road.
- 9. Widen Mill Road to accommodate a northbound left turn lane at the Wallings Road / I-77 NB Ramps / Mill Road intersection.

10. Widen the I-77 SB exit ramp to accommodate a second right turn lane and construct a second westbound thru lane on Wallings Road to receive the traffic from these (2) lanes.

11. Widen Wallings Road from just east of West Mill Road to the I-77 NB entrance ramp.

Project Priority Information



Crash Data					
Crash Totals					
	Fatal & Serious Injury (KA)	Visible Injury (B)	Non-Visible (C)	Property Damage Only (O)	Total
Existing Conditions: Predicted Crash Frequency	1.2402	5.1100	7.3751	26.1375	39.86
Existing Conditions: Expected Crash Frequency	1.2222	5.0261	7.5353	31.7163	45.50
Potential for Safety Improvement	-0.0180	-0.0839	0.1602	5.5788	5.64
Proposed Conditions: Predicted Crash Frequency	0.7710	3.0997	4.3357	16.6029	24.81
Observed Crashes	0.3333	3.6667	9.0000	39.6667	52.67
Observed People Injury Totals	-				
	Fatal Injury (K)	Serious Injury (A)	Visible Injury (B)	Non-Visible (C)	Total
Observed People Injury Totals	0.0000	0.3333	6.6667	14.6667	21.67

Ap	plic	ation	Sco	orina
/ \P				21 H I I I

Category	Scoring Value	Points Awarded	Points Possible
Expected Crash Frequency	45.50	10	10
Ratio of Observed Fatal and Serious Injuries to Observed Total Crashes	0.01	1	5
% of the Potential for Safety Improvement to Total Expected Crashes	12.40%	20	20
Relative Severity Index	\$28,524	10	10
Equivalent Property Damage Only Index	3.14	3	10
Volume to Capacity Ratio	2.39	10	10
Benefit Cost Ratio	0.48	0	30
Safety Funding Request Percentage	34.18%	5	5
	Total	59	100

Strategic Highway Safety Plan						
Functional Class	Minor Arterial Roadway					
Major Route AADT	17,650					
Ohio Emphasis Area	Emphasis Area V - Incident and Congestion Related Crashes					
Ohio Emphasis Area Subcategory	Rear End Crashes					
FHWA Emphasis Area	Other					
FHWA Improvement Category	Roadway					
FHWA Improvement Subcategory	Roadway widening - add lane(s) along segment					

Work Locations					
NLFID	Begin	End	Begin	Begin	Location Termini
	Logpoint	Logpoint	Latitude	Longitude	(i.e. from Street 1 to Street 2)
CCUYCR00057**C	3.090	4.940	41.345	-81.6846	Broadview Road (SR 176) to I-77 Interchange



Safety Funding Application

Project Funding								
Project Phase	Safety Study	Interchange Mod. Study	PE - Environmental	PE - Detailed Design	Right of Way /Utilities	Construction	Total	
Fiscal Year	2015	2016	2017	2018	2019	2020	Total	
Project Phase Completed	2					N/A		
Previous Safety	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
New Safety	\$0.00	\$72,000.00	\$726,048.00	\$726,048.00	\$937,800.00	\$2,538,104.00	\$5,000,000.00	
Sponsor Funding	\$0.00	\$8,000.00	\$80,672.00	\$80,672.00	\$104,200.00	\$2,378,950.60	\$2,652,494.60	
Future Funding Requests	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$6,977,698.40	\$6,977,698.40	
Total	\$0.00	\$80,000.00	\$806,720.00	\$806,720.00	\$1,042,000.00	\$11,894,753.00	\$14,630,193.00	

Additional Funding Detail

Future funding request will be made to NOACA and for ODOT Bridge Funds Local funds will be paid for by the City of Broadview Heights. A future ODOT Urban Paving application will also be made.

Project Development		
Project Phase	Completed by	Completion Date
Safety Study	GPD Group	3/31/2015

Applicant Information						
Name	Title	Phone Number				
Samuel J. Alai	City of Broadview Heights Mayor	(440) 525-3651				
Signature		Date				
		March 31, 2015				

Version: 20140214

The following information should be included in submission of the safety project application:

1. An electronic copy of the Safety Engineering Study

2. All Excel Analysis Files

May include Crash Analysis Module (CAM) Tool, Economic Crash Analysis Tool (ECAT), HSIP Application and Scoring Tool.

3. Benefit-Cost Results (Economic Analysis)

4. DSRT approval signatures

APPENDIX G COST ESTIMATE

3 LANE OPTION

Wallings Road (County Road 57) Preliminary Cost Estimate 3-Lanes Curbed

ITEM	DESCRIPTION	TOTAL QUANTITY	UNIT	ESTIMATED PRICE	TOTAL COST
	ROADWAY				
201	CLEARING AND GRUBBING	1	LUMP	\$25.000	\$25.000
202	CONCRETE WALK REMOVED	2,750	SQ FT	\$5	\$13,750
202		3,050	FT	\$3	\$9,150
202	PIPE REMOVED, 24" AND UNDER	12,250	FT	\$10	\$32,000
202	CATCH BASIN OR INLET REMOVED	60	EACH	\$100	\$6,000
202	MANHOLE REMOVED (STORM)	11	EACH	\$500	\$5,500
203	EMBANKMENT	2,000	CU YD	\$10	\$20,000
608	6" CONCRETE WALK	2,750	SQ FT	\$7	\$19,250
608	CURB RAMP, TYPE A1	29	EACH	\$1,000	\$29,000
623	MONOMENT BOX ADJUSTED TO GRADE	5 134	EACH	\$750	\$3,750
					+,
	ROADWAY SUBTOTAL:				\$228,000
	EROSION CONTROL				
659	SEEDING AND MULCHING	40 000	SQ YD	<u></u> \$3	\$120.000
832	STORM WATER POLLUTION PREVENTION PLAN	1	EACH	\$10,000	\$10,000
832	EROSION CONTROL	50,000	EACH	\$1	\$50,000
895	POST CONSTRUCTION BMPS (WATER QUALITY STRUCTURE)	2	EACH	\$15,000	\$30,000
-	EROSION CONTROL SUBTOTAL:				\$210,000
	DRAINAGE				
605	4" BASE PIPE UNDERDRAINS W/ FABRIC WRAP	22,250	FT	\$9	\$200,250
611	12" CONDUIT, TYPE B	1,350	FT	\$50	\$67,500
611 611	18"-36" CONDUIT, TYPE B (TRUNK SEWER)	10,300	FT FACH	\$100 \$1,750	\$1,030,000 \$152,250
611	MANHOLE, NO. 3	44	EACH	\$4,000	\$176,000
					\$4,626,000
	DRAINAGE SUBTOTAL:				\$1,626,000
	PAVEMENT				
253	PAVEMENT REPAIR	600	SO YD	\$50	\$30,000
254	PAVEMENT PLANING, ASPHALT CONCRETE	59,200	SQ YD	\$2	\$118,400
441	3" ASPHALT RESURFACING	59,200	SQ YD	\$20	\$1,184,000
441 452	FULL DEPTH ASPHALT PAVEMENT (INCLUDES EXCAVATION) 6" NON-REINFORCED CONCRETE PAVEMENT OF ASS OC MS (INCL. EXCAV.)	20,700	SQ YD	\$52 \$62	\$1,076,400
609	CURB, TYPE 6	22,250	FT	\$12	\$267,000
	PAVEMENT SUBTOTAL:				\$2,939.000
	WATER WORKS				
	WATER WORKS				
638	FIRE HYDRANT EXTENDED AND ADJUSTED TO GRADE	15	EACH	\$1,500	\$22,500
638	SERVICE BOX ADJUSTED TO GRADE	134	EACH	\$175	\$23,450
	WATER WORKS SUBTOTAL:				\$46,000
	SANITART SEWER				
611	MANHOLE ADJUSTED TO GRADE	33	EACH	\$400	\$13,200
					*** ***
	SANITARY SEWER SUBTOTAL:				\$13,000

Wallings Road (County Road 57) Preliminary Cost Estimate 3-Lanes Curbed

ITEM	DESCRIPTION	TOTAL QUANTITY	UNIT	ESTIMATED PRICE	TOTAL COST
	TRAFFIC CONTROL				
	SIGNING	1	LUMP	\$40,000	\$40,000
	PAVEMENT MARKINGS	1	LUMP	\$45,000	\$45,000
	TRAFFIC CONTROL SUBTOTAL:				\$85,000
	SIGNALIZATION				
632	TRAFFIC SIGNAL REMOVED	1	EACH	\$2,500	\$2,500
032	IRAFFIC SIGNAL	4	EACH	\$150,000	\$600,000
	SIGNALIZATION SUBTOTAL:				\$603,000
	STRUCTURES				
		40.000	00 FT	* 00	¢010.000
	WALLINGS KOAD BRIDGE EXISTING DECK REMOVAL	10,800	SQ FT	\$20	\$216,000 \$640,000
	WALLINGS ROAD BRIDGE WIDENING	8,800	SQ FT	\$150	\$1,320,000
-	STRUCTURES SUBTOTAL:				\$2,176,000
-					
	MAINTENANCE OF TRAFFIC				
	MAINTENANCE OF TRAFFIC	1	LUMP	\$200,000	\$200,000
	MAINTENANCE OF TRAFFIC SUBTOTAL:				\$200,000
	MISCELLANEOUS				
614	MAINTAINING TRAFFIC	1	LUMP	\$100,000	\$100,000
619	FIELD OFFICE	18	MNTH	\$2,000	\$36,000
623	CONSTRUCTION LAYOUT STAKES	1		\$60,000	\$60,000 \$200,000
SPECIAL	PERFORMANCE BOND	1	LUMP	\$60,000	\$60,000
	MISCELLANEOUS SUBTOTAL:				\$456,000
	RIGHT OF WAY				
			FACU	#0.000	\$000 ccc
	TEMPORARY R/W TAKE - RESIDENTIAL	111 د	EACH FACH	\$2,000	\$222,000
	PERMANENT STRIP R/W TAKE - RESIDENTIAL	19	EACH	\$5,000	\$95,000
	PERMANENT STRIP R/W TAKE - COMMERCIAL (MAJOR)	1	EACH	\$20,000	\$20,000
	ACQUISITION SERVICES - PER PARCEL - RESIDENTIAL ACQUISITION SERVICES - PER PARCEL - COMMERCIAL	130	EACH	\$5,000	\$650,000
		4	LAUI	φ10,000	φ 4 0,000
	RIGHT OF WAY SUBTOTAL:				\$1,042,000
-	TOTAL CONST	RUCTION AND	RIGHT	OF WAY COST:	\$9,624,000
	DESIGN ENGINEERING COST:	(12% OF	CONSTR	R. & R/W COST)	\$1,154,880
	ENVIRONMENTAL COST:	(2% OF	CONSTR	R. & R/W COST)	\$192,480
	SUBSURFACE UTILITY ENGINEERING (SUE):	(2% OF	CONSTR	R. & R/W COST)	\$192,480
	DESIGN CONTINGENCY COSTS	(15% OF	CONSTR	R. & R/W COST)	\$1,443,600
			PROJE	CT SUBTOTAL:	\$12,799,920
	3% INFLATION	CONTINGENC	Y OVER 4	¥YEARS (12%):	\$1,535,990
	PROJECT TOTAL W	THOUT CONS	TRUCTIO	N INSPECTION	\$14,335,910
	CONSTRUCTION INSPECTION COST:	(5	% OF PR	OJECT TOTAL)	\$630,180
				TOTAL:	\$14,966,090

5 LANE OPTION

Wallings Road (County Road 57) Preliminary Cost Estimate 5-Lanes Curbed

ITEM	DESCRIPTION	TOTAL QUANTITY	UNIT	ESTIMATED PRICE	TOTAL COST
	ROADWAY				
201	CLEARING AND GRUBBING	1	LUMP	\$50,000	\$50,000
202	CONCRETE WALK REMOVED	51,600	SQ FT	\$5	\$258,000
202		3,050	FT	\$3	\$9,150
202	PAVEMENT REMOVED PIPE REMOVED 24" AND LINDER	6,400	SY FT	\$10 \$4	\$64,000 \$49,000
202	CATCH BASIN OR INLET REMOVED	65	EACH	\$100	\$6,500
202	MANHOLE REMOVED (STORM)	11	EACH	\$500	\$5,500
203	EXCAVATION	2,000	CU YD	\$10 \$10	\$20,000
608	6" CONCRETE WALK	51.600	SQ FT	\$10	\$2,000
608	CURB RAMP, TYPE A1	29	EACH	\$1,000	\$29,000
623	MONUMENT BOX ADJUSTED TO GRADE	5	EACH	\$750	\$3,750
690	MAILBOX SUPPORT SYSTEM, SINGLE	134	EACH	\$100	\$13,400
	ROADWAY SUBTOTAL:				\$872,000
	EROSION CONTROL				
659	SEEDING AND MULCHING	40,000	SQ YD	\$3	\$120,000
832	STORM WATER POLLUTION PREVENTION PLAN	1	EACH	\$10,000	\$10,000
832	ERUSION CONTROL POST CONSTRUCTION BMPS (WATER OUALITY STRUCTURE)	50,000	EACH	\$1 \$15,000	\$50,000
095		2	LACIT	\$13,000	\$30,000
	EROSION CONTROL SUBTOTAL:				\$210,000
	DRAINAGE				
005		00.050	FT	* 0	¢000.050
605	4" BASE PIPE UNDERDRAINS W/ FABRIC WRAP	22,250	FI	\$9 \$50	\$200,250 \$105,000
611	18"-36" CONDUIT, TYPE B (TRUNK SEWER)	10,300	FT	\$100	\$1,030,000
611	CATCH BASIN, NO. 3A	87	EACH	\$1,750	\$152,250
611	MANHOLE, NO. 3	44	EACH	\$4,000	\$176,000
	DRAINAGE SUBTOTAL:				\$1,664,000
					¢1,001,000
	PAVEMENT				
253	PAVEMENT REPAIR	600	SQ YD	\$50	\$30,000
254	PAVEMENT PLANING, ASPHALT CONCRETE	59,200	SQ YD	\$2	\$118,400
441	3" ASPHALI RESURFACING	59,200	SQ YD	\$20	\$1,184,000
441	6" NON-REINFORCED CONCRETE PAVEMENT, CLASS QC MS (INCL_EXCAV.)	40,800	SQ YD		_₹ ,433,600 \$263,500
609	CURB, TYPE 6	22,250	FT	\$12	\$267,000
	DAVENENT AUDITATA				A4 007 000
	PAVEMENT SUBTOTAL:				\$4,297,000
	WATER WORKS				
638	FIRE HYDRANT EXTENDED AND ADJUSTED TO GRADE	22	EACH	\$1,500	\$33,000
638	SERVICE BOX ADJUSTED TO GRADE	134	EACH	\$175	\$23,450
					450.000
	WATER WORKS SUBTOTAL:				\$56,000
	SANITARY SEWER				
611	MANHOLE ADJUSTED TO GRADE	13	FACH	\$400	\$17 200
011		43	LIGHT	φ+00	ψ17,200
	SANITARY SEWER SUBTOTAL:				\$17,000
l I					

Wallings Road (County Road 57) Preliminary Cost Estimate 5-Lanes Curbed

ITEM	DESCRIPTION	TOTAL QUANTITY	UNIT	ESTIMATED PRICE	TOTAL COST
	TRAFFIC CONTROL				
	SIGNING	1	LUMP	\$40,000	\$40,000
	PAVEMENT MARKINGS	1	LUMP	\$55,000	\$55,000
					\$95.000
					433,000
	SIGNALIZATION	-			
632	TRAFFIC SIGNAL REMOVED	1	EACH	\$2,500	\$2,500
632	TRAFFIC SIGNAL	4	EACH	\$150,000	\$600,000
					\$603.000
					4003,000
	STRUCTURES				
	REPLACE STRUCTURE OVER WATERWAY EAST OF CREEKSIDE TRACE	1	EACH	\$250,000	\$250,000
	WALLINGS ROAD BRIDGE EXISTING DECK REMOVAL	10,800	SQ FT	\$20	\$216,000
	WALLINGS ROAD BRIDGE RE-DECKING	8,000	SQ FT	\$80 \$150	\$640,000
	WALLINGS ROAD BRIDGE WIDENING	8,800	5011	\$150	\$1,320,000
	STRUCTURES SUBTOTAL:				\$2,426,000
	MAINTENANCE OF TRAFFIC				
	MAINTENANCE OF TRAFFIC	1	LUMP	\$200,000	\$200,000
	MAINTENANCE OF TRAFFIC SUBTOTAL:				\$200.000
	MISCELLANEOUS				
614	MAINTAINING TRAFFIC	1	LUMP	\$100,000	\$100,000
619	FIELD OFFICE	18	MNTH	\$2,000	\$36,000
624	MOBILIZATION	1	LUMP	\$200.000	\$200.000
SPECIAL	PERFORMANCE BOND	1	LUMP	\$80,000	\$80,000
					£ 400 000
	MISCELLANEOUS SUBTOTAL:				\$496,000
	RIGHT OF WAY				
	TEMPORARY R/W TAKE - RESIDENTIAL	0	EACH	\$2,000	\$0
	TEMPORARY R/W TAKE - COMMERCIAL	0	EACH	\$5,000	\$0
	PERMANENT STRIP R/W TAKE - RESIDENTIAL	130	EACH	\$10,000	\$1,300,000
		130	EACH	\$50,000 \$5,000	\$200,000 \$650,000
	ACQUISITION SERVICES - PER PARCEL - COMMERCIAL	4	EACH	\$10,000	\$40,000
	RIGHT OF WAY SUBTOTAL:				\$2,190,000
	TOTAL CONST	RUCTION AND	RIGHT	OF WAY COST:	\$13,126,000
		(129/ 05	CONCT		¢4 E7E 400
	DESIGN ENGINEERING COST:	(12% OF	CONSTR		\$1,575,120
	ENVIRONMENTAL COST:	(2% OF	CONSTR	R. & R/W COST)	\$262,520
	SUBSURFACE UTILITY ENGINEERING (SUE):	(2% OF	CONSTR	R. & R/W COST)	\$262,520
	DESIGN CONTINGENCY COSTS	(15% OF	CONSTR	R. & R/W COST)	\$1,968,900
			PROJE	CT SUBTOTAL:	\$17,457,580
	3% INFLATION	CONTINGENC	Y OVER 4	4 YEARS (12%):	\$2,094,910
		THOUT CONST	RUCTIO	N INSPECTION	\$19.552.490
					÷:0,002,400
	CONSTRUCTION INSPECTION COST:	(5	% OF PR	OJECT TOTAL)	\$859,490
				TOTAL:	\$20,411,980

APPENDIX H ESTIMATES OF COUNTERMEASURE EFFECTIVENESS REDUCTION FACTORS (CRF)



CMF / CRF Details

CMF ID: 3941

Improve signal visibility

Description: Includes such treatments as larger signal heads and reflective backboards.

Prior Condition: Unknown

Category: Intersection traffic control

Study: <u>A full Bayes multivariate intervention model with random parameters among</u> <u>matched pairs for before-after safety evaluation</u>, El-Basyouny and Sayed, 2011

Star Quality Rating:	**** [View score details]
Cra	sh Modification Factor (CMF)
Cra Value:	o.71

Unadjusted Standard Error:

Crash Reduction Factor (CRF)

Value:	29 (This value indicates a decrease in crashes)
Adjusted Standard Error:	
Unadjusted Standard Error:	

Applicability	
Crash Type:	All
Crash Severity:	Fatal,Serious injury,Minor injury
Roadway Types:	Not Specified
Number of Lanes:	
Road Division Type:	
Speed Limit:	
Area Type:	Urban
Traffic Volume:	
Time of Day:	All

If countermeasure is intersection-based

Intersection Type:	Roadway/roadway (not interchange related)
Intersection Geometry:	Not specified
Traffic Control:	Signalized
Major Road Traffic Volume:	

Development Details		
Date Range of Data Used:	2001 to 2008	
Municipality:		
State:		
Country:	Canada	
Type of Methodology Used:	Before/after using empirical Bayes or full Bayes	
Sample Size Used:	Site-years	
Before Sample Size Used:	37 Site-years	
After Sample Size Used:	26 Site-years	

Other Details	
Included in Highway Safety Manual?	No
Date Added to Clearinghouse:	06-04-2012
Comments:	

This site is funded by the U.S. Department of Transportation Federal Highway Administration and maintained by the University of North Carolina Highway Safety Research Center

The information contained in the Crash Modification Factors (CMF) Clearinghouse is disseminated



CMF / CRF Details

CMF ID: 3943

Improve signal visibility

Description: Includes such treatments as larger signal heads and reflective backboards.

Prior Condition: Unknown

Category: Intersection traffic control

Error:

Study: <u>A full Bayes multivariate intervention model with random parameters among</u> <u>matched pairs for before-after safety evaluation</u>, El-Basyouny and Sayed, 2011

Star Quality Rating:	***	
Crash Modification Factor (CMF)		
Value:	0.79	
Adjusted Standard Error:		
Unadjusted Standard		

Crash Reduction Factor (CRF)

Value:	21 (This value indicates a decrease in crashes)
Adjusted Standard Error:	
Unadjusted Standard Error:	

Applicability	
Crash Type:	All
Crash Severity:	Property damage only (PDO)
Roadway Types:	Not Specified
Number of Lanes:	
Road Division Type:	
Speed Limit:	
Area Type:	Urban
Traffic Volume:	
Time of Day:	All

If countermeasure is intersection-based

Intersection Type:	Roadway/roadway (not interchange related)
Intersection Geometry:	Not specified
Traffic Control:	Signalized
Major Road Traffic Volume:	

Development Details	
Date Range of Data Used:	2001 to 2008
Municipality:	
State:	
Country:	Canada
Type of Methodology Used:	Before/after using empirical Bayes or full Bayes
Sample Size Used:	Site-years
Before Sample Size Used:	37 Site-years
After Sample Size Used:	26 Site-years

Other Details	
Included in Highway Safety Manual?	No
Date Added to Clearinghouse:	06-04-2012
Comments:	

This site is funded by the U.S. Department of Transportation Federal Highway Administration and maintained by the University of North Carolina Highway Safety Research Center

The information contained in the Crash Modification Factors (CMF) Clearinghouse is disseminated


CMF / CRF Details

CMF ID: 2375

Install curb and gutter

Description: Install AASHTO Type B curb along the outside (right) shoulder of four-lane suburban roadways.

Prior Condition: Suburban four-lane facilities without curb on the outside (right) shoulder. All roads have either two-way left-turn lanes or non-traversable medians.

Category: Shoulder treatments

Study: <u>Collision Models for Multilane Highway Segments to Examine the Safety of</u> <u>Curbs, Baek and Hummer, 2008</u>



Crash Reduction Factor (CRF)								
Value:	11 (This value indicates a decrease in crashes)							
Adjusted Standard Error:								
Unadjusted Standard Error:								

Applicability						
Crash Type:	All					
Crash Severity:	All					
Roadway Types:	Not Specified					
Number of Lanes:	4					
Road Division Type:	Divided by Median					
Speed Limit:	45-55mph					
Area Type:	Suburban					
Traffic Volume:	8333 to 57138					
Time of Day:	All					

If countermeasure is intersection-based

Intersection Type:	
Intersection Geometry:	
Traffic Control:	
Major Road Traffic Volume:	

Development Details						
Date Range of Data Used:	2001 to 2003					
Municipality:						
State:	NC					
Country:						
Type of Methodology Used:	Regression cross-section					
Sample Size Used:	2274 Crashes					

Other Details							
Included in Highway Safety Manual?	No						
Date Added to Clearinghouse:	01-07-2010						
Comments:							

This site is funded by the U.S. Department of Transportation Federal Highway Administration and maintained by the University of North Carolina Highway Safety Research Center

The information contained in the Crash Modification Factors (CMF) Clearinghouse is disseminated under the sponsorship of the U.S. Department of Transportation in the interest of information exchange. The U.S. Government assumes no liability for the use of the information contained in the CMF Clearinghouse. The information contained in the CMF Clearinghouse does not constitute a standard, specification, or regulation, nor is it a substitute for sound engineering judgment.

APPENDIX I BENEFIT / COST WORKSHEETS

FULL PROJECT AMOUNT

FEAT		S	afety Benef	it - Cost An	alysis				
Economic Crash Analysis Tool			Genera	I Information					
Project Name	Wallings Road		Contact Email				cdeibel@gpdgroup.com		
Project Description	Safety and Corridor Study				Contact Phone		(330) 572-2495		
Reference Number	2014383	2014383							
Analyst	Curtis J. Deibel, E.I.				Analysis Year		2019		
Agency/Company	GPD Group								
Select Site Types to be	used in Benefit-Cost Analysis:	Comm	ients:						
All Sites									
		Counterm	neasure Service	Lives, Costs, and	l Safety Benefit	5			
	Countermeasures	Service Life (Years)	Initial Cost of Countermeasure	Annual Maintenance & Energy Costs	Salvage Value	Net Present Cost of Countermeasure	Total Cost of Countermeasures	Summary of Annual Crash Modifications	Net Present Value of Safety Benefits
Widen Wallings Road to 3 L	anes	20	\$6,378,813.00			\$6,378,813.00	\$6,378,813.00		
Remove Traffic Signal at Wallings Road / Wright Road Intersection		20	\$3,325.00			\$3,325.00	\$3,325.00	0.224	62.010.891
Addition of 3 Turning Lanes		20	\$598,500.00			\$598,500.00	\$598,500.00	-8.234	<i>42,919,001</i>
Widen Wallings Road Bridge over I-77		20	\$2,894,080.00			\$2,894,080.00	\$2,894,080.00		
CMF 1 - Improve Signal Visi	bility	20	\$798,000.00			\$798,000.00	\$798,000.00	-6.073	\$2,846,342
CMF 2 - Install Curb and Gu	itter	20	\$355,110.00			\$355,110.00	\$355,110.00	-0.687	\$277,332
CMF 3 - Resurface pavement	nt	20	\$1,772,092.00			\$1,772,092.00	\$1,772,092.00	-0.058	\$59,749
			\$0.00			\$0.00	\$0.00	0.000	\$0
			\$0.00			\$0.00	\$0.00	0.000	\$0
			\$0.00			\$0.00	\$0.00	0.000	\$0
			\$0.00			\$0.00	\$0.00	0.000	\$0
			\$0.00			\$0.00	\$0.00	0.000	\$0
			\$0.00			\$0.00	\$0.00	0.000	\$0
			\$0.00			\$0.00	\$0.00	0.000	\$0
	Totals		\$12,799,920.00	\$0.00	\$0.00	\$12,799,920.00	\$12,799,920.00	-15.053	\$6,103,304











SAFETY REQUEST ONLY

ECAT		5	afety Benef	it - Cost <u>An</u>	alysis					
Economic Crash Analysis Tool			Genera	I Information						
Project Name	Wallings Road		Conta				cdeibel@gpdgroup.c	eibel@gpdgroup.com		
Project Description	Safety and Corridor Study	Safety and Corridor Study					(330) 572-2495			
Reference Number	2014383	Date Performed		4/2/2015						
Analyst	Curtis J. Deibel, E.I.				Analysis Year		2019			
Agency/Company	GPD Group									
Select Site Types to be u	used in Benefit-Cost Analysis:	Comm	ients:							
		Counterm	neasure Service	Lives, Costs, and	l Safety Benefits	;				
	Countermeasures	Salvage Value	Net Present Cost of Countermeasure	Total Cost of Countermeasures	Summary of Annual Crash Modifications	Net Present Value of Safety Benefits				
Widen Wallings Road to 3 La	anes	20	\$5,000,000.00			\$5,000,000.00	\$5,000,000.00			
Remove Traffic Signal at Wa	Illings Road / Wright Road Intersection	20	\$0.00			\$0.00	\$0.00	0.004	<u> </u>	
Addition of 3 Turning Lanes		20	\$0.00			\$0.00	\$0.00	-8.234	\$2,515,001	
Widen Wallings Road Bridge over I-77			\$0.00			\$0.00	\$0.00			
CMF 1 - Improve Signal Visit	bility	20	\$0.00			\$0.00	\$0.00	-6.073	\$2,846,342	
CMF 2 - Install Curb and Gut	tter	20	\$0.00			\$0.00	\$0.00	-0.687	\$277,332	
CMF 3 - Resurface pavemen	ıt	20	\$0.00			\$0.00	\$0.00	-0.058	\$59,749	
			\$0.00			\$0.00	\$0.00	0.000	\$0	
			\$0.00			\$0.00	\$0.00	0.000	\$0	
			\$0.00			\$0.00	\$0.00	0.000	\$0	
			\$0.00			\$0.00	\$0.00	0.000	\$0	
			\$0.00			\$0.00	\$0.00	0.000	\$0	
			\$0.00			\$0.00	\$0.00	0.000	\$0	
			\$0.00			\$0.00	\$0.00	0.000	\$0	
		\$5,000,000.00	\$0.00	\$0.00	\$5,000,000.00	\$5,000,000.00	-15.053	\$6,103,304		











APPENDIX J TRAFFIC SIGNAL WARRANT ANALYSIS

EXISTING YEAR 2015 CONDITIONS

520 South Main Street, Suite 2531, Akron, Ohio 44311

(330) 572-2100

(Urban values apply.)

Signal Warrants - Summary

Major Street Approaches

Northbound: Broadview Road Number of Lanes: 2 Approach Speed: 25 Total Approach Volume: 5,801

Southbound: Broadview Road Number of Lanes: 2 Approach Speed: 25 Total Approach Volume: 5,858

Warrant Summary

Minor Street Approaches

Eastbound: Wallings Road Number of Lanes: 1

Total Approach Volume: 4,599

Westbound: Wallings Road Number of Lanes: 1

Total Approach Volume: 5,677

Warrant 1 - Eight Hour Vehicular Volumes	Satisfied
Warrant 1A - Minimum Vehicular VolumeSatisfied Required volumes reached for 13 hours, 8 are needed	
Warrant 1B - Interruption of Continuous Traffic Not Satisfied Required volumes reached for 6 hours, 8 are needed Required volumes reached for 6 hours, 8 are needed	
Warrant 1 A&B - Combination of Warrants	
Warrant 2 - Four Hour Volumes	Satisfied
Warrant 3 - Peak Hour	Satisfied
Warrant 3A - Peak Hour DelayNot Satisfied Total approach volumes and delays on minor street do not exceed minimums for any hour.	
Warrant 3B - Peak Hour VolumesSatisfied Volumes exceed minimums for at least one hour.	
Warrant 4 - Pedestrian Volumes	Not Evaluated
Warrant 5 - School Crossing	Not Evaluated
Warrant 6 - Coordinated Signal System	Not Evaluated
Warrant 7 - Crash Experience	Not Evaluated
Warrant 8 - Roadway Network	Not Evaluated

GPD Group 520 South Main Street, Suite 2531, Akron,¹⁷Ohio 44311 (330) 572-2100



Analysis of 8-Hour Volume Warrants:

Hour	Major	Higher	Minor		War-1A			War-1B			War-1A&B	
Begin	Total	Vol	Dir	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?
00:00	0	0	EB	600-No	150-No		900-No	75-No		720-No	120-No	
01:00	0	0	EB	600-No	150-No		900-No	75-No		720-No	120-No	
02:00	0	0	EB	600-No	150-No		900-No	75-No		720-No	120-No	
03:00	0	0	EB	600-No	150-No		900-No	75-No		720-No	120-No	
04:00	0	0	EB	600-No	150-No		900-No	75-No		720-No	120-No	
05:00	0	0	EB	600-No	150-No		900-No	75-No		720-No	120-No	
06:00	0	0	EB	600-No	150-No		900-No	75-No		720-No	120-No	
07:00	973	692	EB	600-Yes	150-Yes	Both	900-Yes	75-Yes	Both	720-Yes	120-Yes	Both
08:00	793	523	EB	600-Yes	150-Yes	Both	900-No	75-Yes	Minor	720-Yes	120-Yes	Both
09:00	697	355	EB	600-Yes	150-Yes	Both	900-No	75-Yes	Minor	720-No	120-Yes	Minor
10:00	687	275	EB	600-Yes	150-Yes	Both	900-No	75-Yes	Minor	720-No	120-Yes	Minor
11:00	769	303	WB	600-Yes	150-Yes	Both	900-No	75-Yes	Minor	720-Yes	120-Yes	Both
12:00	796	282	EB	600-Yes	150-Yes	Both	900-No	75-Yes	Minor	720-Yes	120-Yes	Both
13:00	794	310	WB	600-Yes	150-Yes	Both	900-No	75-Yes	Minor	720-Yes	120-Yes	Both
14:00	917	462	WB	600-Yes	150-Yes	Both	900-Yes	75-Yes	Both	720-Yes	120-Yes	Both
15:00	1,015	647	WB	600-Yes	150-Yes	Both	900-Yes	75-Yes	Both	720-Yes	120-Yes	Both
16:00	1,189	807	WB	600-Yes	150-Yes	Both	900-Yes	75-Yes	Both	720-Yes	120-Yes	Both
17:00	1,283	838	WB	600-Yes	150-Yes	Both	900-Yes	75-Yes	Both	720-Yes	120-Yes	Both
18:00	1,029	683	WB	600-Yes	150-Yes	Both	900-Yes	75-Yes	Both	720-Yes	120-Yes	Both
19:00	717	404	WB	600-Yes	150-Yes	Both	900-No	75-Yes	Minor	720-No	120-Yes	Minor
20:00	0	0	EB	600-No	150-No		900-No	75-No		720-No	120-No	
21:00	0	0	EB	600-No	150-No		900-No	75-No		720-No	120-No	
22:00	0	0	EB	600-No	150-No		900-No	75-No		720-No	120-No	
23:00	0	0	EB	600-No	150-No		900-No	75-No		720-No	120-No	

520 South Main Street, Suite 2531, Akron, Ohio 44311 (330) 572-2100

Signal Warrants - Summary

Major Street Approaches

Eastbound: Wallings Road Number of Lanes: 1 Approach Speed: 35 Total Approach Volume: 1,984

Westbound: Wallings Road Number of Lanes: 1 Approach Speed: 35 Total Approach Volume: 2,121

Minor Street Approaches

Northbound: Number of Lanes: 1

Total Approach Volume: 0

Southbound: Elmhurst Road Number of Lanes: 1

Total Approach Volume: 45

Warrant Summary (Urban values apply.)

Warrant 1 - Eight Hour Vehicular Volumes	Not Satisfied
Warrant 1A - Minimum Vehicular VolumeNot Satisfied Required volumes reached for 0 hours, 8 are needed	
Warrant 1B - Interruption of Continuous Traffic	
Warrant 1 A&B - Combination of Warrants	
Warrant 2 - Four Hour Volumes Number of hours (0) volumes exceed minimum < minimum required (4).	Not Satisfied
Warrant 3 - Peak Hour	Not Satisfied
Warrant 3A - Peak Hour DelayNot Satisfied Total approach volumes and delays on minor street do not exceed minimums for any hour.	
Warrant 3B - Peak Hour VolumesNot Satisfied Volumes do not exceed minimums for any hour.	
Warrant 4 - Pedestrian Volumes	Not Evaluated
Warrant 5 - School Crossing	Not Evaluated
Warrant 6 - Coordinated Signal System	Not Evaluated
Warrant 7 - Crash Experience	Not Evaluated
Warrant 8 - Roadway Network	Not Evaluated

GPD Group 520 South Main Street, Suite 2531, Akron, Ohio 44311 (330) 572-2100



Analysis of 8-Hour Volume Warrants:

Hour	Major	Higher	Minor		War-1A			War-1B			War-1A&B	
Begin	Total	Vol	Dir	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?
00:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
01:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
02:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
03:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
04:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
05:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
06:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
07:00	904	9	SB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
08:00	794	4	SB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
09:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
10:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
11:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
12:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
13:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
14:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
15:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
16:00	1,150	15	SB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
17:00	1,257	17	SB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
18:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
19:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
20:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
21:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
22:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
23:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	

520 South Main Street, Suite 2531, Akron, Ohio 44311 (330) 572-2100

Signal Warrants - Summary

Major Street Approaches

Eastbound: Wallings Road Number of Lanes: 1 Approach Speed: 35 Total Approach Volume: 1,933

Westbound: Wallings Road Number of Lanes: 1 Approach Speed: 35 Total Approach Volume: 2,132

Minor Street Approaches

Northbound: Number of Lanes: 1

Total Approach Volume: 0

Southbound: Longview Road Number of Lanes: 1

Total Approach Volume: 30

Warrant Summary (Urban values apply.)

Warrant 1 - Eight Hour Vehicular Volumes	Not Satisfied
Warrant 1A - Minimum Vehicular VolumeNot Satisfied Required volumes reached for 0 hours, 8 are needed	
Warrant 1B - Interruption of Continuous Traffic	
Warrant 1 A&B - Combination of Warrants Not Satisfied Required volumes reached for 0 hours, 8 are needed Required volumes reached for 0 hours, 8 are needed	
Warrant 2 - Four Hour Volumes Number of hours (0) volumes exceed minimum < minimum required (4).	Not Satisfied
Warrant 3 - Peak Hour	Not Satisfied
Warrant 3A - Peak Hour DelayNot Satisfied Total approach volumes and delays on minor street do not exceed minimums for any hour.	
Warrant 3B - Peak Hour VolumesNot Satisfied Volumes do not exceed minimums for any hour.	
Warrant 4 - Pedestrian Volumes	Not Evaluated
Warrant 5 - School Crossing	Not Evaluated
Warrant 6 - Coordinated Signal System	Not Evaluated
Warrant 7 - Crash Experience	Not Evaluated
Warrant 8 - Roadway Network	Not Evaluated

GPD Group 520 South Main Street, Suite 2531, Akron, Ohio 44311 (330) 572-2100



Analysis of 8-Hour Volume Warrants:

Hour	Major	Higher	Minor		War-1A			War-1B			War-1A&B	
Begin	Total	Vol	Dir	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?
00:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
01:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
02:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
03:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
04:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
05:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
06:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
07:00	876	8	SB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
08:00	779	3	SB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
09:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
10:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
11:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
12:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
13:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
14:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
15:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
16:00	1,157	9	SB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
17:00	1,253	10	SB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
18:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
19:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
20:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
21:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
22:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
23:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	

520 South Main Street, Suite 2531, Akron, Ohio 44311

(330) 572-2100

(Urban values apply.)

Signal Warrants - Summary

Major Street Approaches

Eastbound: Wallings Road Number of Lanes: 1 Approach Speed: 35 Total Approach Volume: 1,915

Westbound: Wallings Road Number of Lanes: 1 Approach Speed: 35 Total Approach Volume: 2,163

Warrant Summary

Minor Street Approaches

Northbound: Chestnut Boulevard Number of Lanes: 1

Total Approach Volume: 66

Southbound: Number of Lanes: 1

Total Approach Volume: 0

•	
Warrant 1 - Eight Hour Vehicular Volumes	Not Satisfied
Warrant 1A - Minimum Vehicular VolumeNot Satisfied Required volumes reached for 0 hours, 8 are needed	
Warrant 1B - Interruption of Continuous Traffic	
Warrant 1 A&B - Combination of Warrants	
Warrant 2 - Four Hour Volumes	Not Satisfied
Number of hours (0) volumes exceed minimum < minimum required (4).	
Warrant 3 - Peak Hour	Not Satisfied
Warrant 3A - Peak Hour DelayNot Satisfied	
Total approach volumes and delays on minor street do not exceed minimums for any hour.	
Warrant 3B - Peak Hour VolumesNot Satisfied	
Volumes do not exceed minimums for any hour.	
Warrant 4 - Pedestrian Volumes	Not Evaluated
Warrant 5 - School Crossing	Not Evaluated
Warrant 6 - Coordinated Signal System	Not Evaluated
Warrant 7 - Crash Experience	Not Evaluated
Warrant 8 - Roadway Network	Not Evaluated

GPD Group 520 South Main Street, Suite 2531, Akron, Ohio 44311 (330) 572-2100



Analysis of 8-Hour Volume Warrants:

Hour	Major	Higher	Minor		War-1A			War-1B			War-1A&B	
Begin	Total	Vol	Dir	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?
00:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
01:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
02:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
03:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
04:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
05:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
06:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
07:00	862	31	NB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
08:00	773	11	NB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
09:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
10:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
11:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
12:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
13:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
14:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
15:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
16:00	1,168	14	NB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
17:00	1,275	10	NB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
18:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
19:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
20:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
21:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
22:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
23:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	

520 South Main Street, Suite 2531, Akron, Ohio 44311

(330) 572-2100

Signal Warrants - Summary

Major Street Approaches

Eastbound: Wallings Road Number of Lanes: 1 Approach Speed: 35 Total Approach Volume: 1,950

Westbound: Wallings Road Number of Lanes: 1 Approach Speed: 35 Total Approach Volume: 2,207

Minor Street Approaches

Northbound: Overlook Avenue Number of Lanes: 1

Total Approach Volume: 55

Southbound: Number of Lanes: 1

Total Approach Volume: 0

Warrant Summary (Urban values apply.)	
Warrant 1 - Eight Hour Vehicular Volumes	Not Satisfied
Warrant 1A - Minimum Vehicular VolumeNot Satisfied Required volumes reached for 0 hours, 8 are needed	
Warrant 1B - Interruption of Continuous Traffic	
Warrant 1 A&B - Combination of Warrants	
Warrant 2 - Four Hour Volumes Number of hours (0) volumes exceed minimum < minimum required (4).	Not Satisfied
Warrant 3 - Peak Hour	Not Satisfied
Warrant 3A - Peak Hour DelayNot Satisfied Total approach volumes and delays on minor street do not exceed minimums for any hour.	
Warrant 3B - Peak Hour VolumesNot Satisfied Volumes do not exceed minimums for any hour.	
Warrant 4 - Pedestrian Volumes	Not Evaluated
Warrant 5 - School Crossing	Not Evaluated
Warrant 6 - Coordinated Signal System	Not Evaluated
Warrant 7 - Crash Experience	Not Evaluated
Warrant 8 - Roadway Network	Not Evaluated

GPD Group 520 South Main Street, Suite 2531, Akron, Ohio 44311 (330) 572-2100



Analysis of 8-Hour Volume Warrants:

Hour	Major	Higher	Minor		War-1A			War-1B			War-1A&B	
Begin	Total	Vol	Dir	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?
00:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
01:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
02:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
03:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
04:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
05:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
06:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
07:00	894	25	NB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
08:00	792	10	NB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
09:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
10:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
11:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
12:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
13:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
14:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
15:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
16:00	1,192	5	NB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
17:00	1,279	15	NB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
18:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
19:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
20:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
21:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
22:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
23:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	

520 South Main Street, Suite 2531, Akron, Ohio 44311 (330) 572-2100

Signal Warrants - Summary

Major Street Approaches

Eastbound: Wallings Road Number of Lanes: 1 Approach Speed: 35 Total Approach Volume: 4,823

Westbound: Wallings Road Number of Lanes: 1 Approach Speed: 35 Total Approach Volume: 5,957

Minor Street Approaches

Northbound: Number of Lanes: 1

Total Approach Volume: 0

Southbound: McCreary Road Number of Lanes: 1

Total Approach Volume: 391

Warrant Summary (Urban values apply.)

Warrant 1 - Eight Hour Vehicular Volumes	Not Satisfied
Warrant 1A - Minimum Vehicular VolumeNot Satisfied Required volumes reached for 0 hours, 8 are needed	
Warrant 1B - Interruption of Continuous Traffic	
Warrant 1 A&B - Combination of Warrants Not Satisfied Required volumes reached for 0 hours, 8 are needed Required volumes reached for 0 hours, 8 are needed	
Warrant 2 - Four Hour Volumes Number of hours (0) volumes exceed minimum < minimum required (4).	Not Satisfied
Warrant 3 - Peak Hour	Not Satisfied
Warrant 3A - Peak Hour DelayNot Satisfied Total approach volumes and delays on minor street do not exceed minimums for any hour.	
Warrant 3B - Peak Hour VolumesNot Satisfied Volumes do not exceed minimums for any hour.	
Warrant 4 - Pedestrian Volumes	Not Evaluated
Warrant 5 - School Crossing	Not Evaluated
Warrant 6 - Coordinated Signal System	Not Evaluated
Warrant 7 - Crash Experience	Not Evaluated
Warrant 8 - Roadway Network	Not Evaluated

GPD Group 520 South Main Street, Suite 2531, Akron, Ohio 44311 (330) 572-2100



Analysis of 8-Hour Volume Warrants:

Hour	Major	Higher	Minor		War-1A			War-1B			War-1A&B	
Begin	Total	Vol	Dir	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?
00:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
01:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
02:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
03:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
04:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
05:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
06:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
07:00	968	23	SB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
08:00	841	26	SB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
09:00	630	20	SB	500-Yes	150-No	Major	750-No	75-No		600-Yes	120-No	Major
10:00	554	24	SB	500-Yes	150-No	Major	750-No	75-No		600-No	120-No	
11:00	590	19	SB	500-Yes	150-No	Major	750-No	75-No		600-No	120-No	
12:00	527	23	SB	500-Yes	150-No	Major	750-No	75-No		600-No	120-No	
13:00	599	27	SB	500-Yes	150-No	Major	750-No	75-No		600-No	120-No	
14:00	864	28	SB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
15:00	1,043	37	SB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
16:00	1,202	41	SB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
17:00	1,311	44	SB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
18:00	1,008	57	SB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
19:00	643	22	SB	500-Yes	150-No	Major	750-No	75-No		600-Yes	120-No	Major
20:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
21:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
22:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
23:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	

520 South Main Street, Suite 2531, Akron, Ohio 44311 (330) 572-2100

Signal Warrants - Summary

Major Street Approaches	Minor Street Approaches	
Eastbound: Wallings Road Number of Lanes: 1 Approach Speed: 35	Northbound: Wyatt Road Number of Lanes: 1	
i otal Approach Volume: 4,957	Total Approach Volume: 1,042	
Westbound: Wallings Road Number of Lanes: 1 Approach Speed: 35	Southbound: Number of Lanes: 1	
Total Approach Volume: 6,279	Total Approach Volume: 0	
Warrant Summary (Urban values apply.)		
Warrant 1 - Eight Hour Vehicular Volumes		Not Satisfied
Warrant 1A - Minimum Vehicular Volume Required volumes reached for 1 hours, 8 are needed	Not Satisfied	
Warrant 1B - Interruption of Continuous Traffic	Not Satisfied	
Warrant 1 A&B - Combination of Warrants Required volumes reached for 2 hours, 8 are needed	Not Satisfied	
Warrant 2 - Four Hour Volumes Number of hours (3) volumes exceed minimum < minir	num required (4).	Not Satisfied
Warrant 3 - Peak Hour		Not Satisfied
Warrant 3A - Peak Hour Delay Total approach volumes and delays on minor street do not exceed mini	mums for any hour.	
Warrant 3B - Peak Hour Volumes	Not Satisfied	
Volumes do not exceed minimums for any hour.		
Warrant 4 - Pedestrian Volumes		Not Evaluated
Warrant 5 - School Crossing		Not Evaluated
Warrant 6 - Coordinated Signal System		Not Evaluated
Warrant 7 - Crash Experience		Not Evaluated
Warrant 8 - Roadway Network		Not Evaluated

Major Street Approaches

GPD Group 520 South Main Street, Suite 2531, Akron, Ohio 44311 (330) 572-2100



Analysis of 8-Hour Volume Warrants:

Hour	Major	Higher	Minor		War-1A			War-1B			War-1A&B	
Begin	Total	Vol	Dir	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?
00:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
01:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
02:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
03:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
04:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
05:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
06:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
07:00	942	183	NB	500-Yes	150-Yes	Both	750-Yes	75-Yes	Both	600-Yes	120-Yes	Both
08:00	833	133	NB	500-Yes	150-No	Major	750-Yes	75-Yes	Both	600-Yes	120-Yes	Both
09:00	621	86	NB	500-Yes	150-No	Major	750-No	75-Yes	Minor	600-Yes	120-No	Major
10:00	553	56	NB	500-Yes	150-No	Major	750-No	75-No		600-No	120-No	
11:00	606	55	NB	500-Yes	150-No	Major	750-No	75-No		600-Yes	120-No	Major
12:00	539	56	NB	500-Yes	150-No	Major	750-No	75-No		600-No	120-No	
13:00	617	56	NB	500-Yes	150-No	Major	750-No	75-No		600-Yes	120-No	Major
14:00	929	71	NB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
15:00	1,093	62	NB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
16:00	1,291	69	NB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
17:00	1,411	81	NB	500-Yes	150-No	Major	750-Yes	75-Yes	Both	600-Yes	120-No	Major
18:00	1,112	89	NB	500-Yes	150-No	Major	750-Yes	75-Yes	Both	600-Yes	120-No	Major
19:00	689	45	NB	500-Yes	150-No	Major	750-No	75-No		600-Yes	120-No	Major
20:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
21:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
22:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
23:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	

520 South Main Street, Suite 2531, Akron, Ohio 44311 (330) 572-2100

Signal Warrants - Summary

Major Street Approaches

Eastbound: Wallings Road Number of Lanes: 1 Approach Speed: 35 Total Approach Volume: 2,247

Westbound: Wallings Road Number of Lanes: 1 Approach Speed: 35 Total Approach Volume: 2,443

Minor Street Approaches

Northbound: Number of Lanes: 1

Total Approach Volume: 0

Southbound: Majestic Oaks Trail Number of Lanes: 1

Total Approach Volume: 37

Warrant Summary (Urban values apply.)

Warrant 1 - Eight Hour Vehicular Volumes	Not Satisfied
Warrant 1A - Minimum Vehicular VolumeNot Satisfied Required volumes reached for 0 hours, 8 are needed	
Warrant 1B - Interruption of Continuous Traffic	
Warrant 1 A&B - Combination of Warrants Not Satisfied Required volumes reached for 0 hours, 8 are needed Required volumes reached for 0 hours, 8 are needed	
Warrant 2 - Four Hour Volumes Number of hours (0) volumes exceed minimum < minimum required (4).	Not Satisfied
Warrant 3 - Peak Hour	Not Satisfied
Warrant 3A - Peak Hour DelayNot Satisfied Total approach volumes and delays on minor street do not exceed minimums for any hour.	
Warrant 3B - Peak Hour VolumesNot Satisfied Volumes do not exceed minimums for any hour.	
Warrant 4 - Pedestrian Volumes	Not Evaluated
Warrant 5 - School Crossing	Not Evaluated
Warrant 6 - Coordinated Signal System	Not Evaluated
Warrant 7 - Crash Experience	Not Evaluated
Warrant 8 - Roadway Network	Not Evaluated

GPD Group 520 South Main Street, Suite 2531, Akron, Ohio 44311 (330) 572-2100



Analysis of 8-Hour Volume Warrants:

Hour	Major	Higher	Minor		War-1A			War-1B			War-1A&B	
Begin	Total	Vol	Dir	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?
00:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
01:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
02:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
03:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
04:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
05:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
06:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
07:00	1,081	14	SB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
08:00	918	10	SB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
09:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
10:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
11:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
12:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
13:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
14:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
15:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
16:00	1,280	11	SB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
17:00	1,411	2	SB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
18:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
19:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
20:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
21:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
22:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
23:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	

520 South Main Street, Suite 2531, Akron, Ohio 44311 (330) 572-2100

(Urban values apply.)

Signal Warrants - Summary

Major Street Approaches

Eastbound: Wallings Road Number of Lanes: 1 Approach Speed: 35 Total Approach Volume: 2,289

Westbound: Wallings Road Number of Lanes: 1 Approach Speed: 35 Total Approach Volume: 2,466

Warrant Summary

Minor Street Approaches

Northbound: Creekside Trace Number of Lanes: 1

Total Approach Volume: 96

Southbound: Number of Lanes: 1

Total Approach Volume: 0

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Warrant 1 - Eight Hour Vehicular Volumes	Not Satisfied
Warrant 1A - Minimum Vehicular Volume Required volumes reached for 0 hours, 8 are needed	
Warrant 1B - Interruption of Continuous Traffic	
Warrant 1 A&B - Combination of WarrantsNot Satisfied Required volumes reached for 0 hours, 8 are needed	
Warrant 2 - Four Hour Volumes Number of hours (0) volumes exceed minimum < minimum required (4).	Not Satisfied
Warrant 3 - Peak Hour	Not Satisfied
Warrant 3A - Peak Hour DelayNot Satisfied Total approach volumes and delays on minor street do not exceed minimums for any hour.	
Warrant 3B - Peak Hour VolumesNot Satisfied Volumes do not exceed minimums for any hour.	
Warrant 4 - Pedestrian Volumes	Not Evaluated
Warrant 5 - School Crossing	. Not Evaluated
Warrant 6 - Coordinated Signal System	Not Evaluated
Warrant 7 - Crash Experience	Not Evaluated
Warrant 8 - Roadway Network	. Not Evaluated

GPD Group 520 South Main Street, Suite 2531, Akron, Ohio 44311 (330) 572-2100



Analysis of 8-Hour Volume Warrants:

Hour	Major	Higher	Minor		War-1A			War-1B			War-1A&B	
Begin	Total	Vol	Dir	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?
00:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
01:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
02:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
03:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
04:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
05:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
06:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
07:00	1,113	34	NB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
08:00	937	16	NB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
09:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
10:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
11:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
12:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
13:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
14:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
15:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
16:00	1,286	26	NB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
17:00	1,419	20	NB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
18:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
19:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
20:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
21:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
22:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
23:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	

520 South Main Street, Suite 2531, Akron, Ohio 44311 (330) 572-2100

Signal Warrants - Summary

(Urban values apply.)

Major Street Approaches

Eastbound: Wallings Road Number of Lanes: 1 Approach Speed: 35 Total Approach Volume: 2,332

Westbound: Wallings Road Number of Lanes: 1 Approach Speed: 35 Total Approach Volume: 2,459

Warrant Summary

Minor Street Approaches

Northbound: Joyce Road Number of Lanes: 1

Total Approach Volume: 21

Southbound: Firestation Drive Number of Lanes: 1

Total Approach Volume: 10

Warrant 1 - Eight Hour Vehicular Volumes Not Satisfied Warrant 1A - Minimum Vehicular VolumeNot Satisfied Required volumes reached for 0 hours, 8 are needed Warrant 1B - Interruption of Continuous Traffic Not Satisfied Required volumes reached for 0 hours, 8 are needed Warrant 1 A&B - Combination of WarrantsNot Satisfied Required volumes reached for 0 hours, 8 are needed Warrant 2 - Four Hour Volumes Not Satisfied Number of hours (0) volumes exceed minimum < minimum required (4). Warrant 3 - Peak Hour Not Satisfied Warrant 3A - Peak Hour DelayNot Satisfied Total approach volumes and delays on minor street do not exceed minimums for any hour. Warrant 3B - Peak Hour VolumesNot Satisfied Volumes do not exceed minimums for any hour. Warrant 4 - Pedestrian Volumes Not Evaluated Warrant 5 - School Crossing Not Evaluated Warrant 6 - Coordinated Signal System Not Evaluated Warrant 7 - Crash Experience Not Evaluated Warrant 8 - Roadway Network Not Evaluated

GPD Group 520 South Main Street, Suite 2531, Akron, Ohio 44311 (330) 572-2100



Analysis of 8-Hour Volume Warrants:

Hour	Major	Higher	Minor		War-1A			War-1B			War-1A&B	
Begin	Total	Vol	Dir	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?
00:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
01:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
02:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
03:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
04:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
05:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
06:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
07:00	1,147	3	NB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
08:00	932	5	NB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
09:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
10:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
11:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
12:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
13:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
14:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
15:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
16:00	1,292	6	NB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
17:00	1,420	7	NB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
18:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
19:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
20:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
21:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
22:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
23:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	

520 South Main Street, Suite 2531, Akron, Ohio 44311

(330) 572-2100

(Urban values apply.)

Signal Warrants - Summary

Major Street Approaches

Eastbound: Wallings Road Number of Lanes: 1 Approach Speed: 35 Total Approach Volume: 2,313

Westbound: Wallings Road Number of Lanes: 1 Approach Speed: 35 Total Approach Volume: 2,445

Warrant Summary

Minor Street Approaches

Northbound: Marianna Boulevard Number of Lanes: 1

Total Approach Volume: 31

Southbound: Number of Lanes: 1

Total Approach Volume: 0

•	
Warrant 1 - Eight Hour Vehicular Volumes	Not Satisfied
Warrant 1A - Minimum Vehicular VolumeNot Satisfied Required volumes reached for 0 hours, 8 are needed	
Warrant 1B - Interruption of Continuous Traffic	
Warrant 1 A&B - Combination of Warrants	
Warrant 2 - Four Hour Volumes	Not Satisfied
Number of hours (0) volumes exceed minimum < minimum required (4).	
Warrant 3 - Peak Hour	Not Satisfied
Warrant 3A - Peak Hour DelayNot Satisfied Total approach volumes and delays on minor street do not exceed minimums for any hour.	
Warrant 3B - Peak Hour VolumesNot Satisfied Volumes do not exceed minimums for any hour.	
Warrant 4 - Pedestrian Volumes	Not Evaluated
Warrant 5 - School Crossing	Not Evaluated
Warrant 6 - Coordinated Signal System	Not Evaluated
Warrant 7 - Crash Experience	Not Evaluated
Warrant 8 - Roadway Network	Not Evaluated

GPD Group 520 South Main Street, Suite 2531, Akron, Ohio 44311 (330) 572-2100



Analysis of 8-Hour Volume Warrants:

Hour	Major	Higher	Minor		War-1A			War-1B			War-1A&B	
Begin	Total	Vol	Dir	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?
00:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
01:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
02:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
03:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
04:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
05:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
06:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
07:00	1,114	11	NB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
08:00	916	5	NB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
09:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
10:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
11:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
12:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
13:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
14:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
15:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
16:00	1,300	9	NB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
17:00	1,428	6	NB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
18:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
19:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
20:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
21:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
22:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
23:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
520 South Main Street, Suite 2531, Akron, Ohio 44311 (330) 572-2100

Signal Warrants - Summary

Major Street Approaches

Eastbound: Wallings Road Number of Lanes: 1 Approach Speed: 35 Total Approach Volume: 5,282

Westbound: Wallings Road Number of Lanes: 1 Approach Speed: 35 Total Approach Volume: 6,198

Minor Street Approaches

Northbound: Wright Road Number of Lanes: 1

Total Approach Volume: 334

Southbound: Wright Road Number of Lanes: 1

Total Approach Volume: 370

Warrant Summary (Urban values apply.) 14/------4.4 Cimbt Hour Vobioulor Vol

Warrant 1 - Eight Hour Vehicular Volumes	Not Satisfied
Warrant 1A - Minimum Vehicular Volume Required volumes reached for 0 hours, 8 are needed	
Warrant 1B - Interruption of Continuous Traffic	
Warrant 1 A&B - Combination of Warrants Not Satisfied Required volumes reached for 0 hours, 8 are needed Required volumes reached for 0 hours, 8 are needed	
Warrant 2 - Four Hour Volumes Number of hours (0) volumes exceed minimum < minimum required (4).	Not Satisfied
Warrant 3 - Peak Hour	Not Satisfied
Warrant 3A - Peak Hour DelayNot Satisfied Total approach volumes and delays on minor street do not exceed minimums for any hour.	
Warrant 3B - Peak Hour VolumesNot Satisfied Volumes do not exceed minimums for any hour.	
Warrant 4 - Pedestrian Volumes	Not Evaluated
Warrant 5 - School Crossing	Not Evaluated
Warrant 6 - Coordinated Signal System	Not Evaluated
Warrant 7 - Crash Experience	Not Evaluated
Warrant 8 - Roadway Network	Not Evaluated

GPD Group 520 South Main Street, Suite 2531, Akron, Ohio 44311 (330) 572-2100



Analysis of 8-Hour Volume Warrants:

Hour	Major	Higher	Minor		War-1A			War-1B			War-1A&B	
Begin	Total	Vol	Dir	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?
00:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
01:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
02:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
03:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
04:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
05:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
06:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
07:00	1,130	68	SB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
08:00	903	34	SB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
09:00	645	17	SB	500-Yes	150-No	Major	750-No	75-No		600-Yes	120-No	Major
10:00	571	12	NB	500-Yes	150-No	Major	750-No	75-No		600-No	120-No	
11:00	602	18	SB	500-Yes	150-No	Major	750-No	75-No		600-Yes	120-No	Major
12:00	535	17	NB	500-Yes	150-No	Major	750-No	75-No		600-No	120-No	
13:00	607	17	NB	500-Yes	150-No	Major	750-No	75-No		600-Yes	120-No	Major
14:00	901	49	NB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
15:00	1,091	38	NB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
16:00	1,279	56	SB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
17:00	1,450	43	SB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
18:00	1,098	30	SB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
19:00	668	16	SB	500-Yes	150-No	Major	750-No	75-No		600-Yes	120-No	Major
20:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
21:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
22:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
23:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	

520 South Main Street, Suite 2531, Akron, Ohio 44311 (330) 572-2100

Major Street Approaches	Minor Street Approaches	
<i>Eastbound:</i> Wallings Road Number of Lanes: 1 Approach Speed: 35	Northbound: Craig Lane Number of Lanes: 1	
Westbound: Wallings Road Number of Lanes: 1 Approach Speed: 35	Southbound: Number of Lanes: 1	
Total Approach Volume: 2,479	Total Approach Volume: 0	
Warrant Summary (Urban values apply.)		
Warrant 1 - Eight Hour Vehicular Volumes		Not Satisfied
Warrant 1A - Minimum Vehicular Volume	Not Satisfied	
Required volumes reached for 0 hours, 8 are needed		
Warrant 1B - Interruption of Continuous Traffic	Not Satisfied	
Required volumes reached for 0 hours, 8 are needed		
Warrant 1 A&B - Combination of Warrants	Not Satisfied	
Required volumes reached for 0 hours, 8 are needed		
		Net Orthe Cert
Number of hours (0) volumes exceed minimum $<$ minimum	required (4)	Not Satisfied
Warrant 3 - Peak Hour		Not Satisfied
Warrant 3A - Peak Hour Delay	Not Satisfied	
Total approach volumes and delays on minor street do not exceed minimum	s for any hour.	
Warrant 3B - Peak Hour Volumes	Not Satisfied	
Volumes do not exceed minimums for any hour.		
Warrant 4 - Pedestrian Volumes		Not Evaluated
Warrant 5 - School Crossing		Not Evaluated
Warrant 6 - Coordinated Signal System		Not Evaluated
Warrant 7 - Crash Experience		Not Evaluated
Warrant 8 - Roadway Network		Not Evaluated

GPD Group 520 South Main Street, Suite 2531, Akron, Ohio 44311 (330) 572-2100



Analysis of 8-Hour Volume Warrants:

Hour	Major	Higher	Minor		War-1A			War-1B			War-1A&B	
Begin	Total	Vol	Dir	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?
00:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
01:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
02:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
03:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
04:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
05:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
06:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
07:00	1,158	15	NB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
08:00	920	11	NB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
09:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
10:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
11:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
12:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
13:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
14:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
15:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
16:00	1,312	5	NB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
17:00	1,472	2	NB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
18:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
19:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
20:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
21:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
22:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
23:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	

520 South Main Street, Suite 2531, Akron, Ohio 44311

(330) 572-2100

(Urban values apply.)

Signal Warrants - Summary

Major Street Approaches

Eastbound: Wallings Road Number of Lanes: 1 Approach Speed: 35 Total Approach Volume: 2,398

Westbound: Wallings Road Number of Lanes: 1 Approach Speed: 35 Total Approach Volume: 2,474

Warrant Summary

Minor Street Approaches

Northbound: Number of Lanes: 1

Total Approach Volume: 0

Southbound: Skyline Drive Number of Lanes: 1

Total Approach Volume: 35

Warrant 1 - Eight Hour Vehicular Volumes	Not Satisfied
Warrant 1A - Minimum Vehicular VolumeNot Satisfied Required volumes reached for 0 hours, 8 are needed	
Warrant 1B - Interruption of Continuous Traffic Not Satisfied Required volumes reached for 0 hours, 8 are needed Required volumes reached for 0 hours, 8 are needed	
Warrant 1 A&B - Combination of Warrants Not Satisfied Required volumes reached for 0 hours, 8 are needed	
Warrant 2 - Four Hour Volumes Number of hours (0) volumes exceed minimum < minimum required (4).	Not Satisfied
Warrant 3 - Peak Hour	Not Satisfied
Warrant 3A - Peak Hour DelayNot Satisfied Total approach volumes and delays on minor street do not exceed minimums for any hour.	
Warrant 3B - Peak Hour VolumesNot Satisfied Volumes do not exceed minimums for any hour.	
Warrant 4 - Pedestrian Volumes	Not Evaluated
Warrant 5 - School Crossing	Not Evaluated
Warrant 6 - Coordinated Signal System	Not Evaluated
Warrant 7 - Crash Experience	Not Evaluated
Warrant 8 - Roadway Network	Not Evaluated

GPD Group 520 South Main Street, Suite 2531, Akron, Ohio 44311 (330) 572-2100



Analysis of 8-Hour Volume Warrants:

Hour	Major	Higher	Minor		War-1A			War-1B			War-1A&B	
Begin	Total	Vol	Dir	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?
00:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
01:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
02:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
03:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
04:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
05:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
06:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
07:00	1,166	10	SB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
08:00	929	6	SB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
09:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
10:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
11:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
12:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
13:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
14:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
15:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
16:00	1,313	11	SB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
17:00	1,464	8	SB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
18:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
19:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
20:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
21:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
22:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
23:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	

520 South Main Street, Suite 2531, Akron, Ohio 44311 (330) 572-2100

Signal Warrants - Summary

(Urban values apply.)

Major Street Approaches

Eastbound: Wallings Road Number of Lanes: 1 Approach Speed: 35 Total Approach Volume: 2,420

Westbound: Wallings Road Number of Lanes: 1 Approach Speed: 35 Total Approach Volume: 2,515

Minor Street Approaches

Northbound: Mill Road Number of Lanes: 1

Total Approach Volume: 149

Southbound: Number of Lanes: 1

Total Approach Volume: 0

Warrant Summary Warrant 1 - Eight Hour Vehicular Volumes Not Satisfied Warrant 1A - Minimum Vehicular VolumeNot Satisfied Required volumes reached for 0 hours, 8 are needed Warrant 1B - Interruption of Continuous Traffic Not Satisfied Required volumes reached for 0 hours, 8 are needed Warrant 1 A&B - Combination of WarrantsNot Satisfied Required volumes reached for 0 hours, 8 are needed Warrant 2 - Four Hour Volumes Not Satisfied Number of hours (0) volumes exceed minimum < minimum required (4). Warrant 3 - Peak Hour Not Satisfied Warrant 3A - Peak Hour DelayNot Satisfied Total approach volumes and delays on minor street do not exceed minimums for any hour. Warrant 3B - Peak Hour VolumesNot Satisfied Volumes do not exceed minimums for any hour. Warrant 4 - Pedestrian Volumes Not Evaluated Warrant 5 - School Crossing Not Evaluated Warrant 6 - Coordinated Signal System Not Evaluated Warrant 7 - Crash Experience Not Evaluated Warrant 8 - Roadway Network Not Evaluated

GPD Group 520 South Main Street, Suite 2531, Akron, Ohio 44311 (330) 572-2100



Analysis of 8-Hour Volume Warrants:

Hour	Major	Higher	Minor		War-1A			War-1B			War-1A&B	
Begin	Total	Vol	Dir	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?
00:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
01:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
02:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
03:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
04:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
05:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
06:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
07:00	1,174	58	NB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
08:00	979	35	NB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
09:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
10:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
11:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
12:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
13:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
14:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
15:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
16:00	1,317	33	NB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
17:00	1,465	23	NB	500-Yes	150-No	Major	750-Yes	75-No	Major	600-Yes	120-No	Major
18:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
19:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
20:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
21:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
22:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
23:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	

520 South Main Street, Suite 2531, Akron, Ohio 44311 (330) 572-2100

Signal Warrants - Summary

Major Street Approaches

Eastbound: Wallings Road Number of Lanes: 1 Approach Speed: 35 Total Approach Volume: 5,210

Westbound: Wallings Road Number of Lanes: 1 Approach Speed: 35 Total Approach Volume: 2,764

Minor Street Approaches

Northbound: Number of Lanes: 1

Total Approach Volume: 0

Southbound: I-77 SB Exit Ramp Number of Lanes: 1

Total Approach Volume: 6,184

Warrant Summary (Urban values apply.)

Warrant 1 - Eight Hour Vehicular Volumes		Satisfied
Warrant 1A - Minimum Vehicular Volume Required volumes reached for 8 hours, 8 are needed	Satisfied	
Warrant 1B - Interruption of Continuous Traffic Required volumes reached for 2 hours, 8 are needed	Not Satisfied	
Warrant 1 A&B - Combination of Warrants Required volumes reached for 7 hours, 8 are needed	Not Satisfied	
Warrant 2 - Four Hour Volumes Number of hours (9) volumes exceed minimum >= minimum required (4).		Satisfied
Warrant 3 - Peak Hour		Satisfied
Warrant 3A - Peak Hour Delay Total approach volumes and delays on minor street do not exceed minimums for any hour.	Not Satisfied	
Warrant 3B - Peak Hour Volumes Volumes exceed minimums for at least one hour.	Satisfied	
Warrant 4 - Pedestrian Volumes		Not Evaluated
Warrant 5 - School Crossing		Not Evaluated
Warrant 6 - Coordinated Signal System		Not Evaluated
Warrant 7 - Crash Experience		Not Evaluated
Warrant 8 - Roadway Network		Not Evaluated



Analysis of 8-Hour Volume Warrants:

Hour	Major	Higher	Minor		War-1A			War-1B			War-1A&B	
Begin	Total	Vol	Dir	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?
00:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
01:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
02:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
03:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
04:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
05:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
06:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
07:00	1,054	220	SB	500-Yes	150-Yes	Both	750-Yes	75-Yes	Both	600-Yes	120-Yes	Both
08:00	848	219	SB	500-Yes	150-Yes	Both	750-Yes	75-Yes	Both	600-Yes	120-Yes	Both
09:00	582	194	SB	500-Yes	150-Yes	Both	750-No	75-Yes	Minor	600-No	120-Yes	Minor
10:00	486	208	SB	500-No	150-Yes	Minor	750-No	75-Yes	Minor	600-No	120-Yes	Minor
11:00	444	257	SB	500-No	150-Yes	Minor	750-No	75-Yes	Minor	600-No	120-Yes	Minor
12:00	400	254	SB	500-No	150-Yes	Minor	750-No	75-Yes	Minor	600-No	120-Yes	Minor
13:00	437	304	SB	500-No	150-Yes	Minor	750-No	75-Yes	Minor	600-No	120-Yes	Minor
14:00	606	456	SB	500-Yes	150-Yes	Both	750-No	75-Yes	Minor	600-Yes	120-Yes	Both
15:00	658	725	SB	500-Yes	150-Yes	Both	750-No	75-Yes	Minor	600-Yes	120-Yes	Both
16:00	719	986	SB	500-Yes	150-Yes	Both	750-No	75-Yes	Minor	600-Yes	120-Yes	Both
17:00	742	1,057	SB	500-Yes	150-Yes	Both	750-No	75-Yes	Minor	600-Yes	120-Yes	Both
18:00	613	824	SB	500-Yes	150-Yes	Both	750-No	75-Yes	Minor	600-Yes	120-Yes	Both
19:00	385	480	SB	500-No	150-Yes	Minor	750-No	75-Yes	Minor	600-No	120-Yes	Minor
20:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
21:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
22:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
23:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	

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520 South Main Street, Suite 2531, Akron, Ohio 44311

(330) 572-2100

Signal Warrants - Summary

major Street Approaches	Ma	ior	Street	Ap	proac	hes
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Eastbound: Wallings Road Number of Lanes: 1 Approach Speed: 35 Total Approach Volume: 6,100

Westbound: Wallings Road Number of Lanes: 1 Approach Speed: 35 Total Approach Volume: 2,269

Minor Street Approaches

Northbound: I-77 NB Exit Ramp / Mill Road Number of Lanes: 1

Total Approach Volume: 2,988

Southbound: Number of Lanes: 1

Total Approach Volume: 0

Warrant Summary	(Urban values apply.)	
Warrant 1 - Eight Hour V	ehicular Volumes	Satisfied
Warrant 1A - Minimum Vehici	ular Volume	
Required volumes reached for a		
Warrant 1B - Interruption of C Required volumes reached for 3	Continuous Traffic	
Warrant 1 A&B - Combinatior	n of WarrantsSatisfied	
Required volumes reached for 8	3 hours, 8 are needed	
Warrant 2 - Four Hour Vo Number of hours (7) volu	umes exceed minimum >= minimum required (4).	Satisfied
Warrant 3 - Peak Hour		Satisfied
Warrant 3A - Peak Hour Delay Total approach volumes and de	yNot Satisfied lays on minor street do not exceed minimums for any hour.	
Warrant 3B - Peak Hour Volumes exceed minimums for a	mesSatisfied at least one hour.	
Warrant 4 - Pedestrian V	olumes	Not Evaluated
Warrant 5 - School Cross	sing	Not Evaluated
Warrant 6 - Coordinated	Signal System	Not Evaluated
Warrant 7 - Crash Experi	ience	Not Evaluated
Warrant 8 - Roadway Ne	twork	Not Evaluated

GPD Group 520 South Main Street, Suite 2531, Akron, Ohio 44311 (330) 572-2100



Analysis of 8-Hour Volume Warrants:

Hour	Major	Higher	Minor		War-1A			War-1B			War-1A&B	
Begin	Total	Vol	Dir	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?
00:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
01:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
02:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
03:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
04:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
05:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
06:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
07:00	1,086	330	NB	500-Yes	150-Yes	Both	750-Yes	75-Yes	Both	600-Yes	120-Yes	Both
08:00	863	190	NB	500-Yes	150-Yes	Both	750-Yes	75-Yes	Both	600-Yes	120-Yes	Both
09:00	627	164	NB	500-Yes	150-Yes	Both	750-No	75-Yes	Minor	600-Yes	120-Yes	Both
10:00	505	144	NB	500-Yes	150-No	Major	750-No	75-Yes	Minor	600-No	120-Yes	Minor
11:00	472	157	NB	500-No	150-Yes	Minor	750-No	75-Yes	Minor	600-No	120-Yes	Minor
12:00	449	140	NB	500-No	150-No		750-No	75-Yes	Minor	600-No	120-Yes	Minor
13:00	481	154	NB	500-No	150-Yes	Minor	750-No	75-Yes	Minor	600-No	120-Yes	Minor
14:00	620	300	NB	500-Yes	150-Yes	Both	750-No	75-Yes	Minor	600-Yes	120-Yes	Both
15:00	617	335	NB	500-Yes	150-Yes	Both	750-No	75-Yes	Minor	600-Yes	120-Yes	Both
16:00	707	318	NB	500-Yes	150-Yes	Both	750-No	75-Yes	Minor	600-Yes	120-Yes	Both
17:00	768	354	NB	500-Yes	150-Yes	Both	750-Yes	75-Yes	Both	600-Yes	120-Yes	Both
18:00	721	238	NB	500-Yes	150-Yes	Both	750-No	75-Yes	Minor	600-Yes	120-Yes	Both
19:00	453	164	NB	500-No	150-Yes	Minor	750-No	75-Yes	Minor	600-No	120-Yes	Minor
20:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
21:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
22:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	
23:00	0	0	NB	500-No	150-No		750-No	75-No		600-No	120-No	

OPENING YEAR 2020 'BUILD' CONDITIONS



































APPENDIX K AUXILIARY TURN LANE WARRANT ANALYSIS DESIGN YEAR 2040 'BUILD' CONDITIONS

Wallings Road / Elmhurst Drive Intersection

Eastbound Left Turn



Wallings Road / Longview Road Intersection

Eastbound Left Turn



Wallings Road / Chestnut Boulevard Intersection

Westbound Left Turn



Wallings Road / Overlook Avenue Intersection

Westbound Left Turn


Wallings Road / McCreary Road Intersection

Eastbound Left Turn



Wallings Road / Majestic Oaks Trail Intersection

Eastbound Left Turn



Wallings Road / Creekside Terrace Intersection

Westbound Left Turn



Wallings Road / Joyce Road / Fire Station Drive Intersection

Eastbound Left Turn



Wallings Road / Joyce Road / Fire Station Drive Intersection

Westbound Left Turn



Wallings Road / Marianna Boulevard Intersection

Westbound Left Turn



Wallings Road / Wright Road Intersection

Eastbound Left Turn



Wallings Road / Wright Road Intersection

Westbound Left Turn



Wallings Road / Craig Lane Intersection

Westbound Left Turn



Wallings Road / Skyline Drive Intersection

Eastbound Left Turn



Wallings Road / West Mill Road Intersection

Westbound Left Turn



Wallings Road / Elmhurst Drive Intersection

Westbound Right Turn



Wallings Road / Longview Road Intersection

Westbound Right Turn



Wallings Road / Chestnut Boulevard Intersection



Wallings Road / Overlook Avenue Intersection



Wallings Road / McCreary Road Intersection

Westbound Right Turn



Wallings Road / Majestic Oaks Trail Intersection

Westbound Right Turn



Wallings Road / Creekside Terrace Intersection



Wallings Road / Joyce Road / Fire Station Drive Intersection



Wallings Road / Joyce Road / Fire Station Drive Intersection

Westbound Right Turn



Wallings Road / Marianna Boulevard Intersection



Wallings Road / Wright Road Intersection



Wallings Road / Wright Road Intersection

Westbound Right Turn



Wallings Road / Craig Lane Intersection



Wallings Road / Skyline Drive Intersection

Westbound Right Turn



Wallings Road / West Mill Road Intersection



APPENDIX L HCS INTERSECTION CAPACITY ANALYSIS

OPENING YEAR 2020 'NO-BUILD' CONDITIONS

												,						
General Inform	nation									Int	tersect	tion Infe	ormatio	on	4	4241		
Agency		GPD Group								Du	uration,	h	0.25		1	417		
Analyst		BMF		Analys	is Da	ate	Mar 2,	2015		Are	ea Typ	е	Other				4	
Jurisdiction		City of Broadview H	leights	Time F	Perio	d	AM Pe	ak Hou	ır	PH	-IF		0.92			W + E		
Intersection		Wallings Road/Broa	dview F	Analys	is Ye	ear	2020			An	nalysis	Period	1> 7:0	00				
File Name		1. Wallings Rd_Broa	adview	Rd_Ope	ening	y Yea	ar 2020) 'No-Bi	uild' A	M.x	kus					<u>ካተ</u> ⊭	×	
Project Descrip	tion	Opening Year 2020	'No-Bui	ild' AM F	Peak	Ηοι	Jr									↓ ★ ↑ ↓ ♥ ↑		
				-											<u>,</u>			
Demand Inform	nation				E	B			N	WB			NB			SB		
Approach Move	ement			L	Т		R	L		Т	R	L	Т	R	L	Т	R	
Demand (v), ve	h/h			320	56	60	70	80	2	00	80	50	560	380	70 190 80			
0:					1 1				_									
Signal Informa	tion		•	-	1	2	245			÷	1 .2 }	<u>-</u>	R			7	\rightarrow	
Cycle, s	154.4	Reference Phase	2		7	ì	i sn			E	B.	ć			2	3	4	
Offset, s	0	Reference Point	End	Green	22.	0	35.0	22.0	12	2.4	35.0	0.0		-				
Uncoordinated	Incoordinated Yes Simult Gap E/W On			Yellow	3.6		3.6	3.6	3.	6	3.6	0.0	_ `		$\mathbf{\Psi}$	<u> </u>	-A	
Force Mode Fixed Simult. Gap N/S On			Red	2.0		2.0	2.0	2.	0	2.0	0.0		5	6	7	Y 8		
Timer Desults							DT			14		ND		NDT			ODT	
Accidented Deco	-			EBL	-		:ВТ о	WBL 7		4 VVB1			L NBT		SBL		0	
Assigned Phase	8			3			0	/	_	0	4			0	5		2	
Case Number				1.1		4	+.U	1.1		5	0.0 0.6	1.1	<u>.</u>	4.0	27.6		4.0	
Change Duration	nase Duration, s			27.0	27.6 40		0.0	45.6		58.6		27.6		40.0 5.6	27.0		40.0 5.6	
	$(T + \square c)$, 5		3.0 3.		0.0	2.0 4.1		<u> </u>		4.3		0.0 4.2	5.6		1.0		
	oo Timo	(α) , s		4.1		4 2	+. I 7 0	6.0		15.5		5.1		4.3	4.3	-	4.0	
Groop Extensio	n Timo	$(g_s), s$		24.0	-	3	7.0) 0	0.0		1	1.0	0.1		0.0	0.4		6.0	
Phase Call Pro	hability	(<i>ge</i>), s		1.00		1	00	1 00		1.00		1.00		1.00	1.00	0.0		
Max Out Proba	bility			1.00		1	.00	0.00	,	0	.00	0.00	,	1.00	0.00		0.12	
Wax Out Floba	onity			1.00		1.	.00	0.00	,	0.	.05	0.00)	1.00			0.12	
Movement Gro	oup Res	ults			EE	3			W	В			NB			SB		
Approach Move	ement			L	Т	Т	R	L	Т		R	L	Т	R	L	Т	R	
Assigned Move	ment			3	8		18	7	4		14	1	6	16	5	2	12	
Adjusted Flow I	Rate (v)	, veh/h		348	68	5		87	21	7	87	54	548	474	76	151	143	
Adjusted Satura	ation Flo	w Rate (s), veh/h/ln		1792	184	4		1757	184	5	1563	1774	1863	1610	1774	1900	1712	
Queue Service	Time (g	/s), S		22.0	35.	0		4.0	13.	5	6.0	3.1	35.0	35.0	4.4	10.3	10.9	
Cycle Queue C	learance	e Time (<i>gc</i>), s		22.0	35.	0		4.0	13.	5	6.0	3.1	35.0	35.0	4.4	10.3	10.9	
Green Ratio (g/	(C)			0.37	0.2	3		0.50	0.3	4	0.34	0.37	0.23	0.23	0.37	0.23	0.23	
Capacity (c), ve	eh/h			567	418	8		502	633	3	537	454	422	365	299	431	388	
Volume-to-Cap	acity Ra	tio (<i>X</i>)		0.613	1.63	38		0.173	0.34	13 (0.162	0.120	1.298	1.298	0.254	0.350	0.368	
Available Capa	city (<i>c</i> a),	, veh/h		567	418	8		502	633	3	537	454	422	365	299	431	388	
Back of Queue	(<i>Q</i>), veł	n/In (50th percentile)		10.6	50.	8		1.7	6.2	2	2.3	1.4	34.3	29.9	2.0	5.0	4.8	
Queue Storage	Ratio (Ratio (RQ) (50th percentile)		2.68	0.0	0		0.35	0.0	0	0.18	0.12	0.00	0.00	0.17	0.00	0.00	
Uniform Delay (elay (<i>d</i> 1), s/veh		38.1	59.	7		24.8	37.	7	35.3	32.3	59.7	59.7	36.1	50.1	50.4		
Incremental De	remental Delay (<i>d</i> 2), s/veh		2.0	297	.7		0.2	0.3	3	0.1	0.1	150.5	153.0	0.4	0.5	0.6		
Initial Queue De	nitial Queue Delay (<i>d</i> ₃), s/veh			0.0	0.0)		0.0	0.0)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Control Delay (<i>d</i>), s/veh		40.1	357	.4		25.0	38.	1	35.4	32.4	210.2	212.7	36.5	50.6	50.9			
Level of Service (LOS)		D	F			С	D		D	С	F	F	D	D	D			
Approach Delay	, s/veh	/ LOS		250.	5		F	34.6	6		С	202.	3	F	47.8		D	
Intersection De	lay, s/ve	h / LOS					176	6.9							F			
Multimodal Re	sults				EE	3			W	В			NB			SB		
Pedestrian LOS	Pedestrian LOS Score / LOS																	
Bicycle LOS Sc	ore / LC	DS																

			9							y					
General Inform	nation								Intersec	tion Inf	ormati	วท	J.	╡╎╋┼	þa ly
Agency	ation	GPD Group							Duration	h	0.25	511			
Analyst		BMF		Analys	is Dat	e Mar 2	2015		Area Tvr)e	Othe		- <u>-</u> -		۲. 4
Jurisdiction		City of Broadview H	leiahts	Time F	Period		eak Hou	ır	PHF		0.92		→ 	w↓e	↓ ↓
Intersection		Wallings Boad/Wya	tt Road	Analys	is Yea	r 2020			Analysis	Period	1>7:	00			+ *
File Name		7. Wallings Bd. Wya	att Rd (Doenina	Year	2020 'No	-Build' A	M.xu	5					.	
Project Descrip	tion	Opening Year 2020	'No-Bu	ild' AM F	Peak ⊢	lour	20.007						-	Ϋ́ * † * Ϋ́	<u> 1</u>
Demand Inform	nation				EB			W	В		NB			SB	
Approach Move	ment			L	Т	R	L	Т	R	L	Т	R	L	Т	R
Demand (v), ve	h/h				970	10	50	33	0	40	0	240			
Signal Informa	tion	1		e			-								-+-
Cycle, s	121.8	Reference Phase	2		L L	'R ″		2					₹ 2	3	\mathbf{Y}_{4}
Offset, s	0	Reference Point	End	Green	15.0	60.0	30.0	0.0	0.0	0.0				-	
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	3.6	3.6	3.6	0.0	0.0	0.0					
Force Mode Fixed Simult. Gap N/S On			Red	2.0	2.0	2.0	0.0	0.0	0.0		5	6	7	8	
							1					_			
Timer Results				EBL	-	EBT	WB		WBT	NB		NBT	SBL	·	SBT
Assigned Phase	Э					2	1		6			4			
Case Number						8.3	1.0		4.0	<u> </u>		12.0			
Phase Duration	, S					65.6	20.6	3	86.2	6.2		35.6			
Change Period,	(Y+Rc)	, S					5.6		5.6			5.6			
Max Allow Head	dway (<i>N</i>	<i>1AH</i>), s					1.1		1.0	<u> </u>		1.5			
Queue Clearan	ce Time	e (<i>gs</i>), s				62.0	3.5		12.2			23.5			
Green Extensio	n Time	(<i>g</i> _e), s				0.0	0.0		0.0			0.0			
Phase Call Prob	oability					1.00	1.00)	1.00			1.00			
Max Out Proba	oility					1.00	0.00		0.00			0.00			
Movement Gro	un Res	aulte	_		FB			WB			NB	_		SB	
Approach Move	ment				Т	B	1	Т	B		Т	B		т	B
Assigned Move	ment				2	12	1	6	+	7	4	14	_	<u> </u>	
Adjusted Flow F	Rate (v)	veh/h			1065		54	359	-	<u> </u>	304				
Adjusted Satura	ation Flo	w Rate (s), veh/h/ln			1859		1723	1810)		1604				
Queue Service	Time (a	(s). S	_		60.0		1.5	10.2			21.5				
Cycle Queue C	learance	e Time (<i>a</i> c), s			60.0		1.5	10.2			21.5				
Green Ratio (<i>q</i> /	(C)	(30), 0			0.49		0.63	0.66	;		0.25				
Capacity (c), ve	h/h				916		271	1197	7		395				
Volume-to-Capa	acity Ra	tio (<i>X</i>)			1.163	3	0.200	0.30	2		0.770				
Available Capa	city (<i>Ca</i>),	veh/h			916		271	1197	7		395				
Back of Queue	(<i>Q</i>), veł	n/In (50th percentile)			47.1	1	0.8	3.8	1		9.5				
Queue Storage	Ratio (RQ) (50th percentile))		0.00		0.20	0.00			0.00				
Uniform Delay (form Delay (d_1) , s/veh			30.9		24.3	8.7	1		42.7					
Incremental De	ncremental Delay (<i>d</i> ₂), s/veh			85.4		0.1	0.1			8.2					
Initial Queue Delay (d3), s/veh				0.0		0.0	0.0	1		0.0					
Control Delay (<i>d</i>), s/veh			116.3	;	24.4	8.7			50.9						
Level of Service (LOS)			F		С	Α			D						
Approach Delay	, s/veh	/ LOS		116.3	3	F	10.8	3	В	50.9		D	0.0		
Intersection Del	ay, s/ve	h / LOS				80).7						F		
Multimodal Results			EB			WB			NB			SB			
Pedestrian LOS	Pedestrian LOS Score / LOS														
Bicycle LOS Score / LOS															

			Ū									,					
General Inform	nation									Int	tersect	ion Inf	ormati	on		424	bi lu
Agency		GPD Group								Dı	uration,	h	0.25			*	
Analyst		BMF		Analys	is Da	te N	/lar 2,	2015		Ar	ea Type	Э	Othe	r	4		۲. ۲.
Jurisdiction		City of Broadview H	leights	Time F	eriod	I A	M Pe	ak Hou	r	PH	HF		0.92			w∔e s	,×_⊬ ∕_
Intersection		Wallings Road/Wrig	ht Road	Analys	is Ye	ar 2	020			Ar	nalysis I	Period	1>7:	00			4 1
File Name		12. Wallings Rd_Wr	right Rd	_Openir	ng Ye	ar 20)20 'N	lo-Build	' AM.	.xus	5					*	
Project Descrip	tion	Opening Year 2020	'No-Bu	Id' AM F	Peak	Hour										14144	r (*
				1				1				1					
Demand Inform	nation				EE	3			N	/B			NB			SB	1 _
Approach Move	ement			L	Т		R	L		Т	R	L	Т	R	L	Т	R
Demand (<i>v</i>), ve	h/h			20	119	90	10	10	3	50	10	20	20	10	50	10	10
Signal Informa	tion			1	1		5										
	09.4	Poforonco Phaso	0			<u>_</u>	2 €	- 24S	в						X		<u>ሉ</u>
Offect s	90.4	Reference Point	End			Ē	3		7					1	Y 2	3	4
Uncoordinated	Voc	Simult Gap E/W	On	Green	15.0) 4	47.0	20.0	0.	0	0.0	0.0	_	_	A		
Force Mode Fixed Simult Gap N/S On			Red	3.6		3.6	3.2	0.	0	0.0	0.0		5	¥ 6	7	Y	
Force Mode Fixed Simult. Gap N/S On			Tieu	2.0	14	0	2.0	0.	0	0.0	0.0						
Timer Results				FBI		FB	BT	WBI		v	VBT	NBI		NBT	SBI		SBT
Assigned Phase	,			5		2		1		6				8	0.0.		4
Case Number				1.1		4.(0	1.1		4	4.0			8.0			8.0
Phase Duration	. S			20.6	;	52.	.6	20.6		52.6				25.2			25.2
Change Period,	, (Y+Rc)	, S		5.6 5.		5.6	6	5.6		5.6			5.2			5.2	
Max Allow Head	dway (<i>I</i> /	<i>IAH</i>), s		3.1		6.0	0	3.1		6	6.0			4.3			4.3
Queue Clearan	ce Time	(<i>gs</i>), s		2.5		49.	.0	2.2		1	6.1			4.4			6.2
Green Extensio	n Time	(<i>g</i> _e), s		0.0		0.0	0	0.0		24.1				0.3			0.3
Phase Call Prol	oability			1.00		1.0	0	1.00)	1	.00			1.00			1.00
Max Out Proba	bility			0.00		1.0	00 0.00		0.73).73			0.00			0.00
Movement Gro	un Res	ulte			EB	2			\٨/١	R			NB			SB	
Approach Move	ment				Т	,	R	1	Т		R	1	Т	B	1	Т	R
Assigned Move	ment			5	2		12	1	6	+	16	3	8	18	7	4	14
Adjusted Flow F	Rate (v)	veh/h		22	1304	4		. 11	39	1		0	54			. 76	
Adjusted Satura	ation Flo	w Rate (s) veh/h/ln		1774	186	0		1740	181	8			1621			1442	
Queue Service	Time (a	s). S	_	0.5	47.0)		0.2	14.	1			0.0			1.7	
Cvcle Queue C	learance	e Time (<i>a</i> c), s		0.5	47.0)		0.2	14.	1			2.4			4.2	
Green Ratio (a/	(C)	(9-), -		0.63	0.48	3		0.63	0.4	8	_		0.20			0.20	
Capacity (c), ve	e/ h/h			654	888	3		338	868	B			381			356	
Volume-to-Cap	acity Ra	tio (<i>X</i>)		0.033	1.46	8		0.032	0.45	51			0.143	1		0.214	
Available Capa	city (<i>Ca</i>),	veh/h		654	888	;		338	868	в			381			356	
Back of Queue	(<i>Q</i>), veł	eh/In (50th percentile)		0.2	72.5	5		0.1	5.8	3			1.1			1.6	
Queue Storage	e Ratio (<i>RQ</i>) (50th percentile))	0.04	0.00)		0.04	0.0	0			0.00			0.00	
Uniform Delay (niform Delay (<i>d</i> 1), s/veh		8.2	25.7	7		18.0	17.	1			32.2			32.8		
Incremental De	ncremental Delay (<i>d</i> ₂), s/veh			0.0	216.	9		0.0	0.8	3			0.2			0.3	
Initial Queue Delay (<i>d</i> 3), s/veh			0.0	0.0			0.0	0.0)			0.0			0.0		
Control Delay (<i>d</i>), s/veh			8.2	242.	6		18.0	17.	9			32.4			33.1		
Level of Service (LOS)		A	F			В	В				С			С			
Approach Delay	/, s/veh	/ LOS		238.	7	F		17.9)		В	32.4		С	33.1	1	С
Intersection De	lay, s/ve	h / LOS					176	6.5							F		
																•==	
Multimodal Re	Multimodal Results				EB				W	В			NB			SB	
Pedestrian LOS	Score	/ LUS															
BICYCIE LOS SC	ore / LC	5															

		1105 20	010 3	ignan	200	inter 30		inc	Jui	113 01		41 y					
General Inform	nation								Inte	ersecti	ion Info	ormatio	on		424.	bi L	
Agency		GPD Group							Du	ration.	h	0.25			4 L		
Analyst		BMF		Analys	is Dat	e Mar 2	. 2015		Are	ea Type))	Other				~_ &	
Jurisdiction		Citv of Broadview H	leiahts	Time F	Period	AM P	ak Hou	ır	PH	IF		0.92		⇒ 	W + E	• ⊊ ∲	
Intersection		Wallings Road / I-77	7 SB	Analys	is Yea	ur 2020			Ana	alvsis F	Period	1> 7:	00			 72	
File Name		16. Wallings Rd I-7	7 SB C		Year 2	2020 'No	-Build' A	M.xu	s								
Project Descrip	tion	Opening Year 2020	'No-Bu	ild' AM F	Peak H	lour									4147	7	
Demand Inform	nation				EB			N	/B			NB			SB		
Approach Move	ement			L	Т	R	L		Г	R	L	Т	R	L	Т	R	
Demand (v), ve	h/h				950	220	60	22	20					140	10	150	
0:					1			_									
Signal Informa	tion		-	-		_245.											
Cycle, s	90.0	Reference Phase	2		₿'	c.								1 2		4	
Offset, s	0	Reference Point	End	Green	54.5	24.5	0.0	0.0 0.0		0.0 0.0							
Uncoordinated	Yes	Fixed Simult Gap N/S On		Yellow	3.6	3.0	0.0 0.0		0	0.0 0.0		-	_		_ 1	ф 1	
Force Mode	Fixed	Tixed Sindit. Gap N/S On		Red 1.9		2.5			0.0		0.0		5	6	7	8	
Timor Poculto			_	EDI		ERT	W/P	WRI			NDI		NRT	SBI		CPT	
Accigned Phase	0			EDL	-	2	VVD	WBL		ю і 6	INDL	· · ·	INDI	301	-	0	
Caso Number	5					2	<u> </u>							<u> </u>		10.0	
Phase Duration						60.0				n.0 n.0					_	30.0	
Change Period	$(V_{\perp}B_{c})$	c				5.5			5	60.0 E.E.					_	5.5	
Max Allow Hear	, (<i>1 + 1 ic)</i> dway (<i>N</i>	, 3 14H) s	_						2.3					<u> </u>		4.2	
Queue Clearan	ce Time	$(a_{\rm s})$ s				56.5			56.5							10.2	
Green Extensio	n Time	(q_{e}) s				0.0			0.0					<u> </u>		1.0	
Phase Call Pro	bability	(90), 0				1.00		-	1.	.00						1.00	
Max Out Proba	bility		_			1.00		-	1.	.00						0.01	
																0.01	
Movement Gro	oup Res	sults			EB			WE	3			NB			SB		
Approach Move	ement			L	Т	R	L	Т		R	L	Т	R	L	Т	R	
Assigned Move	ment				2	12	1	6						3	8	18	
Adjusted Flow I	Rate (v)	, veh/h			1272	2		304	4					152	174		
Adjusted Satura	ation Flo	ow Rate (s), veh/h/ln			1820			241	1					1740	1563		
Queue Service	Time (g	rs), S			54.5			0.0)					6.3	8.2		
Cycle Queue C	learanc	e Time (<i>g</i> c), s			54.5			54.	5					6.3	8.2		
Green Ratio (g/	(C)				0.61			0.6	1					0.27	0.27		
Capacity (c), ve	eh/h				1102			194	4					474	426		
Volume-to-Cap	acity Ra	tio (X)			1.154	1		1.56	65					0.321	0.409		
Available Capa	city (<i>C</i> a),	, veh/h			1102			194	4					474	426		
Back of Queue	(<i>Q</i>), veł	n/In (50th percentile)			43.3			18.	0					2.6	3.0		
Queue Storage	Ratio (RQ) (50th percentile)		0.00			0.0	0				<u> </u>	0.00	0.00		
Uniform Delay	(d1), S/V	eh			17.8	_		31.0	6				<u> </u>	26.1	26.8		
Incremental De	lay (<i>d</i> ₂),	s/veh			80.0			277.	.9					0.4	0.6		
Initial Queue De	elay (d3)	/ (<i>d</i> 3), s/veh			0.0			0.0)				<u> </u>	0.0	0.0		
Control Delay (ontrol Delay (d), s/veh			97.7			309.	.5					26.5	27.4			
Level of Service	l of Service (LOS)		077	F		000			_				U of a				
Approach Delay	y, s/ven	105		97.7		F	309.	5			0.0			27.0		0	
intersection De	iay, s/ve	en / LUS 				11	9.5							F			
Multimodal Re	sulte				FR			\٨/٢	3			NR			SB		
Pedestrian I OS	S Score	/105															
Bicycle LOS So	ore / I C)S															
-,									_								

		100 20		gnan	200			ne	ounto o	amm	ur y				
General Inform	nation							Ĩ	Intersec	tion Inf	ormatio	on	4	4 J 40 1	la la
Agency		GPD Group							Duration	h	0.25				
Analyst		BMF		Analys	sis Dat	e Mar 2	2015		Area Tvn	, Ie	Other		- 1 - 4		۲. 4
Jurisdiction		City of Broadview H	eiahts	Time F	Period		ak Hou	r	PHF		0.92		 	w∔e	+≯- ∲-
Intersection		Wallings Boad/I-77	NB/Mill	Analys	sis Yea	r 2020			Analysis	Period	1>7:	00			+ *
File Name		17. Wallings Rd I-7	7 NB N	fill Rd (Dpenir	a Year 2	020 'No	-Build	' AM.xus					.	<u>_</u>
Project Descrip	tion	Opening Year 2020	'No-Bui	Id' AM F	Peak H	lour	0_0.10							\ \1 ↑ ↑ ↑ ↑	1 d
· · • • • • • • • • • • •													I		
Demand Inform	nation				EB			W	В		NB			SB	
Approach Move	ement			L	Т	R	L	Т	R	L	Т	R	L	Т	R
Demand (v), ve	h/h			840	170	80	20	11	0 260	170	230	70			
				1	1		-		1	_					
Signal Informa	tion	r1			12	₹							_		-+-
Cycle, s	90.0	Reference Phase	2		R	Ř	517	7				1		3	
Offset, s	0	Reference Point	End	Green	0.0	59.7	19.7	0.0	0.0	0.0			- K		•
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	4.0	3.6	3.0	0.0	0.0	0.0		~			
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.9	1.7	2.3	0.0	0.0	0.0	_	5	6	7	8
					1										
Timer Results				EBL	-	EBT	WBI	- -	WBT	NBI	-	NBT	SBL	-	SBT
Assigned Phase	e			5		2		_	6			4			
Case Number				0.0		14.0			8.3			12.0			
Phase Duration	, S			0.0		65.0			65.0			25.0			
Change Period,	(Y+Rc)	, S		6.9 5		5.3			5.3			5.3			
Max Allow Head	dway (<i>N</i>	1AH), s		0.0	0.0 2				2.8		5.2 21.7				
Queue Clearan	ce lime	(<i>gs</i>), s				61.7			12.2			21.7			
Green Extensio	n lime	(<i>g</i> e), s		0.0		0.0			2.5	<u> </u>		0.0	<u> </u>		
Phase Call Prol	Dability					1.00			1.00	<u> </u>		1.00			
Max Out Proba	bility					1.00			0.38			1.00			
Movement Gro	up Res	ults			FB			WB			NB			SB	
Approach Move	ement		_		T	B		Т	B	1	Т	B		T	B
Assigned Move	ment			5	2	12	1	6	16	7	4	14			
Adjusted Flow F	Rate (v)	. veh/h			1185			424			511				
Adjusted Satura	ation Flo	w Rate (s), veh/h/ln			1057			1750)		1765				
Queue Service	Time (g	(), S			6.0			0.0			19.7				
Cycle Queue C	learance	e Time (gc), s			59.7			10.2	2		19.7				
Green Ratio (g/	(C)				0.66			0.66	;		0.22				
Capacity (c), ve	h/h				772			1203	3		386				
Volume-to-Capa	acity Ra	tio (X)			1.534			0.35	3		1.322				
Available Capa	city (<i>C</i> a),	veh/h			772			1203	3		386				
Back of Queue	(<i>Q</i>), veł	n/In (50th percentile)			68.3			3.0			25.7				
Queue Storage	Ratio (RQ) (50th percentile))		0.00			0.00			0.00				
Uniform Delay (Jniform Delay (<i>d</i> ₁), s/veh				18.8			6.8			35.2				
Incremental Delay (d2), s/veh				247.0			0.1			162.0					
Initial Queue Delay (d3), s/veh				0.0			0.0			0.0					
Control Delay (d), s/veh				265.8			6.9			197.2					
Level of Service (LOS)			F			Α			F						
Approach Delay, s/veh / LOS		265.	8	F	6.9		А	197.	2	F	0.0				
Intersection De	lay, s/ve	h / LOS				19	7.5						F		
Multimodal Results			EB			WB			NB			SB			
Pedestrian LOS	Pedestrian LOS Score / LOS														
Bicycle LOS Score / LOS															

TWO-WAY STOP CONTROL SUMMARY												
General Informatio	า		Site I	nform	ation							
Analyst	BMF		Interse	ection		Wallings Drive	Road/Elml	nurst				
Agency/Co.	GPD Gro	ир	luriedi	ction		City of B	roadview H	ojahta				
Date Performed	3/2/2015			is Vear		2020 'No		eignis				
Analysis Time Period	AM Peak	Hour				2020 110	Bulla					
Project Description Wa	allings Road Sa	fety & Corridor St	udy			•						
East/West Street: Wallin	ngs Road		North/S	South S	treet: Elm	hurst Drive						
Intersection Orientation:	East-West		Study I	Period ((hrs): 0.25							
Vehicle Volumes ar	nd Adjustme											
Major Street		Eastbound				Westbou	und					
Movement	1	2	3		4	5		6				
	L	Т	R		L	Т		R				
Volume (veh/h)	50	960				350		10				
Peak-Hour Factor, PHF	0.92	0.92	1.00	<u>'</u>	1.00	0.92		0.92				
Hourly Flow Rate, HFR (veh/h)	54	1043	0		0	380		10				
Percent Heavy Vehicles	2				0							
Median Type				Undiv	rided							
RT Channelized			0					0				
Lanes	0	1	0		0	1		0				
Configuration	LT							TR				
Upstream Signal		0				0						
Minor Street		Northbound				Southbo	und					
Movement	7	8	9		10	11		12				
	L	Т	R		L	Т		R				
Volume (veh/h)					10			10				
Peak-Hour Factor, PHF	1.00	1.00	1.00)	0.92	1.00		0.92				
Hourly Flow Rate, HFR (veh/h)	0	0	0		10	0		10				
Percent Heavy Vehicles	0	0	0		0	0		0				
Percent Grade (%)		0				0						
Flared Approach		N				N						
Storage		0				0						
RT Channelized			0					0				
l anes	0	0	0		0	0		0				
Configuration	Ť		Ť		0	IR		<u> </u>				
Delay Queue Length a	nd Level of Se	rvice		I								
Annroach	Fastbound	Westhound		Northbo	und		Southbound	1				
Movement	1	4	7	8	9	10	11	12				
Lane Configuration							IR					
v (veh/h)	54						20					
C (m) (veh/h)	1160						208					
	0.05						0.10					
V/C	0.05						0.10					
95% queue length	0.15						0.31					
Control Delay (s/veh)	8.2						24.1					
LOS	A						С					
Approach Delay (s/veh)							24.1					
Approach LOS							С					

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General Information Site Information Analysit BMF Intersection Wallings Road/Longview Road Agency/Co. GPD Group Unisdiction City of Broadview Heights Date Performed 32/2015 Analysis Year 2020 'No-Build' Analysis Time Period AM Peak Hour Value 2020 'No-Build' Project Description Wallings Road Safety & Corridor Study EastWest Street Study Period (hrs): 0.25 Vehicle Volumes and Adjustments Major Street Eastbound Westbound Movement 1 2 3 4 5 6 Vehicle Volumes and Adjustments Major Street Westbound Movement 1 2 3 4 5 6 Volume (weh/h) 30 940 1.00 0.92 0 0	TWO-WAY STOP CONTROL SUMMARY												
Analyst BMF Intersection Wallings Road/Longview Road Agency/Co. GPD Group Unrediction City of Broadview Heights Analysis Time Period AM Peak Hour 2020 No-Build Project Description Wallings Road Safety & Comdor Study North/South Street: Longview Road BastWest Street Wallings Road Safety & Comdor Study North/South Street: Longview Road Major Street Eastbound North/South Street: Longview Road Movement 1 2 3 4 5 6 Movement 1 2 3 4 5 6 Volume (veh/h) 30 940 - 350 10 Peak-Hour Factor, PHF 0.92 0.92 1.00 0.9380 10 Vehring Vehicles 2 - - 0 - - R Chanelized 0 1 0 1 0 0 1 Vehring Vehicles 2 - - - 0 -	General Informatio	า		Site I	nform	atio	n						
Agency/Co. GPD Group Jurisdiction City of Broadview Heights Date Performed 3/2/2015 Analysis Time Period AM Peak Hour 2020 No-Build Project Description Wallings Road Safety & Corridor Study North/South Street: Langvise Year 2020 No-Build Basily Street: Wallings Road Safety & Corridor Study North/South Street: Langvise Road Image: South Street: North/South Street: No	Analyst	BMF		Interse	ection			Wallings I Road	Road/L	ong	view		
Date Performed 3/2/2015 Date Second and the period of th	Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadviev	N He	iahts		
Analysis Time Period Mallings Road Safety & Corridor Study East Vest East Vest Project Description Wallings Road Safety & Corridor Study North/South Street: Longview Road Intersection Orientation: East-West Study Period (hrs): 0.25 Vehicle Volumes and Adjustments Base Study Study Period (hrs): 0.25 Volume (veh/h) 1 2 3 4 5 6 Major Street Eastbound Westbound North/South Street: North/South Street: R Volume (veh/h) 30 940 1.00 1.00 0.92 0.92 Volume (veh/h) 32 1021 0 0 380 10 Percent Heavy Vehicles 2 - 0 - - Median Type Undivided 0 1 0 0 10 Rons Street Northbound Southbound Southbound Northbound Nouthone 10 Minor Street Northbound Southbound 10 10 10	Date Performed	3/2/2015		Analys	is Year			2020 'No-	Build'	uild'			
Project Description Wallings Road North/South Street: Langview Road East/West Street: Bitudy Period (hts): 0.25 Vehicle Volumes and Adjustments Westbound Westbound Movement 1 2 3 4 5 6 Volume (veh/h) 30 940 350 10 7 R Volume (veh/h) 30 940 380 10 92 0.92 0	Analysis Time Period	AM Peak	Hour					2020 110	Dulla				
EastWest Street: Wailings Road North/South Street: Longview Road Main Street Eastbound Westbound Movement 1 2 3 4 5 6 Movement 1 2 3 4 5 6 Volume (veh/h) 30 940 350 10 Peak-Hour Factor, PHF 0.92 0.92 1.00 0.92 0.92 Hourly Flow Rate, HFR 32 1021 0 0 380 10 Percent Heavy Vehicles 2 0 Median Type Undivided T 0 0 0 0 Lanes 0 1 0 0 10 0 0 Upstream Signal 0 0 0 0 11 12 Volume (veh/h) 1 1 12 0 0 0 0 Movement 7 8 9 10 11	Project Description Wa	allings Road Sa	fety & Corridor Stu	udy									
Intersection Orientation: East-West Study Period (hrs): 0.25 Vehicle Volumes and Adjustments Eastbound Westbound Movement 1 2 3 4 5 6 Movement 1 2 3 4 5 6 Volume (veh/h) 30 940 T 7 R Peak-Hour Factor, PHF 0.92 0.92 1.00 1.00 0.92 0.92 Vehufty low Rate, HFR 32 1021 0 0	East/West Street: Wallin	ngs Road		North/S	South St	treet:	Longvie	w Road					
Vehicle Volumes and Adjustments Major Street Eastbound Westbound Movement 1 2 3 4 5 6 Volume (veh/h) 30 940 - 350 10 Peak-Hour Factor, PHF 0.92 0.92 1.00 1.00 0.92 0.92 Hourly Flow Rate, HFR 32 1021 0 0 380 10 Percent Heavy Vehicles 2 - 0 - - - Minor Street 0 1 0 0 1 0 0 Minor Street Northbound Southbound 0 - - - Morement 7 8 9 10 11 12 - Volume (veh/h) - 1.00 1.00 0.92 1.00 0.92 Minor Street Northbound Southbound - - - - Volume (veh/h) - 1.00	Intersection Orientation:	East-West		Study I	Period (hrs):	0.25						
Major Street Eastbound Westbound Movement 1 2 3 4 5 6 Volume (veh/h) 30 940 I T R Valume (veh/h) 30 940 I 350 10 Peak-Hour Factor, PHF 0.92 0.92 1.00 0.92 0.92 Hourly Flow Rate, HFR 32 1021 0 0 380 10 Percent Heavy Vehicles 2 - 0 - Median Type Undivided 0 0 1 0 0 1 0 Configuration L.T 0 1 0 0 1 10 0 Minor Street Northbound Southbound Southbound 10	Vehicle Volumes ar	nd Adjustme	nts										
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	Major Street		Eastbound					Westbou	nd				
$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	Movement	1	2	3			4	5		6			
Volume (veh/h) 30 940 10 350 10 Peak-Hour Factor, PHF 0.92 0.92 1.00 0.92 0.92 Hourly Flow Rate, HFR 32 1021 0 0 380 10 Percent Heavy Vehicles 2 - 0 Median Type 0 0 1 0 0 10 Errcent Heavy Vehicles 2 - 0 Minor Street 0 1 0 0 10 0 Minor Street Northbound Southbound Southbound 10 10 Movement 7 8 9 10 11 12 More Street Northbound 100 0.92 1.00 0.92 1.00 Peak-Hour Factor, PHF 1.00 1.00 1.00 0 0 0 Percent Heavy Vehicles 0 0 0 0 0 0		L	T	R			L	T			R		
Peak-Hour Factor, PHF 0.92 0.92 1.00 1.00 0.92	Volume (veh/h)	30	940	1.00				350		10			
Houry Prov Rate, HFR 32 1021 0 0 380 10 Percent Heavy Vehicles 2 0 Median Type Undivided 0 0 Median Type 0 0 0 1 0 0 0 0 Lanes 0 1 0 0 1 0 0 0 Minor Street Northbound Southbound Movement 7 8 9 10 11 12 More Street Northbound 100 1.00 1.00 0.92 1.00 0.92 Moury Flow Rate, HFR 0 0 0 0 0 0 0 10 Percent Grade (%) 0 0 0 0 0 0 10 Percent Grade (%) 0 0 0 0 0 0 0 0 0 0<	Peak-Hour Factor, PHF	0.92	0.92	1.00		1	1.00	0.92		0	.92		
Percent Heavy Vehicles 2 0 Median Type Undivided RT Channelized 0 0 0 Lanes 0 1 0 0 Configuration LT 0 0 1 0 Minor Street Northbound 0 11 12 Movement 7 8 9 10 11 12 Volume (veh/h) L T R L T R Volume (veh/h) 1.00 1.00 0.92 1.00 0.92 Hourly Flow Rate, HFR 0 0 0 0 0 0 Percent Grade (%) 0 0 0 0 0 0 0 Storage 0 0 0 0 0 0 0 Lanes 0 0 0 0 0 0 0 Configuration 1 4 7<	(veh/h)	32	1021	0			0	380			10		
Median TypeUndividedRT Channelized010010Lanes010010ConfigurationLT07R07RUpstream Signal001112Minor StreetNorthboundSouthbound7R1012Movement789101112Minor StreetNorthbound101112Movement789101112Volume (veh/h)11001.001.000.921.000.92Houry Flow Rate, HFR (veh/h)000000Percent Heavy Vehicles000000Percent Grade (%)000000Storage000000RT Channelized00000Lanes00000Delay, Queue Length, and Level of Service000ApproachEastboundWestboundNorthboundSouthboundMovement147891011Lane ConfigurationLTI1012Delay, Queue Length, and Level of Service200200200C (m) (veh/h)321112Lane ConfigurationLT4789 <th< td=""><td>Percent Heavy Vehicles</td><td>2</td><td></td><td></td><td></td><td></td><td>0</td><td></td><td></td><td></td><td></td></th<>	Percent Heavy Vehicles	2					0						
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General Information Site Information Analyst BMF Intersection Wallings Rd/Chestrut Blvd Agency/Co. GPD Group Jurisdiction City of Broadview Heights Date Performed 3/2/2015 Analysis Time Period Alw Peak Hour Project Description Wallings Road Safety & Corridor Study Analysis Time Period Alw Peak Hour Project Description Wallings Road Safety & Corridor Study Cast.West Study Period (hrs): 0.25 Vehicle Volumes and Adjustments Study Period (hrs): 0.25 Vehicles Cast.West Major Street East.West Study Period (hrs): 0.22 0.32 0.36 Volume (weh/h) L T R L T R Order Fork Rest, HFR 0 1021 10 10 369 0 Percent Heavy Vehicles 2 - - 4 - - Actors Fiscet North/bound 0 1 0 0 0 Lanes 0	TWO-WAY STOP CONTROL SUMMARY												
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Configuration LR Configuration LR Configuration Configuration LR Configuration Configuration LR Configuration Southbound Southbound Southbound Movement 1 4 7 8 9 10 11 12 Lane Configuration LT LR Configuration Configuration Configuration LT LR Configuration Configuration Configuration Configuration LT LR Configuration Configuration <t< td=""><td></td><td>0</td><td>0</td><td>0</td><td></td><td></td><td>0</td><td>0</td><td></td><td></td><td>0</td></t<>		0	0	0			0	0			0		
Delay, Queue Length, and Level of ServiceApproachEastboundWestboundNorthboundSouthboundMovement14789101112Lane ConfigurationLTLR </td <td>Configuration</td> <td></td> <td>I R</td> <td></td> <td></td> <td></td> <td>0</td> <td></td> <td></td> <td></td> <td>0</td>	Configuration		I R				0				0		
Approach Eastbound Westbound Northbound Southbound Movement 1 4 7 8 9 10 11 12 Lane Configuration LT LR v (veh/h) 10 53													
Approach Lastbound Westbound Nontribuind Southbound Movement 1 4 7 8 9 10 11 12 Lane Configuration LT LR v (veh/h) 10 53 <	Approach	Eastbound	Weethound		Jorthha	aund			outhh	ound			
Lane Configuration LT LR III IIII IIIII IIIII IIIIII IIIII IIIIIIII IIIIIIIIIIIIIIII IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	Approach Movement			7	8	Juna	9	10	Southbound		12		
Line configuration Line L	Lane Configuration	•		•									
V (Ven/n) 10 33 10 33 C (m) (veh/h) 666 212 10 v/c 0.02 0.25 10 95% queue length 0.05 0.95 10 Control Delay (s/veh) 10.5 27.5 10 LOS B D 10 Approach Delay (s/veh) 27.5 10			10		<u> </u>								
C (m) (veh/h) 666 212 1 v/c 0.02 0.25 1 95% queue length 0.05 0.95 1 Control Delay (s/veh) 10.5 27.5 1 LOS B D 1 Approach Delay (s/veh) 27.5			10		53								
v/c 0.02 0.25 100 95% queue length 0.05 0.95 100 Control Delay (s/veh) 10.5 27.5 100 LOS B D 100 100 Approach Delay (s/veh) 27.5 100	C (m) (ven/n)		666		212	<u>.</u>							
95% queue length 0.05 0.95 Control Delay (s/veh) 10.5 27.5 LOS B D Approach Delay (s/veh) 27.5 Approach LOS D	v/c		0.02		0.25	5							
Control Delay (s/veh) 10.5 27.5 Image: Control Delay (s/veh) Image: C	95% queue length		0.05		0.95	5							
LOS B D Image: Delay (s/veh) Image: Delay (s/veh) <thimage: (s="" delay="" th="" veh)<=""> <thimage: (s="" delay="" th="" veh)<=""></thimage:></thimage:>	Control Delay (s/veh)		10.5		27.5	5							
Approach Delay (s/veh) 27.5 Approach LOS D	LOS		В		D								
Approach LOS D	Approach Delay (s/veh)				27.5	5							
	Approach LOS				D								

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General Information Site Information Analyst BMF Intersection Wallings Rd/Overlook Ave Agency/Co. Agency/Co. GPD Group Jurisdiction City of Broadview Heights Date Performed 3/2/2015 Analysis Time 2020 Wo-Build' Analysis Time Period AW Peak Hour 2020 Wo-Build' Analysis Time Project Description Wallings Road North/South Street: Overlook Avenue ast/West Street Wallings Road North/South Street: Overlook Avenue misresction Ondentation: Eastbound Westbound Movement 1 2 3 4 5 6 Adume (veh/h) L T R L T R Outry Flow Risk, HFR 0 1043 10 10 369 0 arenes 0 1 0 0 1 0 Adverted 0 1 0 1 0 0 arenes 0 1 0 0 1		TW	O-WAY STOP	CONTR		UMN	MARY				
Analyst BMF Intersection Wallings Rd/Overlook Ave Unsolicition City of Broadview Heights Agency/Co. GPD Group Junsdiction City of Broadview Heights Date Performed 3/2/015 Analysis Year 2/20 Wo-Build Analysis Time Period AM Peak Hour 2/2015 Analysis Year 2/20 Wo-Build Construction Wellings Road Safety & Condor Study 2/2015 Study Period (hrs): 0.25 Vehicle Volumes and Adjustments Eastbound Westbound Westbound Westbound Volume (veh/h) 1 2 3 4 5 6 Volume (veh/h) 960 10 10 340 - - Vehicle Volumes and Adjustments 0 1043 10 10 369 0 Vehicle Volumes and Adjustments 0 1043 10 10 369 0 Vehinice Street 0 1 0 0 - - - Vehinice Street 0 1 0 0	General Information	n		Site I	nform	natio	on				
Agency/Co. GPD Group Uurisdiction City of Broadview Heights Date Performed 3/2/2015 Analysis Time Period NorthSouth Street: Ocean Analysis Time Period NorthSouth Street: Ocean Analysis Time Period NorthSouth Street: Ocean Analysis Time Period NorthSouth Street: NorthSouth Street: NorthSouth Street: Ocean Analysis Time Period NorthSouth Street:	Analyst	BMF		Interse	ection			Wallings	Rd/Ov	rerloo	k Ave
Date Performed 37/2015 Analysis Time Period Study Analysis Street Wallings Road North/South Street: Overlook Avenue Intersection Origination: 0.25 Wall Street Eastbound Westbound Westbound Movement 1 2 3 4 5 6 More Mailings Road 10 10 340 - - - Vehicle Volumes and Adjustments U T R L T R Movement 1 2 3 4 5 6 Vehin) 960 10 10 340 - - - Vehin) 960 1043 10 10 369 0 - Vehin) 0 10 0 1 0 0 - - - - - <td< td=""><td>Agency/Co.</td><td>GPD Gro</td><td>ир</td><td>Jurisdi</td><td>ction</td><td></td><td></td><td>City of Br</td><td>oadvie</td><td>ew He</td><td>eights</td></td<>	Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadvie	ew He	eights
Analysis Time Period IMM Peak Hour Image: Control Study Project Description Wallings Road Sorth/South Street: Overhook Avenue Intersection Orientation: East-West Study Period (hrs): 0.25 Vehicle Volumes and Adjustments Magor Street Westbound Mestbound Mayer Street Eastbound Westbound T R Mayer Street Eastbound Westbound Period 960 10 10 340 Period Vehicle Volumes and Adjustments Base Street Eastbourd Westbound Period Period <t< td=""><td>Date Performed</td><td>3/2/2015</td><td>•</td><td>Analys</td><td>sis Yea</td><td>r</td><td></td><td>2020 'No-</td><td>Build'</td><td></td><td>-</td></t<>	Date Performed	3/2/2015	•	Analys	sis Yea	r		2020 'No-	Build'		-
Project Description Wallings Road Safety & Corridor Study astWest Street. Wallings Road North/South Street: Overlook Avenue Intersection Distance Study Period (trs): 0.26 Webricle Volumes and Adjustments Westbound Westbound Movement 1 2 3 4 5 6 Vehicle Volumes and Adjustments L T R L T R Movement 1 2 3 4 5 6 Volume (veh/h) 960 10 10 340 - - Peak-Hour Factor, PHF 0.88 0.92 0.92 0.92 0.92 0.86 fourly Flow Rate, HFR 0 1043 10 10 369 0 Percent Heavy Vehicles 2 - 2 - - - - - - - - - - - - - - - - - - - </td <td>Analysis Time Period</td> <td>AM Peak</td> <td>Hour</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	Analysis Time Period	AM Peak	Hour								
East/West Street: Overhook Avenue Intersection Orientation: East/West Study Period (hrs): 0.25 Vehicle Volumes and Adjustments Westbound Westbound Image: Constraint of the study Period (hrs): 0.25 Vehicle Volumes and Adjustments Image: Constraint of the study Period (hrs): 0.25 Vestbound Image: Constraint of the study Period (hrs): 0.25 Vehicle Volumes and Adjustments Image: Constraint of the study Period (hrs): 0.25 0.86 Image: Constraint of the study Period (hrs): 0.25 0.86 Vehicle Volume and Adjustments Image: Constraint of the study Period (hrs): 0.92 0.92 0.92 0.86 Vehicle Volume and Adjustments 0 1043 10 10 369 0 Vehicle Volume and Adjustments 0 1043 10 10 369 0 0 Percent Heavy Vehicles 2 - 2 - - - - - - - - - - - - - - - - -	Project Description W	allings Road Sa	fety & Corridor Si	tudy							
Intersection Orientation: East-West Study Period (hrs): 0.25 Vehicle Volumes and Adjustments Eastbound Westbound Movement 1 2 3 4 5 6 Movement L T R L T R /olume (veh/h) 960 10 10 340 - Peak-Hour Factor, PHF 0.86 0.92 0.92 0.92 0.86 Veh/h) 0 1043 10 10 369 0 Percent Heavy Vehicles 2 - 2 - anes 0 1 0 0 1 0 0 Channelized 0 1 0 0 1 0 0 Winor Street Northbound Southbound Southbound 11 12 Veh/h) 10 30 - - - - Olume (veh/h) 10 32 0 <td< td=""><td>East/West Street: Walli</td><td>ngs Road</td><td></td><td>North/S</td><td>South S</td><td>Stree</td><td>t: Overloo</td><td>ok Avenue</td><td></td><td></td><td></td></td<>	East/West Street: Walli	ngs Road		North/S	South S	Stree	t: Overloo	ok Avenue			
Vehicle Volumes and Adjustments Major Street Eastbound Westbound Movement 1 2 3 4 5 6 Outme (veh/h) B60 10 10 340 T R Peak-Hour Factor, PHF 0.88 0.92 0.92 0.92 0.92 0.86 Outme (veh/h) 0 1043 10 10 369 0 Peak-Hour Factor, PHF 0.88 0.92 0.92 0.92 0.86 Outme (veh/h) 100 1043 10 10 369 0 Percent Heavy Vehicles 2 - 2 - Mition Street 0 1 0 0 1 0 Upstream Signal 0 11 12 2 - - Volume (veh/h) 10 30 - 0 0 - Value (vel/h) 10 0 32 0 0<	Intersection Orientation:	East-West		Study I	Period	(hrs)): 0.25				
Wajor Street Eastbound Westbound Movement 1 2 3 4 5 6 Volume (veh/h) L T R L T R Value (veh/h) 0.88 0.92 0.92 0.92 0.92 0.86 fourly Flow Rate, HFR 0 1043 10 10 369 0 Percent Heavy Vehicles 2 2 RT Channelized 0 0 1 0 1 0 Canses 0 1 0 0 1 0 Signal 0 7 8 9 10 11 12 Valuer (veh/h) 10 30 - - - - - Valuer (veh/h) 10 30 - - - - - Valuer (veh/h) 10 32 0 0 - - - -	Vehicle Volumes ar	nd Adjustme	ents								
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Major Street		Eastbound					Westbou	nd		
$\begin{tabular}{ c c c c c c } \hline L & T & R & L & T & R \\ \hline Olume (veh/h) & 960 & 10 & 10 & 340 \\ \hline Peak-Hour Factor, PHF & 0.88 & 0.92 & 0.92 & 0.92 & 0.92 & 0.86 \\ \hline lourly Flow Rate, HFR & 0 & 1043 & 10 & 10 & 369 & 0 \\ \hline lourly flow Rate, HFR & 0 & 1043 & 10 & 10 & 369 & 0 \\ \hline Percent Heavy Vehicles & 2 & - & - & 2 & - & - & - \\ \hline Wedian Type & & & & & & & & & & & & & & & & & & &$	Movement	1	2	3			4	5			6
Volume (veh/h) 960 10 10 340 Peak-Hour Factor, PHF 0.88 0.92 0.92 0.92 0.92 0.86 Hourly Flow Rate, HFR 0 1043 10 10 369 0 Percent Heavy Vehicles 2 - - 2 - - Median Type Undivided 0 0 1 0 0 anes 0 1 0 0 1 0 0 Configuration 7 7 8 9 10 11 12 Minor Street Northbound Southbound Southbound 0 - - Volume (veh/h) 10 30 - <td></td> <td>L</td> <td>Т</td> <td>R</td> <td></td> <td></td> <td>L</td> <td>Т</td> <td></td> <td></td> <td>R</td>		L	Т	R			L	Т			R
Peak-Hour Factor, PHF 0.88 0.92	Volume (veh/h)		960	10			10	340			
Houry Prov Rate, HFR veh/h) 0 1043 10 10 369 0 Percent Heavy Vehicles 2 2 Wedian Type 0 0 0 0 0 0 RT Channelized 0 1 0 0 1 0 Lanes 0 1 0 0 1 0 Configuration 7 8 9 10 11 12 Minor Street Northbound Southbound Volume (veh/h) 10 30	Peak-Hour Factor, PHF	0.88	0.92	0.92			0.92	0.92		(0.86
Percent Heavy Vehicles 2 2 Wedian Type Undivided 0 0 RT Channelized 0 1 0 0 1 0 Configuration 7 8 9 10 11 12 Jpstream Signal 0 0 0 Minor Street Northbound Southbound 0 Volume (veh/h) 10 30	Hourly Flow Rate, HFR (veh/h)	0	1043	10			10	369			0
Wedian Type Undivided QT Channelized 0 0 0 Lanes 0 1 0 0 Configuration TR LT 0 Jpstream Signal 0 1 0 0 Minor Street Northbound Southbound 0 Movement 7 8 9 10 11 12 Volume (veh/h) 10 30 R L T R Volume (veh/h) 10 30 R R R R R R R R	Percent Heavy Vehicles	2					2				
RT Channelized 0 1 0 0 1 0 Configuration 0 1 0 0 1 0 Configuration 0 7R LT 0 0 0 Upstream Signal 0 0 0 11 0 0 Winor Street Northbound Southbound 0 11 12 Winor Street Northbound 30	Median Type				Undiv	/idea	1				
Lanes 0 1 0 0 1 0 Configuration TR LT 0	RT Channelized			0							0
ConfigurationTRLT0Jpstream Signal0000Winor StreetNorthboundSouthboundMovement7891011LTRLTRVolume (veh/h)1030Peak-Hour Factor, PHF0.921.000.920.671.00Outry Flow Rate, HFR1003200Percent Heavy Vehicles40400Percent Grade (%)0000Percent Grade (%)0000Parced Storage0000Storage00000ConfigurationLR000Delay, Queue Length, and Level of ServiceApproachLTLR112ApproachLTLR112ApproachLTLR112SouthboundNorthboundSouthbound-C0.020.191112ConfigurationLTLR111042111042111042111110421120.020.191130.050.671141022511524.611200.19<	Lanes	0	1	0			0	1			0
Jpstream Signal00Winor StreetNorthboundSouthboundMovement789101112LTRLTRVolume (veh/h)1030	Configuration			TR			LT				
Winor Street Northbound Southbound Movement 7 8 9 10 11 12 L T R L T R Value T R Volume (veh/h) 10 30 - - R Value T R Peak-Hour Factor, PHF 0.92 1.00 0.92 0.67 1.00 0.67 Heak-Hour Factor, PHF 0.92 1.00 0.92 0.67 1.00 0.67 Peak-Hour Factor, PHF 0.92 1.00 0.92 0.67 1.00 0.67 Percent Grade (%) 0 4 0 0 0 0 0 Percent Grade (%) 0 0 0 0 0 0 0 0 0 Storage 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 </td <td>Upstream Signal</td> <td></td> <td>0</td> <td></td> <td></td> <td></td> <td></td> <td>0</td> <td></td> <td></td> <td></td>	Upstream Signal		0					0			
Movement 7 8 9 10 11 12 L T R L T R L T R Volume (veh/h) 10 30 - - R - T R Peak-Hour Factor, PHF 0.92 1.00 0.92 0.67 1.00 0.67 Ourly Flow Rate, HFR 10 0 32 0 0 0 Percent Heavy Vehicles 4 0 4 0 0 0 Percent Grade (%) 0 0 0 0 0 0 Storage 0 0 0 0 0 0 0 Chinguration LR 0 0 0 0 0 0 0 anee 0 0 0 0 0 11 12 Approach Eastbound Westbound Northbound Southbound N 11 12 1	Minor Street		Northbound					Southbou	Ind		
L T R L T R Volume (veh/h) 10 30 Peak-Hour Factor, PHF 0.92 1.00 0.92 0.67 1.00 0.67 Hourly Flow Rate, HFR 10 0 32 0 0 0 Peak-Hour Factor, PHF 0.92 1.00 0.92 0.67 1.00 0.67 Hourly Flow Rate, HFR 10 0 32 0 0 0 Percent Grade (%) 0 4 0 0 0 0 Percent Grade (%) 0 0 0 0 0 0 Storage 0 0 0 0 0 0 0 anes 0 0 0 0 0 0 0 Configuration LR 1 4 7 8 9 10 11 12 Lane Configuration LT LR <	Movement	7	8	9			10	11			12
Volume (veh/h) 10 30 Image: stress of the stress of t		L	Т	R	R		L	Т			R
Deck-Hour Factor, PHF 0.92 1.00 0.92 0.67 1.00 0.67 Hourly Flow Rate, HFR (veh/h) 10 0 32 0 0 0 0 Percent Heavy Vehicles 4 0 4 0 0 0 0 Percent Grade (%) 0 0 0 0 0 0 0 Storage 0 0 0 0 0 0 0 0 Part Channelized 0 0 0 0 0 0 0 0 0 Lanes 0	Volume (veh/h)	10		30							
Hourly Flow Rate, HFR (veh/h)10032000Percent Heavy Vehicles404000Percent Grade (%)00000Percent Grade (%)00000Storage00000RT Channelized00000Lanes000000ConfigurationLR0000Delay, Queue Length, and Level of ServiceNSouthboundSouthboundMovement147891011_ane ConfigurationLTLR1121_ane Configuration0421112_ane ConfigurationLTLR1121_ane Configuration0421112_ane ConfigurationLTLR1112_ane Configuration0.020.191112_ane ConfigurationLTLR1112_ane ConfigurationLTLR111_ane ConfigurationLTLR111_ane ConfigurationLTLR111_ane ConfigurationLOS0.67111_ane ConfigurationLOS0.67111_ane ConfigurationLOS0.67	Peak-Hour Factor, PHF	0.92	1.00	0.92	·		0.67	1.00		(0.67
Dercent Heavy Vehicles404000Percent Grade (%)00000Percent Grade (%)00000Percent Grade (%)00000Percent Grade (%)00000Storage000000RT Channelized000000Lanes000000ConfigurationLR1478910Delay, Queue Length, and Level of ServiceNorthboundSouthboundMovement147891011Lane ConfigurationLTLR1121Lane ConfigurationLTLR1121V (veh/h)1042111C (m) (veh/h)661225111V(c0.020.19111Costrol Delay (s/veh)10.524.611LOSBC111Approach LOSC11	Hourly Flow Rate, HFR (veh/h)	10	0	32		0		0			0
Percent Grade (%)00Flared ApproachNNStorage00RT Channelized00Lanes00O00ConfigurationLRDelay, Queue Length, and Level of ServiceApproachEastboundWestboundNorthboundMovement1478910LTLane ConfigurationLTLane ConfigurationLT14789101042C (m) (veh/h)661225Image: Control Delay (s/veh)10.524.6CosBCImage: Control Delay (s/veh)24.6Approach LOSC	Percent Heavy Vehicles	4	0	4		0		0			0
Flared ApproachNNStorage00RT Channelized00Lanes00O00ConfigurationLRDelay, Queue Length, and Level of ServiceApproachEastboundWovement1414789101112Lane ConfigurationLTLane ConfigurationLTLane ConfigurationLT14789101042101025110225101025% queue length0.050.671010.524.620SBC10Approach LOSC	Percent Grade (%)		0					0			
Storage 0 0 0 Storage 0 0 0 0 RT Channelized 0 0 0 0 0 Lanes 0 0 0 0 0 0 Configuration LR 0 0 0 0 0 Delay, Queue Length, and Level of Service Northbound Southbound Movement 1 4 7 8 9 10 11 12 Lane Configuration LT LR 1 12 12 1 12 Lane Configuration LT LR 1 12 12 1 12 Lane Configuration LT LR 1 12 1 12 1 12 Lane Configuration LT LR 10 11 12 12 1 12 Lane Configuration LT LR 10 125 1 1 12 1 1 1 1 1 1 1 1 1 1 1 1 <td>Flared Approach</td> <td></td> <td>N</td> <td></td> <td></td> <td></td> <td></td> <td>N</td> <td></td> <td></td> <td></td>	Flared Approach		N					N			
Other Stress O <t< td=""><td>Storage</td><td></td><td>0</td><td></td><td></td><td></td><td></td><td>0</td><td></td><td></td><td></td></t<>	Storage		0					0			
Image: Control Delay (s/veh) Image: Control Delay (s/veh) <th< td=""><td>RT Channelized</td><td>_</td><td></td><td>0</td><td></td><td></td><td></td><td></td><td></td><td></td><td>0</td></th<>	RT Channelized	_		0							0
Configuration LR C C C C C Delay, Queue Length, and Level of ServiceApproachEastboundWestboundNorthboundSouthboundMovement14789101112_ane Configuration LT LR </td <td></td> <td>0</td> <td>0</td> <td>0</td> <td></td> <td></td> <td>0</td> <td>0</td> <td></td> <td></td> <td>0</td>		0	0	0			0	0			0
Delay, Queue Length, and Level of ServiceApproachEastboundNorthboundSouthboundMovement14789101112_ane ConfigurationLTLR101112_ane Configuration01042 </td <td>Configuration</td> <td></td> <td>I R</td> <td></td> <td></td> <td></td> <td>0</td> <td>0</td> <td></td> <td></td> <td>0</td>	Configuration		I R				0	0			0
Deray, Guede Length, and Level of Service Approach Eastbound Westbound Northbound Southbound Movement 1 4 7 8 9 10 11 12 Lane Configuration LT LR v (veh/h) 10 42											
Approach Lastbound Westbound Northbound Southbound Southbound<	Approach	Eastbound	Weethound		Jorthh	ound	1		outhh	ound	
Instrument Instrument <td>Approach Movement</td> <td></td> <td>4</td> <td>7</td> <td>8</td> <td>Juna</td> <td>9</td> <td>10</td> <td>1</td> <td>1</td> <td>12</td>	Approach Movement		4	7	8	Juna	9	10	1	1	12
Line Configuration Line Line <thline< th=""> Line Line<td>Lane Configuration</td><td>•</td><td></td><td>· · ·</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></thline<>	Lane Configuration	•		· · ·							
70 70 42 10 42 C (m) (veh/h) 661 225 10 7/c 0.02 0.19 10 95% queue length 0.05 0.67 10 Control Delay (s/veh) 10.5 24.6 10 -OS B C 10 Approach Delay (s/veh) 24.6 Approach LOS C			L1 10								
C (m) (veh/h) 661 225 1 v/c 0.02 0.19 1 95% queue length 0.05 0.67 1 Control Delay (s/veh) 10.5 24.6 1 LOS B C 1 Approach Delay (s/veh) 24.6	v (ven/n)		10		42	_					
//c 0.02 0.19 10 95% queue length 0.05 0.67 10 Control Delay (s/veh) 10.5 24.6 10 _OS B C 10 10 Approach Delay (s/veh) 24.6 10	C (m) (ven/n)		661		225	>					
0.05 0.67 Control Delay (s/veh) 10.5 24.6 LOS B C C Approach Delay (s/veh) 24.6 Approach LOS C C	v/c		0.02		0.19	9					
Control Delay (s/veh) 10.5 24.6 Image: Control Delay (s/veh) Image: C	95% queue length		0.05		0.67	7					
OS B C Image: Color of the state of	Control Delay (s/veh)		10.5		24.6	6					
Approach Delay (s/veh) 24.6 Approach LOS C	LOS		В		С						
Approach LOS C	Approach Delay (s/veh)				24.6	6					
	Approach LOS				С						

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	TW	O-WAY STOP	CONTR	OL SU	MMARY			
General Informatio	n		Site I	nforma	ation			
Analvst	BMF		Interse	ection		Wallings	Rd/McCrea	rv Rd
Agency/Co.	GPD Gro	ир	Jurisdi	ction		City of Br	oadview He	eights
Date Performed	3/2/2015		Analys	is Year		2020 'No	-Build'	-
Analysis Time Period	AM Peak	Hour						
Project Description W	allings Road Sa	fety & Corridor Si	tudy					
East/West Street: Walli	ngs Road		North/S	South St	reet: McCi	reary Road		
Intersection Orientation:	East-West		Study I	Period (h	nrs): 0.25	•		
Vehicle Volumes a	nd Adjustme	ents						
Major Street		Eastbound				Westbou	nd	
Movement	1	2	3		4	5		6
	L	Т	R		L	Т		R
Volume (veh/h)	30	960				340		30
Peak-Hour Factor, PHF	0.92	0.92	0.89		0.82	0.92	().92
Hourly Flow Rate, HFR (veh/h)	32	1043	0		0	369		32
Percent Heavy Vehicles	2				2			
Median Type				Undivi	ded			
RT Channelized			0					0
Lanes	0	1	0		0	1		0
Configuration	LT							TR
Upstream Signal		0				0		
Minor Street		Northbound				Southbor	und	
Movement	7	8	9		10	11		12
	L	Т	R		L	Т		R
Volume (veh/h)					20			10
Peak-Hour Factor, PHF	0.57	1.00	0.57		0.92	1.00	().92
Hourly Flow Rate, HFR	0	0	0		21	0		10
Percent Heavy Vehicles	4	0	4		0	0		0
Percent Grade (%)		0	· ·		•	0		•
Flared Approach		N				N		
Storage		0				0		
RT Channelized			0					0
Lanes	0	0	0		0	0		0
Configuration					-	LR		-
Delay, Queue Length, a	and Level of Se	ervice						
Approach	Eastbound	Westbound	· · · · · ·	Vorthboi	und	S	outhbound	
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	32						31	
C (m) (veh/h)	1158						179	
v/c	0.03						0.17	
95% queue length	0.09						0.61	
Control Delav (s/veh)	8.2						29.3	
	A.				-		0	
Annroach Delay (s/yeh)			L				20.3	
Annroach I OS	/en)					29.5		

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	тw	O-WAY STOP	CONTR	OL SU	MMAR	Y				
General Informatio	າ		Site I	nform	ation					
Analyst	BMF		Interse	ection			Wallings I	Rd/Maje	stic (Daks
Agency/Co.	GPD Gro	ир	lurisdi	ction			City of Br	nadview	Hoir	nhts
Date Performed	3/2/2015			is Vear			2020 'No	Build'	i ieig	ji ilo
Analysis Time Period	AM Peak	Hour					2020 110-	Dulla		
Project Description Wa	allings Road Sa	fety & Corridor Stu	Jdy							
East/West Street: Walling	ngs Road		North/S	South St	treet: M	ajestio	c Oaks Trail			
Intersection Orientation:	East-West		Study I	Period (hrs): 0.2	25				
Vehicle Volumes ar	nd Adjustme	nts								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3		4		5		(ô
	L	Т	R		L		Т		ŀ	۲ ۲
Volume (veh/h)	10	1200					370		1	0
Peak-Hour Factor, PHF	0.92	0.92	0.89		0.82		0.92		0.9	92
Hourly Flow Rate, HFR (veh/h)	10	1304	0		0		402		1	0
Percent Heavy Vehicles	2				2				-	-
Median Type		•		Undiv	ided		•			
RT Channelized			0						C)
Lanes	0	1	0		0		1		0)
Configuration	LT	-	-		-		· · ·		T	R
Upstream Signal		0					0			-
Minor Street		Northbound					Southbou	ind		
Movement	7	8	9		10		11		1	2
	L	T	R		L		Т		ł	<u>-</u> ר
Volume (veh/h)					10				1	0
Peak-Hour Factor, PHF	0.57	1.00	0.57	·	0.92		1.00		0.9	92
Hourly Flow Rate, HFR	0	0	0		10		0		1	0
(Venin) Percent Heavy Vehicles	4	0	4		0		0		()
Percent Grade (%)	,	0	,				0			,
Flared Approach		N N					N N			
Storage		0					0			
RT Channelized			0						()
lanes	0	0	0		0		0		()
Configuration			Ť		<u> </u>		LR			,
Delay Queue Length a	nd Level of Se	rvice		I				l		
Approach	Fastbound	Westbound		Northbo	und		S	outhbou	nd	
Movement	1	4	7	8		9	10	11		12
Lane Configuration	LT					-		LR		
v (veh/h)	10							20		
C (m) (veh/h)	1147							169	-	
	0.01				_			0 12		
V/C	0.07				_			0.72	╋	
	0.03							0.39	+	
Control Delay (s/veh)	8.2			<u> </u>				29.1	+	
LUS				I				D		
Approach Delay (s/veh)	eh)							29.1		
Approach LOS								D		

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	TW	O-WAY STOP	CONTR	OL SU	MMARY			
General Informatio	า		Site II	nforma	ation			
Analyst	BMF		Interse	ection		Wallings	Rd/Creek	side Trce
Agency/Co.	GPD Grou	ир	Jurisdi	ction		City of Br	oadview H	leights
Date Performed	3/2/2015	•	Analys	is Year		2020 'No	-Build'	
Analysis Time Period	AM Peak	Hour						
Project Description Wa	allings Road Saf	fety & Corridor St	udy					
East/West Street: Walli	ngs Road		North/S	South St	reet: Creek	side Terrace		
Intersection Orientation:	East-West		Study F	Period (I	nrs): 0.25			
Vehicle Volumes ar	nd Adjustme	nts						
Major Street		Eastbound				Westbou	nd	
Movement	1	2	3		4	5		6
	L	Т	R		L	Т		R
Volume (veh/h)		1200	10		10	370		
Peak-Hour Factor, PHF	0.80	0.92	0.92		0.92	0.92		0.76
Hourly Flow Rate, HFR (veh/h)	0	1304	10		10	402		0
Percent Heavy Vehicles	2				4			
Median Type				Undivi	ded			
RT Channelized			0					0
Lanes	0	1	0		0	1		0
Configuration			TR		LT			
Upstream Signal		0				0		
Minor Street		Northbound				Southbou	ind	
Movement	7	8	9		10	11		12
	L	Т	R		L	Т		R
Volume (veh/h)	10		40					
Peak-Hour Factor, PHF	0.92	1.00	0.92		0.70	1.00		0.70
Hourly Flow Rate, HFR (veh/h)	10	0	43		0	0		0
Percent Heavy Vehicles	3	0	3		0	0		0
Percent Grade (%)		0	-			0	•	
Flared Approach		N				N		
Storage		0				0		
RT Channelized			0					0
Lanes	0	0	0		0	0		0
Configuration		LR						
Delay, Queue Length, a	nd Level of Se	rvice				•	•	
Approach	Eastbound	Westbound	1	Northbo	und	S	outhboun	d
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
v (veh/h)		10		53				
$C_{\rm (m)}$ (veh/h)		520		162				
		0.02		033				
95% quoue longth		0.02		1 22				
Control Dolow (chick)		0.00		1.33			<u> </u>	
Control Delay (s/ven)		12.1		31.1				
LUS		В		E				
pproach Delay (s/veh)			37.7					
Approach LOS	ch LOS			E				

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	TW	O-WAY STOP	CONTR		MARY					
General Information	า		Site II	nformat	ion					
Analyst	BMF		Interse	ection		Wallings I Rd/Eirebo	Rd/Joyce			
Agency/Co.	GPD Gro	рир	Jurisdi	ction		City of Br	nadview H	eiahts		
Date Performed	3/2/2015		Analys	is Year		2020 'No	Ruild'	eiginto		
Analysis Time Period	AM Peak	Hour				2020 110	Dulla			
Project Description Wa	allings Road Sa	fety & Corridor St	udy							
East/West Street: Walli	ngs Road		North/S	South Stre	et: Joyce R	Road/Fireho	use			
Intersection Orientation:	East-West		Study F	Period (hrs	s): 0.25					
Vehicle Volumes ar	nd Adjustme	ents								
Major Street		Eastbound				Westbou	nd			
Movement	1	2	3		4	5		6		
	L	Т	R		L	Т		R		
Volume (veh/h)	10	1200	30		10	360		10		
Peak-Hour Factor, PHF	0.92	0.92	0.92		0.92	0.92		0.92		
Hourly Flow Rate, HFR (veh/h)	10	1304	32		10	391		10		
Percent Heavy Vehicles	2				1					
Median Type				Undivide	ed					
RT Channelized			0				1	0		
Lanes	0	1	0		0	1		0		
Configuration	LTR				LTR					
Upstream Signal		0				0				
Minor Street		Northbound				Southbou	Ind			
Movement	7	8	9		10	11	1	12		
	L	Т	R		L	Т		R		
Volume (veh/h)	10	10	10		10	10		10		
Peak-Hour Factor, PHF	0.92	0.92	0.92		0.92	0.92		0.92		
Hourly Flow Rate, HFR (veh/h)	10	10	10		10	10		10		
Percent Heavy Vehicles	0	0	0		0	0		0		
Percent Grade (%)		0	•			0				
Flared Approach		N				N				
Storage		0				0				
RT Channelized			0					0		
Lanes	0	1	0		0	1		0		
Configuration		LTR				LTR				
Delay, Queue Length, a	nd Level of Se	ervice	•			-				
Approach	Eastbound	Westbound	1	Northbour	ld	S	outhbound			
Movement	1	4	7	8	9	10	11	12		
Lane Configuration	LTR	LTR		LTR			LTR			
v (veh/h)	10	10		30			30			
C (m) (veh/h)	1158	520		84			92			
v/c	0.01	0.02		0.36			0.33			
95% queue length	0.03	0.02		1 28	+		1 25			
Control Doloy (chuch)	0.00	10.00		70.0	+		62.0			
	0.1	12.1 D		70.0			02.0	┨───┤		
LUO	A	В								
Approach Delay (s/veh)			70.0				62.0			
Approach LOS				<u> </u>		F				

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	TW	O-WAY STOP	CONTR	OL SI	JMN	IARY				
General Information	า		Site I	nform	atio	on				
Analyst	BMF		Interse	ection			Wallings	Rd/Mar	ianna	a Blvd
Agency/Co.	GPD Grou	лр	Jurisdi	ction			City of Br	oadviev	v He	ights
Date Performed	3/2/2015		Analys	is Yea	r		2020 'No-	·Build'		
Analysis Time Period	AM Peak	Hour								
Project Description Wa	allings Road Saf	ety & Corridor St	udy							
East/West Street: Wallin	ngs Road		North/S	South S	Stree	t: <i>Mariann</i>	na Boulevar	ď		
Intersection Orientation:	East-West		Study F	Period ((hrs)	: 0.25				
Vehicle Volumes ar	nd Adjustme	nts								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5			6
	L	T	R			L	T			R
Volume (veh/h)		1210	10			10	370	-+		70
Peak-Hour Factor, PHF	0.80	0.92	0.92			0.92	0.92		0	.76
Hourly Flow Rate, HFR (veh/h)	0	1315	10			10	402			0
Percent Heavy Vehicles	2					3				
Median Type				Undiv	videa					
RT Channelized			0							0
Lanes	0	1	0			0	1			0
Configuration			TR			LT				
Upstream Signal		0					0			
Minor Street		Northbound					Southbou	ind		
Movement	7	8	9			10	11			12
	L	Т	R			L	Т			R
Volume (veh/h)	10		10							
Peak-Hour Factor, PHF	0.92	1.00	0.92			0.70	1.00		0	.70
Hourly Flow Rate, HFR (veh/h)	10	0	10		0		0			0
Percent Heavy Vehicles	0	0	0			0	0			0
Percent Grade (%)		0					0			
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0							0
Lanes	0	0	0			0	0			0
Configuration		LR								
Delay, Queue Length, a	nd Level of Se	rvice								
Approach	Eastbound	Westbound	I	Northbo	ound		S	outhbo	und	
Movement	1	4	7	8		9	10	11		12
Lane Configuration		LT		LR						
v (veh/h)		10		20						
C (m) (veh/h)		518		127	,					
v/c		0.02		0.16	5					
95% queue length		0.06		0.54	1					
Control Delay (s/veh)		12.1		38.6	, S					
		 B		- 00.0	-					
Approach Delay (s/yeh)			38.6					I	1	
Approach LOS		55.5 E								
							1			

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	TW	O-WAY STOP	CONTR	OL SU	JMN	IARY				
General Information	n		Site I	nform	atio	n				
Analyst	BMF		Interse	ection			Wallings	Rd/Cr	aia Li	n
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadvi	ew He	eights
Date Performed	3/2/2015		Analys	is Year	-		2020 'No	Build	'	<u> </u>
Analysis Time Period	AM Peak	Hour								
Project Description Wa	allings Road Sa	fety & Corridor Si	tudy							
East/West Street: Walli	ngs Road	-	North/S	South S	treet	: Craig L	ane			
Intersection Orientation:	East-West		Study I	Period ((hrs):	0.25				
Vehicle Volumes ar	nd Adjustme	ents								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5			6
	L	Т	R			L	Т			R
Volume (veh/h)		1240	10			10	360			
Peak-Hour Factor, PHF	0.80	0.92	0.92			0.92	0.92		(0.76
Hourly Flow Rate, HFR (veh/h)	0	1347	10			10	391			0
Percent Heavy Vehicles	2					3				
Median Type				Undiv	ided					
RT Channelized			0							0
Lanes	0	1	0			0	1			0
Configuration			TR			LT				
Upstream Signal		0					0			
Minor Street		Northbound					Southbou	ind		
Movement	7	8	9			10	11			12
	L	Т	R	R		L	Т			R
Volume (veh/h)	10		40							
Peak-Hour Factor, PHF	0.92	1.00	0.92		(0.70	1.00		().70
Hourly Flow Rate, HFR (veh/h)	10	0	43	43		0	0			0
Percent Heavy Vehicles	7	0	7			0	0			0
Percent Grade (%)		0	•				0			
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0							0
lanes	0	0	0			0	0			0
Configuration		LR				-	-			
Delay, Queue Length, a	nd Level of Se	rvice								
Approach	Eastbound	Westbound		Northbo	ound		s	outhb	ound	
Movement	1	4	7	8		9	10	1	1	12
Lane Configuration		LT		LR						
v (veh/h)		10		53						
C (m) (veh/h)		504		150						
v/c		0.02		0.35	;					
95% gueue length		0.06		1.46	;					
Control Delay (s/veh)		12.3		41.6	;		1			
LOS		В		E			1			
Approach Delav (s/veh)	lav (s/veh)		41.6							
Approach LOS		F								
			<u> </u>							

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	TW	O-WAY STOP	CONTR	OL SI	JMN	IARY				
General Informatio	n		Site I	nform	atic	on				
Analvst	BMF		Interse	ection			Wallings	Rd/Skvline	Dr	
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadview He	eights	
Date Performed	3/2/2015	•	Analys	is Year	r		2020 'No-	Build'	-	
Analysis Time Period	AM Peak	Hour								
Project Description W	allings Road Sa	fety & Corridor St	tudy							
East/West Street: Walli	ngs Road		North/S	South S	street	t: Skyline	Drive			
Intersection Orientation:	East-West		Study I	Period ((hrs)	: 0.25				
Vehicle Volumes a	nd Adjustme	ents								
Major Street		Eastbound	-				Westbou	nd		
Movement	1	2	3			4	5		6	
	L	Т	R			L	Т		R	
Volume (veh/h)	20	1260					360		10	
Peak-Hour Factor, PHF	0.92	0.92	0.81			0.78	0.92	().92	
Hourly Flow Rate, HFR (veh/h)	21	1369	0			0	391		10	
Percent Heavy Vehicles	1					3				
Median Type				Undiv	livided					
RT Channelized			0						0	
Lanes	0	1	0			0	1		0	
Configuration	LT								TR	
Upstream Signal		0					0			
Minor Street		Northbound	•				Southbou	ind		
Movement	7	8	9			10	11		12	
	L	Т	R			L	Т		R	
Volume (veh/h)						10			10	
Peak-Hour Factor, PHF	0.63	1.00	0.63			0.92	1.00	().92	
Hourly Flow Rate, HFR (veh/h)	0	0	0			10	0		10	
Percent Heavy Vehicles	7	0	7			4	0		4	
Percent Grade (%)		0					0			
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0						0	
Lanes	0	0	0			0	0		0	
Configuration							LR			
Delay, Queue Length, a	and Level of Se	ervice	•							
Approach	Eastbound	Westbound	1	Vorthbo	ound		S	outhbound		
Movement	1	4	7	8		9	10	11	12	
Lane Configuration	LT							LR		
v (veh/h)	21							20		
C (m) (veh/h)	1163							149		
v/c	0.02							0.13		
95% queue length	0.06							0.45		
Control Delav (s/veh)	8.2							32.9		
LOS	A							D		
Approach Delay (s/veh)								32.9		
Approach LOS			+				D			

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	TW	O-WAY STOP	CONTR	OL SI	JMN	MARY					
General Information	า		Site I	nform	atio	on					
Analyst	BMF		Interse	ection			Wallings	Rd/W	Mill F	Rd	
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadvi	ew He	eights	
Date Performed	3/2/2015		Analys	is Yea	r		2020 'No	Build	'	<u> </u>	
Analysis Time Period	AM Peak	Hour									
Project Description Wa	allings Road Sa	fety & Corridor Si	tudy								
East/West Street: Walli	ngs Road		North/S	South S	Stree	t: West M	lill Road				
Intersection Orientation:	East-West		Study I	Period	(hrs)	: 0.25					
Vehicle Volumes ar	nd Adjustme	ents									
Major Street		Eastbound					Westbou	nd			
Movement	1	2	3			4	5			6	
	L	Т	R			L	Т			R	
Volume (veh/h)		1120	150			10	360				
Peak-Hour Factor, PHF	0.80	0.92	0.92			0.92	0.92		(0.63	
Hourly Flow Rate, HFR (veh/h)	0	1217	163			10	391			0	
Percent Heavy Vehicles	1					3					
Median Type				Undiv	videa	1					
RT Channelized			0							0	
Lanes	0	1	0			0	1			0	
Configuration			TR			LT					
Upstream Signal		0					0				
Minor Street		Northbound					Southbou	ind			
Movement	7	8	9			10	11			12	
	L	Т	R			L	Т			R	
Volume (veh/h)	10		50								
Peak-Hour Factor, PHF	0.92	1.00	0.92			0.79	1.00		().79	
Hourly Flow Rate, HFR (veh/h)	10	0	54		0		0			0	
Percent Heavy Vehicles	2	0	2			4	0			4	
Percent Grade (%)		0					0				
Flared Approach		N					N	T			
Storage		0					0				
RT Channelized			0				Ů			0	
		-				0	0			0	
Configuration			- ·			0	0			0	
Delay, Queue Length, a	Ind Level of Se			1				61 - 1 -			
Approacn Movement	Eastbound	vvestbound	7		ouna	0	10			10	
Novement	I	4	1			9	10		I	12	
		L1									
v (veh/h)		10		64							
C (m) (veh/h)		494		171							
v/c		0.02		0.37	7						
95% queue length		0.06		1.60)						
Control Delay (s/veh)		12.4		38.1	1						
LOS		В		E							
Approach Delay (s/veh)	ch Delay (s/veh)		38.1								
Approach LOS		E									

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General Inform	nation							ĺ	Intersec	tion Info	ormatio	on		4441	× (,
Agency		GPD Group							Duration	h	0.25			્ય∔દ	
Analyst		BME		Analys	is Dat	e Mar 2	2015		Area Typ	, e	Other				₹. #
Jurisdiction		City of Broadview H	eiahts	Time F	Period		ak Hou	ır	PHF		0.92		- <u>→</u>	w∔e	\$ _ <u>}</u> 4 ∳
Intersection		Wallings Boad/Broa	dview F	Analys	is Yea	r 2020			Analysis	Period	1 > 7.	0			+ ₹
File Name		1 Wallings Rd Broa	adview	Rd One		/ear 2020) 'No-Bi	uild' P		T ONOG				KA	
Project Descrip	tion	Opening Year 2020	'No-Bui	ild' PM F	Peak H				MIX40					ין איז איז אין	* (*
r rojoor booonp		opening real 2020	No Bu		oann	loai									
Demand Inform	nation				EB			W	В		NB			SB	
Approach Move	ement			L	Т	R	L	Т	R	L	Т	R	L	Т	R
Demand (v), ve	h/h			130	240	100	360	74	0 160	130	440	140	210	620	270
Signal Informa	tion	1		e	5	215				\leq					Ð-
Cycle, s	154.4	Reference Phase	2		5	_ ! ≌⊕	7 ⁻ 4	7	۳R,	e		<u></u>) ₁≝ч	2	3	4
Offset, s	0	Reference Point	End	Green	22.0	35.0	22.0	12	.4 35.0	0.0		•			
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	3.6	3.6	3.6	3.6	3.6	0.0			∇		-
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	2.0	2.0	2.0) 2.0	0.0		5	6	7	Y 8
					1			. 1							
Timer Results				EBL	-	EBT	WB		WBT	NBL	-	NBT	SBL		SBT
Assigned Phase	9			3		8	7		4	1		6	5		2
Case Number				1.1		4.0	1.1		3.0	1.1		4.0	1.1		4.0
Phase Duration	, S			27.6		40.6	45.6	\$	58.6	27.6		40.6	27.6	; · ·	40.6
Change Period,	Change Period, (<i>Y+Rc</i>), s //ax Allow Headway (<i>MAH</i>), s			5.6		5.6	5.6		5.6	5.6		5.6	5.6		5.6
Max Allow Headway (<i>MAH</i>), s				4.1		4.1			4.1	4.3		4.3	4.3		4.3
Queue Clearan	Queue Clearance Time (g_s) , s			10.3	;	33.1	26.7	<u> </u>	55.0	10.4	· -	27.8	16.4	. ;	37.0
Green Extensio	n lime	(<i>g</i> e), s		0.3		1.1	1.2		0.0	0.3		4.0	0.4		0.0
Phase Call Prol	bability			1.00		1.00	1.00)	1.00	1.00		1.00	1.00		1.00
Max Out Proba	bility			0.00		1.00	0.01		1.00	0.00		0.76	0.43		1.00
Movement Gro	up Res	aults			FB			WF	3		NB	_		SB	_
Approach Move	ement				T	B	1	Т	B		Т	B		T	B
Assigned Move	ment			3	. 8	18	7	4	14	1	6	16	5	2	12
Adjusted Flow F	Rate (v)	. veh/h	_	141	370		391	804	174	141	327	303	228	510	457
Adjusted Satura	ation Flo	w Rate (<i>s</i>), veh/h/ln		1792	1787	·	1757	184	5 1563	1774	1863	1708	1774	1900	1703
Queue Service	Time (a	(-), S		8.3	31.1		24.7	53.0) 12.7	8.4	25.4	25.8	14.4	35.0	35.0
Cycle Queue C	learanc	e Time (<i>q</i> c), s		8.3	31.1		24.7	53.0) 12.7	8.4	25.4	25.8	14.4	35.0	35.0
Green Ratio (g/	(C)			0.37	0.23		0.50	0.34	0.34	0.37	0.23	0.23	0.37	0.23	0.23
Capacity (c), ve	, h/h			302	405		527	633	537	299	422	387	337	431	386
Volume-to-Cap	acity Ra	ttio (<i>X</i>)		0.468	0.913	3	0.743	1.27	0 0.324	0.472	0.775	0.783	0.678	1.184	1.184
Available Capa	city (<i>Ca</i>)	, veh/h		302	405		527	633	537	299	422	387	337	431	386
Back of Queue	(<i>Q</i>), vel	n/In (50th percentile)		3.8	16.8		10.1	47.7	7 5.0	3.8	13.1	12.3	6.9	29.5	26.6
Queue Storage	Ratio (RQ) (50th percentile))	0.95	0.00		2.06	0.00	0.39	0.32	0.00	0.00	0.58	0.00	0.00
Uniform Delay ((d1), s/v	eh		37.3	58.2		35.0	50.7	7 37.5	37.3	56.0	56.1	38.6	59.7	59.7
Incremental De	lay (<i>d</i> 2),	s/veh		1.1	24.6		5.6	133.	8 0.3	1.2	8.7	10.0	5.4	104.3	106.3
Initial Queue De	itial Queue Delay (d3), s/veh			0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (<i>d</i>), s/veh				38.4	82.8		40.6	184.	5 37.8	38.5	64.7	66.2	44.0	164.0	166.0
Level of Service (LOS)				D	F		D	F	D	D	Е	E	D	F	F
Approach Delay, s/veh / LOS				70.5		E	124.	7	F	60.5		E	141.	9	F
Intersection De	Intersection Delay, s/veh / LOS					11	0.0						F		
										1					
Multimodal Re	Multimodal Results			EB			WE	3		NB			SB		
Pedestrian LOS	Score	/ LOS													
Bicycle LOS Sc	ian LOS Score / LOS LOS Score / LOS														

				J -									j					
General Inform	nation									Inte	ersecti	ion Infe	ormati	on		비지 나지	1 b	Q.
Agency		GPD Group								Dur	ration.	h	0.25					
Analvst		BMF		Analys	is Da	ate	Mar 2.	2015		Are	ea Type)	Othe					۲. ۲.
Jurisdiction		Citv of Broadview H	leiahts	Time F	erioc	t t	PM Pe	ak Hou	r	PH	F		0.92			w† ,		↓ ↓ ↓
Intersection		Wallings Road/Wya	tt Road	Analys	is Ye	ar	2020			Ana	alvsis F	Period	1>7:	00				++ ₹
File Name		7. Wallings Rd Wva	att Rd C	Dpenina	Year	r 202	20 'No-	Build' F	PM.xu	IS	,							
Project Descrip	tion	Opening Year 2020	'No-Bui	ild' PM F	Peak	Ηοι	Jr			-						াৰা † ক	۲¥	1
, , ,		1 0																
Demand Inform	nation				E	В			W	В			NB			SE	3	
Approach Move	ement			L	Т	-	R	L	٦	-	R	L	Т	R	L	Т		R
Demand (v), ve	h/h				53	0	70	190	12	70		50	0	50				
				li-	1 14						i	- II						
Signal Informa	tion	1		-		\leftarrow												-+-
Cycle, s	121.8	Reference Phase	2			4	R ″	1 str	2					1			3	
Offset, s	0	Reference Point	End	Green	15.0	0	60.0	30.0	0.0)	0.0	0.0			_			-
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	3.6	3.6		3.6 0.0)	0.0	0.0						
Force Mode	Fixed	Simult. Gap N/S	On	Red 2.0		0 2.0		2.0 0.0)	0.0	0.0		5	6		7	8
			_			_												
Timer Results				EBL	-	E	BT	WBI	-	W	BT	NBL	-	NBT	SBI		S	BT
Assigned Phase	9					2	2	1	_	6	6			4		\rightarrow		
Case Number						8	.3	1.0		4.	.0			12.0		_		
Phase Duration	, S					65	5.6	20.6	;	86	5.2			35.6		_		
Change Period, (<i>Y+Rc</i>), s Max Allow Headway (<i>MAH</i>), s						5	0.6	5.6		5.	.6			5.6		_		
Max Allow Head	Max Allow Headway (<i>MAH</i>), s					1	.0	1.1	_	1.	.0			1.4		_		
Queue Clearance Time (g_s) , s						36.4		8.1		82	2.6			8.4		\rightarrow		
Green Extensio	n Time	(<i>g</i> e), s				0.0		0.0		0.	.0			0.0		\rightarrow		
Phase Call Prot	bability					1.00		1.00)	1.(00			1.00		_		
Max Out Probal	bility				0.00		0.00)	1.(00			0.00					
Movement Gro	up Res	aults			FF	3			WF	3			NB			SF	{	_
Approach Move	ement				 T		R	1	T		B	1	Т	B	1	Т		B
Assigned Move	ment				2	+	12	1	6	+		7	4	14	_	<u> </u>	+	
Adjusted Flow F	Rate (v)	veh/h			652	>		207	138	0			109		-	-	+	
Adjusted Satura	ation Flo	w Rate (<i>s</i>), veh/h/ln			182	4		1723	181	0			1671				+	
Queue Service	Time (a	s). S			34.4	4		6.1	80.6	3			6.4				+	
Cvcle Queue C	learance	e Time (<i>a</i> c), s			34.4	4		6.1	80.6	3			6.4				+	
Green Ratio (<i>q</i> /	(C)	(30), 0	_		0.49	9		0.63	0.66	3		_	0.25				+	_
Capacity (c), ve	h/h				899	3		430	119	7			411				+	
Volume-to-Capa	acity Ra	tio (<i>X</i>)			0.72	26		0.480	1.15	3			0.264				╈	
Available Capa	city (<i>Ca</i>),	veh/h			899	3		430	119	7			411				+	
Back of Queue	(<i>Q</i>), veł	n/In (50th percentile)			14.9	9		2.2	55.7	7			2.7				╈	
Queue Storage	Ratio (RQ) (50th percentile))		0.00	0		0.58	0.00)			0.00				+	
Uniform Delay ((d1), s/ve	eh	,		24.4	4		16.8	20.6	3			37.0				╈	
Incremental De	lav (<i>d</i> 2).	s/veh			2.6	;		0.3	78.7	7			0.1				+	
Initial Queue De	Initial Queue Delay (d2), s/ven				0.0)		0.0	0.0				0.0				+	
Control Delay (<i>d</i>), s/veh					27.0	0		17.2	99.3	3			37.1				+	
Level of Service (LOS)					С			В	F				D				+	_
Approach Delay, s/veh / LOS				27.0		(С	88.6	;	F	F	37.1		D	0.0			
Intersection Del	lay, s/ve	h / LOS					69	.1						E				
	Intersection Belay, swerry 200																	
Multimodal Re	sults				EB	3			WE	3			NB			SE	}	
Pedestrian LOS	Score	/ LOS																
Bicycle LOS Sc	edestrian LOS Score / LOS cycle LOS Score / LOS																	

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General Inform	nation								Int	tersect	ion Inf	ormati	on		4241.	6 L
Agency		GPD Group							Du	uration,	h	0.25			*	
Analyst		BMF		Analys	is Date	e Mar 2	2015		Are	ea Typ	e	Othe				۲. ۲.
Jurisdiction		City of Broadview H	leights	Time P	eriod	PM Pe	eak Hou	ır	PH	HF		0.92			w ‡ e	, <u>≻</u> ∕_
Intersection		Wallings Road/Wrig	ht Roac	Analys	is Yea	r 2020			An	alysis	Period	1>7:	00			*
File Name		12. Wallings Rd Wr	right Rd	Openir	ig Yea	r 2020 'N	lo-Build	PM.	xus	;					-	4
Project Descrip	tion	Opening Year 2020	'No-Bui	ild' PM F	eak ⊢	lour									1 1 4 7 1 1 1 1 1 1 1 1 1	1 4
							1				14					
Demand Inform	nation				EB			W	/B			NB			SB	
Approach Move	ement			L	Т	R	L		Г	R	L	Т	R	L	Т	R
Demand (v), ve	h/h			10	560	10	20	14	10	30	20	10	10	20	10	20
Oine al la famma	4!			1	1											
Signal Informa			0		La .	1.3 \$	1245									ሐ
Cycle, s	98.4	Reference Phase	2			R	5	7					1	\$ 2	3	4
Offset, s	0	Reference Point	End	Green	15.0	47.0	20.0	0.0	0	0.0	0.0			<u>5</u>		
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	3.6	3.6	3.2	0.0	0	0.0	0.0					Ý
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	2.0	2.0	0.0	0	0.0	0.0	_	5	6	7	8
T D U			_	EDI		EDT			14		ND		NIDT	0.01		ODT
Assisted Dhose				EBL		EBI	WB		V\	VB1	NBI	-	NBI	SBL	-	SBI
Assigned Phase	e			5		2	1	\rightarrow		6			8		_	4
Case Number				1.1		4.0	1.1	<u> </u>	4	+.0		_	8.0			8.0
Phase Duration	Change Period, $(Y+R_c)$, s			20.6		52.6	20.6		5.	2.6			25.2		-	25.2
Change Period	Change Period, (Y+Rc), s Jax Allow Headway (MAH), s			5.0		5.6	5.0		0	0.0			5.Z		_	5.2
Max Allow Headway (<i>MAH</i>), s				2.1		0.0	2.1		1	0.0 0.0			4.3			4.5
Groop Extonsio	Queue Clearance Time (g_s) , s			2.2		19.6	2.5		4	9.0			4.0			4.0
Bhase Call Pro	hability	(<i>ge</i>), s		1.00		1 00	1.00		1	00			1.00		_	1.00
Max Out Proba	bility			0.00		0.07	0.00	2	1	.00			0.00			0.00
Max Out 1 100a	onity			0.00		0.97	0.00	5	1.	.00			0.00			0.00
Movement Gro	oup Res	ults			EB			WE	3			NB			SB	
Approach Move	ement			L	Т	R	L	Т		R	L	Т	R	L	Т	R
Assigned Move	ment			5	2	12	1	6		16	3	8	18	7	4	14
Adjusted Flow I	Rate (v)	, veh/h		11	620		22	156	5			43			54	
Adjusted Satura	ation Flo	w Rate (s), veh/h/ln		1774	1857		1740	182	0			1549			1539	
Queue Service	Time (g	/s), S		0.2	25.7		0.5	47.0	0			0.0			0.0	
Cycle Queue C	learance	e Time (<i>g</i> c), s		0.2	25.7		0.5	47.0	0			2.0			2.6	
Green Ratio (g/	′C)			0.63	0.48		0.63	0.48	8			0.20			0.20	
Capacity (c), ve	eh/h			344	887		492	869	9			370			364	
Volume-to-Capa	acity Ra	tio (<i>X</i>)		0.032	0.699		0.044	1.80	00			0.118			0.149	
Available Capa	city (<i>c</i> a),	veh/h		344	887		492	869	9			370			364	
Back of Queue	(<i>Q</i>), veł	n/In (50th percentile)		0.1	11.1		0.2	106.	.7			0.9			1.1	
Queue Storage	Ratio (RQ) (50th percentile)	0.03	0.00		0.05	0.0	0			0.00			0.00	
Uniform Delay	(<i>d</i> 1), s/ve	əh		18.0	20.1		10.8	25.	7			32.0			32.3	
Incremental De	lay (<i>d2</i>),	s/veh		0.0	3.1		0.0	364.	.8			0.1			0.2	
Initial Queue De	nitial Queue Delay (d3), s/veh			0.0	0.0		0.0	0.0				0.0			0.0	
Control Delay (d), s/veh				18.0	23.3		10.9	390.	.5			32.2			32.4	
Level of Service (LOS)				В	С		В	F				С			С	
Approach Delay	Approach Delay, s/veh / LOS			23.2		С	385.	3		F	32.2	2	С	32.4		С
Intersection De	Intersection Delay, s/veh / LOS					27	1.8							F		
Multimodal Re	Aultimodal Results			EB			WE	3			NB			SB		
Pedestrian LOS	Score	/ LOS														
Bicycle LOS Sc	cycle LOS Score / LOS															

General Information				ignan	200	inter se	SCLION	ne	suns	Ju	mma	ıу				
Conoral Inform	nation								Intore	ootio	n Info	rmatio	'n		42444	ų.
	ation								Durati	on h		0.25)		4 L	
Apolyet				Analyc	ic Dat	o Mor 2	2015		Aroa T			0.25 Othor		- 1		₹
Analysi		City of Broadview H	loiahte	Time F	oriod		, 2015 ook Hou	r		ype		0 02		- → ☆>	N w∔e	<u>≻</u> +
Intersection		Wallings Boad / L-7				r 2020	ak nou	-	Analys		ariod	1 7.0	0			
File Name		16 Wallings Rd L7	7 SB C	Doping	Voar 2	020 'No.	Build' P	Mvu	Analys	51516	enou	127.0				E C
Project Description	tion	Opening Vear 2020	/ 00_0	ild' PM F	Doak H		Dulla 1	IVI.AU	5					-	41471	
T Toject Descrip	lion	Opening real 2020	NO-Du		Carri	ioui								_		
Demand Inform	nation				EB			W	В			NB			SB	
Approach Move	ment			L	Т	R	L	Т		R	L	Т	R	L	Т	R
Demand (v), ve	h/h				480	110	60	53	80					270	10	930
				10-	11											
Signal Informa	tion			÷		_216										
Cycle, s	90.0	Reference Phase	2		₿"								1	₹ 2	3	4
Offset, s	0	Reference Point	End	Green	54.5	24.5	0.0	0.0) 0.	.0	0.0					
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	3.6	3.0	0.0	0.0) 0.	.0	0.0					Φ
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.9	2.5	0.0	0.0) 0.	.0	0.0		5	6	7	8
Timer Results				EBL	-	EBT	WBI		WBT		NBL		NBT	SBL		SBT
Assigned Phase	9					2		\rightarrow	6						_	8
Case Number						8.0		\rightarrow	8.0	_						0.0
Phase Duration	, S					60.0		\rightarrow	60.0	_						30.0
Change Period,	(Y+Rc)	, S				5.5			5.5							5.5
Max Allow Head	dway (<i>N</i>	<i>1AH</i>), s				2.2		_	2.2	_						4.3
Queue Clearan	ce Time	e (<i>gs</i>), s				21.3		\rightarrow	30.3						2	26.5
Green Extensio	n Time	(<i>g</i> e), s			_	1.0		_	1.0	_					_	0.0
Phase Call Prol	bability					1.00		\rightarrow	1.00							.00
Max Out Proba	bility					0.00			0.00							.00
Movement Gro	up Res	aults			FB			WF	}			NB			SB	
Approach Move	ement				T	B		Т	R		1	Т	R		Т	R
Assigned Move	ment			_	2	12	1	6			_			3	8	18
Adjusted Flow F	Rate (v)	. veh/h			641			641						293	1022	
Adjusted Satura	ation Flo	w Rate (<i>s</i>), veh/h/ln			1820			150	6					1740	1551	
Queue Service	Time (g	(), S			19.3			9.0						13.3	24.5	
Cycle Queue C	learance	e Time (<i>g</i> _c), s			19.3			28.3	3					13.3	24.5	
Green Ratio (g/	(C)				0.61			0.61	i					0.27	0.27	
Capacity (c), ve	h/h				1102			956	;					474	422	
Volume-to-Cap	acity Ra	tio (<i>X</i>)			0.582	:		0.67	1					0.620	2.420	
Available Capa	city (<i>Ca</i>),	, veh/h			1102			956	;					474	422	
Back of Queue	(<i>Q</i>), veł	n/In (50th percentile)			6.8			7.1						5.6	84.5	
Queue Storage	Ratio (RQ) (50th percentile)		0.00			0.00)					0.00	0.00	
Uniform Delay ((d1), s/ve	eh			10.8			11.9)					28.7	32.8	
Incremental De	lay (<i>d2</i>),	s/veh			0.5			1.5						2.5	646.3	
Initial Queue De	elay (<i>d</i> 3)	, s/veh			0.0			0.0						0.0	0.0	
Control Delay (d), s/veł	1			11.3			13.4	1					31.1	679.1	
Level of Service	e (LOS)				В			В						С	F	
Approach Delay	/, s/veh	/ LOS		11.3		В	13.4		В		0.0			534.	5	F
Intersection De	lay, s/ve	h / LOS				27	6.7							F		
Multimodal Re	sults				EB			WE	3			NB			SB	
Pedestrian LOS	Score	/ LOS														
Bicycle LOS Sc	ore / LC	DS														

				.g							 ,				
General Inform	ation								Intersec	tion In	ormatio	n	al al	nt hante t	la la
Agency	lation	GPD Group							Duration	h	0.25	<u>, , , , , , , , , , , , , , , , , , , </u>			
Analyst		BMF		Analys	is Dat	e Mar 2	2015		Area Tvr)e	Other		- 1 - 4		بر 4
Jurisdiction		City of Broadview H	leiahts	Time F	Period		eak Hou	r	PHF		0.92		→ -\$	w∔e	
Intersection		Wallings Road/I-77	NB/Mill	Analys	is Yea	r 2020	Jan Tieu		Analysis	Period	1> 7:	00	4		 7
File Name		17. Wallings Rd I-7	7 NB C	Doenina	Year 2	2020 'No-	Build' P	M.xu	s					.	<u>_</u>
Project Descrip	tion	Opening Year 2020	'No-Bui	Id' PM F	Peak H	lour			-				- n	ገ 4 1 ቀ የ	P 7
-,				-											
Demand Inform	nation				EB			W	В		NB			SB	
Approach Move	ment			L	Т	R	L	Т	R	L	Т	R	L	Т	R
Demand (v), ve	h/h			250	370	130	10	18	0 120	410	70	60			
				1	1	_		_			_		_		
Signal Informa	tion			-	La	28	=								-
Cycle, s	90.0	Reference Phase	2		R	Ř	1 - Stř	2				1		3	
Offset, s	0	Reference Point	End	Green	0.0	59.7	19.7	0.0	0.0	0.0			<u> </u>		
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	4.0	3.6	3.0	0.0	0.0	0.0		~ `			
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.9	1./	2.3	0.0	0.0	0.0	_	5	6	7	8
Time or Desculte						EDT			MDT			NDT			ODT
Assisted Desc				EBL	-	EBI	VVBI	-	WBI	NE		INB I	SBL	·	SBI
Assigned Phase	9			5		2		_	6			4		\rightarrow	
Case Number				0.0		14.0			8.3			12.0			
Phase Duration	, S	-		0.0		65.0		_	65.0			25.0		\rightarrow	
Change Period,	(Y+Hc)	, S		6.9		5.3			5.3		_	5.3	<u> </u>		
	away (<i>IV</i>	(α) , s		0.0		2.3	<u> </u>		2.3			0.3 01.7	<u> </u>		
Green Extensio	n Timo	$(g_s), s$		0.0		1.0			9.2			21.7			
Bhase Call Prot		(<i>ge</i>), S		0.0		1.2	<u> </u>	+	1.1			1.00		+	
Max Out Proba						0.00			0.02			1.00			
Max Out Flobal	Jiily					0.00			0.02			1.00			
Movement Gro	up Res	ults			EB			WE	;		NB			SB	
Approach Move	ment			L	Т	R	L	Т	R	L	Т	R	L	Т	R
Assigned Move	ment			5	2	12	1	6	16	7	4	14			
Adjusted Flow F	Rate (v)	, veh/h			815			337			587				
Adjusted Satura	ation Flo	w Rate (s), veh/h/ln			1482			1736	3		1744				
Queue Service	Time (g	s), S			6.0			0.0			19.7				
Cycle Queue C	learance	e Time (<i>g</i> c), s			33.3			7.2			19.7				
Green Ratio (g/	(C)				0.66			0.66	3		0.22				
Capacity (c), ve	h/h				1039			1193	3		382				
Volume-to-Capa	acity Ra	tio (X)			0.785	5		0.28	2		1.538				
Available Capao	city (<i>c</i> a),	veh/h			1039			1193	3		382				
Back of Queue	(<i>Q</i>), veł	n/In (50th percentile)			10.3			2.2			35.3				
Queue Storage	Ratio (RQ) (50th percentile))		0.00			0.00)		0.00				
Uniform Delay (d1), s/ve	eh			10.9			6.3			35.2				
Incremental De	lay (<i>d2</i>),	s/veh			3.7			0.0			254.9				
Initial Queue De	elay (<i>d</i> 3)	, s/veh			0.0			0.0			0.0				
Control Delay (d), s/veł	1			14.6			6.4			290.0				
Level of Service	e (LOS)				В			Α			F				
Approach Delay	/, s/veh	/ LOS		14.6	i	В	6.4		А	290	.0	F	0.0		
Intersection Del	ay, s/ve	h / LOS				10	5.9						F		
											• • • =				
Multimodal Re	sults	// 00			EB			WE			NB			SB	
Pedestrian LOS	Score	/ LUS													
Bicycle LOS Sc	ore / LC	05													

	TW	O-WAY STOP	CONTR	OL SI	JMN	IARY					
General Informatio	า		Site I	nform	atic	n					
Analyst	BMF		Interse	ection			Wallings I Drive	Road/Elm	nhurst		
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadview	Heights		
Date Performed	3/2/2015		Analys	is Year	r		2020 'No-	Build'	loiginto		
Analysis Time Period	PM Peak	Hour			1		2020 110	Dulla			
Project Description Wa	allings Road Sa	fety & Corridor St	udy								
East/West Street: Wallin	ngs Road		North/S	South S	Street	:: Elmhurs	t Drive				
Intersection Orientation:	East-West		Study F	Period ((hrs)	0.25					
Vehicle Volumes ar	nd Adjustme	nts									
Major Street		Eastbound					Westbou	nd			
Movement	1	2	3			4	5		6		
	L	T	R			L	Т		R		
Volume (veh/h)	10	580				4.00	1240		10		
Peak-Hour Factor, PHF	0.92	0.92	1.00			1.00	0.92		0.92		
(veh/h)	10	630	0			0	1347		10		
Percent Heavy Vehicles	1					0					
Median Type		1		Undiv	/ided						
RT Channelized			0						0		
Lanes	0	1	0		0 1		0 1			0	
Configuration	LT								TR		
Upstream Signal		0					0				
Minor Street		Northbound					Southbou	Ind			
Movement	7	8	9			10	11		12		
	L	Т	R			L	Т		L T		R
Volume (veh/h)						10	0		20		
Peak-Hour Factor, PHF	1.00	1.00	1.00	00 0.92 1.00			0.92				
Hourly Flow Rate, HFR (veh/h)	0	0	0			10	0		21		
Percent Heavy Vehicles	0	0	0			0	0		0		
Percent Grade (%)		0					0				
Flared Approach		N					N				
Storage		0					0				
RT Channelized			0						0		
Lanes	0	0	0			0	0		0		
Configuration							LR				
 Delay, Queue Length, a	nd Level of Se	rvice					•				
Approach	Eastbound	Westbound		Northbo	ound		S	outhbour	ld		
Movement	1	4	7	8		9	10	11	12		
Lane Configuration	LT							LR			
v (veh/h)	10							31			
C (m) (veh/h)	510							116			
v/c	0.02			-				0.27			
95% queue length	0.06				1 00						
Control Delay (s/veh)	12.2				47.0	1					
	, <u>,</u> , <u>,</u> <u>,</u> <u>,</u> <u>,</u> <u>,</u> <u>,</u> <u>,</u> <u>,</u>				F7.0						
LOU Approach Doloy (a/yah)	D							47.0	1		
Approach LCC							47.0				
Approach LOS							E				

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	TW	O-WAY STOP	CONTR	OL SU	JMMARY			
General Informatio	า		Site I	nform	ation			
Analyst	BMF		Interse	ection		Wallings I Road	Road/Long	view
Agency/Co.	GPD Gro	ир	Jurisd	iction		City of Br	oadview H	eiahts
Date Performed	3/2/2015		Analys	sis Year		2020 'No	Build'	cigino
Analysis Time Period	PM Peak	Hour				2020 110	Dalla	
Project Description Wa	allings Road Sa	fety & Corridor St	udy					
East/West Street: Wallin	ngs Road		North/	South S	treet: Long	view Road		
Intersection Orientation:	East-West		Study	Period (hrs): 0.25			
Vehicle Volumes ar	nd Adjustme	nts						
Major Street		Eastbound				Westbou	nd	
Movement	1	2	3		4	5		6
	L	T	R		L	Т		R
Volume (veh/h)	10	580				1240		10
Peak-Hour Factor, PHF	0.92	0.92	1.00)	1.00	0.92		0.92
Hourly Flow Rate, HFR (veh/h)	10	630	0		0	1347		10
Percent Heavy Vehicles	1				0			
Median Type				Undiv	ided			
RT Channelized			0					0
Lanes	0	1	0		0	1		0
Configuration	LT							TR
Upstream Signal		0			0			
Minor Street		Northbound				Southbou	ind	
Movement	7	8	9		10	11		12
	L	Т	R		L	Т		R
Volume (veh/h)				10			10	
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00 0.92 1.00			0.92	
Hourly Flow Rate, HFR (veh/h)	0	0	0		10	0		10
Percent Heavy Vehicles	0	0	0		0	0		0
Percent Grade (%)		0				0		
Flared Approach		N				N		
Storage		0				0		
RT Channelized			0					0
Lanes	0	0	0		0	0		0
Configuration			1			LR		
 Delay, Queue Length, a	nd Level of Se	rvice				-		
Approach	Eastbound	Westbound		Northbo	ound	S	outhbound	
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	10						20	
C (m) (veh/h)	510						96	
v/c	0.02						0.21	
95% queue length	0.06						0.73	
Control Delay (s/veh)	12.2						52.1	
108	 				F			
Approach Delay (s/yoh)							52 1	I
Approach LOS							52.1 E	
Approach LOS						F		

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	TW	O-WAY STOP	CONTR	OL SU	MMA	٦Y				
General Information	า		Site I	nform	ation					
Analyst	BMF		Interse	ection			Wallings	Rd/Ch	nestni	ıt Blvd
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadvie	ew He	eights
Date Performed	3/2/2015	•	Analys	sis Year			2020 'No	-Build'	1	-
Analysis Time Period	PM Peak	Hour								
Project Description Wa	allings Road Sa	fety & Corridor Si	tudy							
East/West Street: Walli	ngs Road		North/S	South St	treet: C	Chestn	ut Boulevar	ď		
Intersection Orientation:	East-West		Study I	Period (hrs): 0	.25				
Vehicle Volumes ar	nd Adjustme	ents								
Major Street		Eastbound	_				Westbou	ind		
Movement	1	2	3		4		5			6
	L	T	R		L		Т			R
Volume (veh/h)		560	30		40		1240			
Peak-Hour Factor, PHF	0.92	0.92	0.92		0.92	2	0.92			0.92
Hourly Flow Rate, HFR (veh/h)	0	608	32		43		1347			0
Percent Heavy Vehicles	2				1					
Median Type				Undivi	ided					
RT Channelized			0	0 0 0						0
Lanes	0	1	0		0		1			0
Configuration			TR	TR LT						
Upstream Signal		0				0				
Minor Street		Northbound				Southbound				
Movement	7	8	9	9 10		11			12	
	L	Т	R		L		Т			R
Volume (veh/h)	10		10							
Peak-Hour Factor, PHF	0.92	0.92	0.92	· · · · ·	0.92	2	0.92		0	.92
Hourly Flow Rate, HFR (veh/h)	10	0	10		0		0			0
Percent Heavy Vehicles	0	0	0		0		0			0
Percent Grade (%)		0					0			
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0							0
Lanes	0	0	0		0		0			0
Configuration		I R	Ť				Ť			•
Delay Queue Length	I avel of Se									
Approach	Fastbound	Westbound		Northbo	und		S	outhb	ound	
Movement	1	4	7	8		9	10	1	1	12
Lane Configuration		LT		LR						
v (veh/h)		43		20						
C (m) (veh/h)		949		104						
v/c		0.05		0.19						
95% queue length		0.14		0.67						
Control Delay (s/veh)		9.0		47.7						
LOS		A		E						
Approach Delav (s/veh)			47.7							
Approach LOS			47.7 E							

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	TW	O-WAY STOP	CONTR		UMN	MARY				
General Information	n		Site I	nform	natio	on				
Analyst	BMF		Interse	ection			Wallings	Rd/Ov	verloo	k Ave
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadvie	ew He	eights
Date Performed	3/2/2015	•	Analys	is Yea	r		2020 'No-	Build'	,	-
Analysis Time Period	PM Peak	Hour								
Project Description W	allings Road Sa	fety & Corridor Si	tudy							
East/West Street: Walli	ngs Road	-	North/S	South S	Stree	t: Overloo	ok Avenue			
Intersection Orientation:	East-West		Study I	Period	(hrs)	: 0.25				
Vehicle Volumes ar	nd Adjustme	ents								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5			6
	L	Т	R			L	Т			R
Volume (veh/h)		560	10			30	1270			
Peak-Hour Factor, PHF	0.88	0.92	0.92			0.92	0.92		(.86
Hourly Flow Rate, HFR (veh/h)	0	608	10			32	1380			0
Percent Heavy Vehicles	2					1				
Median Type				Undiv	/idea	1				
RT Channelized			0							0
Lanes	0	1	0			0	1			0
Configuration			TR			LT	0			
Upstream Signal		0					0			
Minor Street		Northbound		Sout		Southbou	ind			
Movement	7	8	9			10	11			12
	L	Т	R			L	Т			R
Volume (veh/h)	10		20							
Peak-Hour Factor, PHF	0.92	1.00	0.92			0.67	1.00		(.67
Hourly Flow Rate, HFR (veh/h)	10	0	21			0	0			0
Percent Heavy Vehicles	0	0	0			0	0			0
Percent Grade (%)		0					0			
Flared Approach		N					N			
Storage	-	0					0			
RT Channelized	_		0							0
	0	0	0			0	0			0
Configuration		I R				0	0			0
Approach	Eastbound	Westbound	,	Jorthh	ound	1		outhh	ound	
Approach Movement		4	7	8	Juna	9	10	1	1	12
Lane Configuration	•	I T	· · ·						·	
		20		21						
		32		31						
C (m) (ven/n)		967		146)					
v/c		0.03		0.21	1					
95% queue length		0.10		0.77	7					
Control Delay (s/veh)		8.9		36.2	2					
LOS		A		E						
Approach Delay (s/veh)			36.2							
Approach LOS				E						

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	TW	O-WAY STOP	CONTR	OL SL	JMN	IARY			
General Informatio	n		Site I	nform	atio	n			
Analvst	BMF		Interse	ection			Wallings	Rd/McCrea	rv Rd
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadview He	eights
Date Performed	3/2/2015		Analys	sis Year	r		2020 'No-	·Build'	- -
Analysis Time Period	PM Peak	Hour							
Project Description W	allings Road Sa	fetv & Corridor St	udv						
East/West Street: Walli	ngs Road		North/S	South S	treet	: McCrea	ry Road		
Intersection Orientation:	East-West		Study I	Period ((hrs):	0.25	•		
Vehicle Volumes ar	nd Adjustme	ents							
Major Street		Eastbound					Westbou	nd	
Movement	1	2	3			4	5		6
	L	Т	R			L	T		R
Volume (veh/h)	10	570					1260		60
Peak-Hour Factor, PHF	0.92	0.92	0.89			0.82	0.92	().92
Hourly Flow Rate, HFR (veh/h)	10	619	0			0	1369		65
Percent Heavy Vehicles	1					2			
Median Type		_		Undiv	ided				
RT Channelized			0						0
Lanes	0	1	0			0	1		0
Configuration	LT								TR
Upstream Signal		0					0		
Minor Street		Northbound	orthbound				Southbou	Ind	
Movement	7	8	9			10	11		12
		Т	R				Т		R
Volume (veh/h)						20			40
Peak-Hour Factor PHF	0.57	1 00	0.57			0.92	1 00	(192
Hourly Flow Rate, HFR									
(veh/h)	0	0	0			21	0		43
Percent Heavy Vehicles	4	0	4			0	0		0
Percent Grade (%)		0					0		
Flared Approach		N					Ν		
Storage		0					0		
RT Channelized			0						0
Lanes	0	0	0			0	0		0
Configuration							LR		
Delay, Queue Length, a	and Level of Se	ervice							
Approach	Eastbound	Westbound	1	Northbo	ound		S	outhbound	
Movement	1	4	7	8		9	10	11	12
Lane Configuration	LT							LR	
v (veh/h)	10							64	
C. (m) (veh/h)	477							109	
	0.02							0.50	
0.50/ augus longth	0.02				0.03				
So /o queue leligili	0.00		2.0			2.04			
Control Delay (s/ven)	12.7				/0.9				
LOS	В		-			F			
Approach Delay (s/veh)			76.9			76.9			
Approach LOS			F						

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	тw	O-WAY STOP	CONTR	OL S	UMN	IARY			
General Informatio	า		Site I	nform	natio	on			
Analyst	BMF		Interse	ection			Wallings I	Rd/Majes	tic Oaks
Agency/Co.	GPD Gro	ир	luriod	iotion			II City of Pr	oodviow	laiahta
Date Performed	3/2/2015	•	Junsa		r			Dadview i	reignts
Analysis Time Period	PM Peak	Hour		515160	11		2020 110-	·Dullu	
Project Description Wa	allings Road Sa	fety & Corridor St	udy				•		
East/West Street: Walling	ngs Road	-	North/S	South S	Stree	t: <i>Majestic</i>	: Oaks Trail	1	
Intersection Orientation:	East-West		Study	Period	(hrs)	: 0.25			
Vehicle Volumes ar	nd Adjustme	nts							
Major Street		Eastbound					Westbou	nd	
Movement	1	2	3			4	5		6
	L	Т	R			L	Т		R
Volume (veh/h)	10	570					1450		10
Peak-Hour Factor, PHF	0.92	0.92	0.89)		0.82	0.92		0.92
Hourly Flow Rate, HFR (veh/h)	10	619	0			0	1576		10
Percent Heavy Vehicles	1					2			
Median Type				Undi	videa				
RT Channelized			0						0
Lanes	0	1	0		0 1			0	
Configuration	LT								TR
Upstream Signal		0					0		
Minor Street		Northbound					Southbou	Ind	
Movement	7	8	9			10	11		12
	L	Т	R			L	Т		R
Volume (veh/h)						10			10
Peak-Hour Factor, PHF	0.57	1.00	0.57	7		0.92	1.00		0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0			10	0		10
Percent Heavy Vehicles	4	0	4			0	0		0
Percent Grade (%)		0	•				0	•	
Flared Approach		N					N		
Storage		0					0		
RT Channelized			0						0
Lanes	0	0	0			0	0		0
Configuration						-	LR		-
Delav. Queue Length. a	nd Level of Se	rvice	•						
Approach	Eastbound	Westbound		Northb	ound		S	outhboun	d
Movement	1	4	7	8		9	10	11	12
Lane Configuration	LT							LR	
v (veh/h)	10							20	
C (m) (veh/h)	417							70	
v/c	0.02							0.29	
95% queue length	0.02					1 03			
Control Dolor (alreh)	12.07				75.0				
Control Delay (s/ven)	13.0					/ J. Ŏ _			
	В	ļ						<i>F</i>	
Approach Delay (s/veh)								75.8	
Approach LOS			F						

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	TW	O-WAY STOP	CONTR	OL SI	JMN	IARY				
General Informatio	n		Site Ir	nform	atio	on				
Analyst	BMF		Interse	ection			Wallings	Rd/Cr	eeksi	de Trce
Agency/Co.	GPD Grou	ıр	Jurisdi	ction			City of Br	oadvie	ew He	eights
Date Performed	3/2/2015		Analys	is Yea	r		2020 'No-	·Build'		
Analysis Time Period	PM Peak	Hour								
Project Description Wa	allings Road Saf	ety & Corridor St	udy							
East/West Street: Walli	ngs Road		North/S	South S	Stree	t: Creeksi	de Terrace			
Intersection Orientation:	East-West		Study F	Period	(hrs)	: 0.25				
Vehicle Volumes ar	nd Adjustme	nts								
Major Street		Eastbound					Westbou	nd		-
Movement	1	2	3			4	5			6
	L	570	R			L				R
Volume (ven/n)	0.00	570	10			10	1440			
Peak-Hour Factor, PHF	0.80	0.92	0.92			0.92	0.92		ι).70
(veh/h)	0	619	10			10	1565			0
Percent Heavy Vehicles	2					1				
Median Type				Undiv	/idea	1				
RT Channelized			0							0
Lanes	0	1	0			0	1			0
Configuration			TR			LT				
Upstream Signal		0					0			
Minor Street		Northbound					Southbou	ind		
Movement	7	8	9 10		11			12		
	L	Т	R			L	Т			R
Volume (veh/h)	20		10							
Peak-Hour Factor, PHF	0.92	1.00	0.92			0.70	1.00		C).70
Hourly Flow Rate, HFR (veh/h)	21	0	10		0 0				0	
Percent Heavy Vehicles	5	0	5			0	0			0
Percent Grade (%)		0	1				0			
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0							0
Lanes	0	0	0			0	0			0
Configuration		LR								
Delay, Queue Length, a	nd Level of Sei	rvice	•							
Approach	Eastbound	Westbound	1	Vorthbo	ound		S	outhb	ound	
Movement	1	4	7	8		9	10	1	1	12
Lane Configuration		LT		LR						
v (veh/h)		10		31						
C (m) (veh/h)		958		66						
v/c		0.01	0.47							
95% queue length		0.03		1.86	<u>5</u>					
Control Delay (s/veh)		8.8		100	7					
LOS		A		F	-					
Approach Delav (s/veh)			100.7			I				
Approach LOS				F						
							I			

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General Information Site Information Analysit BMF Agency/Co. GPD Group Date Performed 32/2015 Analysis Time Period PM Peak Hour Date Performed PM Peak Hour Analysis Time Period PM Peak Hour Description Weilings Road Safety & Corridor Study East/West Street Wallings Road Safety & Corridor Study East/West Street Sludy Period (Ins): 0.25 Vehicle Volumes and Adjustments Budy Street Sludy Period (Ins): 0.25 Workment 1 2 3 4 6 6 Movement 1 2 3 4 6 6 Movement 10 560 10 10 1430 10 Percent Heavy Vehicles 1 - - 1 - - RT Channelized 0 1 0 0 1 0 2 Reak-Hour Factor, PHF 0.92 0.92 0.92 0.92 0.92		тw	O-WAY STOP	CONTR		IMARY				
Analyst BMF Agency/Co. GPD Group Date Performed 3/2/2015 Analysis Time Period PM Peak Hour Project Description Wallings Road Safety & Corridor Study EastWest Street Worth/South Street: Journame Project Description Wallings Road Safety & Corridor Study EastWest Street Westbound Major Street Eastbound Morement 1 2 1 2 3 4 Valume (veh/h) 10 560 10 10 Movement 1 2 3 4 5 6 Valume (veh/h) 10 560 10 10 1430 10 Percent Heavy Vehicles 1 - - 1 - - RT Channelized 0 1 0 0 1 0 Upstream Signal 0 10 10 10 10 10 Upstream Signal 0 0 0 <th>General Informatio</th> <th colspan="9">Site Information Wallings Rd/Joyce</th>	General Informatio	Site Information Wallings Rd/Joyce								
Agency/Co. GPD Group Date Performed City of Broadview Heights Analysis Time Period Division City of Broadview Heights Analysis Year Division City of Broadview Heights 2020 No-Build" Project Description Wallings Road Safety & Corridor Study East-West 2020 No-Build" EastWest Street Wallings Road North/South Street: Joyce Road/Firehouse East-West Wajor Street East-West Study Period (hrs): 0.25 Volume (veh/h) 10 560 10 10 1430 10 Percent Heavy Vehicles 1 - R -	Analyst	BMF		Interse	ection		Wallings I Rd/Eirebo	Rd/Joyce		
Date Performed 3/2/2015 Date Serior Date Serior <thdate serior<="" th=""> <thdate serior<="" th=""></thdate></thdate>	Agency/Co.	GPD Gro	ир	Jurisdi	ction		City of Br	nadview H	eiahts	
Project Description Wallings Road Safety & Corridor Study Description Project Description Wallings Road North/South Street: Joyce Road/Firehouse EastWest Street Westbourd North/South Street: Joyce Road/Firehouse Study Period (hrs): 0.25 Vehicle Volumes and Adjustments Major Street Eastbound Westbound Movement 1 2 3 4 5 6 Major Street Eastbound Westbound Mestbound Noth/South Street: Noth/South Street: Noth/South Street: Robitstreet: Robits	Date Performed	3/2/2015		Analys	is Year		2020 'No-	Build'	cigino	
Project Description Wallings Road Safety & Corridor Study North/South Street: Joyce Road/Firehouse Intersection Orientation: East-West Study Period (trs): 0.25 Vehicle Volumes and Adjustments Study Period (trs): 0.25 Wein Clevel L T R Movement 1 2 3 4 5 6 Volume (veh/h) 10 560 10 10 1430 10 Peak-Hour Factor, PHF 0.92 0.92 0.92 0.92 0.92 0.92 Vehicles 1 - - 1 - - - Vehicles 1 - - 1 - - - Vehicles 1 - - 1 - - - O 1 0 0 1 0 0 - - Vehicles 1 0 0 1 0 0 - - -	Analysis Time Period	PM Peak	Hour				2020 110	Dana		
East.West Street: Wailings Road North/South Street: Joyce Road/Firehouse Major Street Eastbound Westbound Westbound Movement 1 2 3 4 5 6 Volume (veh/h) 10 560 10 10 1430 10 Peak-Hour Factor, PHF 0.92 0.92 0.92 0.92 0.92 0.92 Houry Flow Rate, HFR 10 608 10 10 1554 10 Percent Heavy Vehicles 1 1 Moting Street 0 1 0 0 10 1554 10 Percent Heavy Vehicles 1 1 Moting Street 0 1 0 0 10 10 10 Upstream Signal 0 10 10 11 12 Movement 7 8 9 10 11 10	Project Description Wa	allings Road Sa	fety & Corridor St	udy						
Intersection Orientation: East-West Study Period (hrs): 0.25 Vehicle Volumes and Adjustments Eastbound Westbound Movement 1 2 3 4 5 6 Movement L T R L T R Volume (veh/h) 10 560 10 10 1430 10 Peak-Hour Factor, PHF 0.92 0.92 0.92 0.92 0.92 0.92 (veh/h) 10 608 10 10 1554 10 Peak-Hour Factor, PHF 0.92 0.92 0.92 0.92 0.92 Veh/h) 10 60 0 1 0 Configuration LTR Undivided 0 Morestreet Northbound Southbound Southbound No 10 10 10 10 Notimestreet 0 0 0 0 0 0 0 0	East/West Street: Wallin	ngs Road		North/S	South Stre	eet: Joyce F	Road/Fireho	use		
Vehicle Volumes and Adjustments Major Street Eastbound Westbound Movement 1 2 3 4 5 6 Volume (vel/h) 10 560 10 10 1430 10 Peak-Hour Factor, PHF 0.92 0.92 0.92 0.92 0.92 0.92 Houry Flow Rate, HFR 10 608 10 10 1554 10 Percent Heavy Vehicles 1 - 1 RT Channelized 0 1 0 0 1 0 Configuration LTR UTR - - - - Movement 7 8 9 10 11 12 Volume (vel/h) 10 10 10 10 10 10 Movement 7 8 9 10 11 12 Peak-Hour Factor, PHF 0.92 0.92 0.92 0.92 0.92 </td <td>Intersection Orientation:</td> <td>East-West</td> <td></td> <td>Study F</td> <td>Period (hr</td> <td>s): 0.25</td> <td></td> <td></td> <td></td>	Intersection Orientation:	East-West		Study F	Period (hr	s): 0.25				
Major Street Eastbound Westbound Movement 1 2 3 4 5 6 Volume (veh/h) 10 560 10 10 1430 10 Peak-Hour Factor, PHF 0.92 <td>Vehicle Volumes ar</td> <td>nd Adjustme</td> <td>nts</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	Vehicle Volumes ar	nd Adjustme	nts							
Movement 1 2 3 4 5 6 Volume (veh/h) L T R L T R Volume (veh/h) 10 560 10 10 1430 10 Peak-Hour Factor, PHF 0.92	Major Street		Eastbound				Westbou	nd		
$\begin{tabular}{ c c c c c c c } \hline \begin{tabular}{ c c c c c c } \hline \begin{tabular}{ c c c c c c c } \hline \begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	Movement	1	2	3		4	5		6	
Volume (veh/h) 10 560 10 10 1430 10 Peak-Hour Factor, PHF 0.92<		L	Т	R		L	Т		R	
Peak-Hour Factor, PHF 0.92	Volume (veh/h)	10	560	10		10	1430		10	
Houry Prow Rate, HER 10 608 10 10 1554 10 Percent Heavy Vehicles 1 1 Median Type Undivided 0 0 0 0 Lanes 0 1 0 0 1 0 Lanes 0 1 0 0 1 0 Winor Street Northbound Southbound Movement 7 8 9 10 11 12 Winor Street Northbound Southbound Movement 7 8 9 10 11 12 Volume (veh/h) 10 10 10 10 10 10 10 Percent Factor, PHF 0.92	Peak-Hour Factor, PHF	0.92	0.92	0.92		0.92	0.92		0.92	
Percent Heavy Vehicles 1 1 Median Type Undivided 0 0 0 RT Channelized 0 1 0 0 1 0 Lanes 0 1 0 1 0 0 Minor Street Northbound Southbound 0 R Movement 7 8 9 10 11 12 Median (veh/h) 10 10 10 10 10 10 10 Peak-Hour Factor, PHF 0.92 0.92 0.92 0.92 0.92 0.92 Hourly Flow Rate, HFR 10 10 10 10 10 10 Percent Grade (%) 0 0 0 0 0 0 0 Fraced Approach N Vithound N	Hourly Flow Rate, HFR (veh/h)	10	608	10		10	1554		10	
Median Type Undivided RT Channelized 0 0 0 Lanes 0 1 0 0 0 0 Configuration LTR LTR 0 </td <td>Percent Heavy Vehicles</td> <td>1</td> <td></td> <td></td> <td></td> <td>1</td> <td></td> <td></td> <td></td>	Percent Heavy Vehicles	1				1				
RT Channelized 0 0 1 0 0 1 0 Lanes 0 1 0 0 1 0 Configuration LTR LTR 0 0 0 Mior Street Northbound Southbound 0 11 12 Mior Street Northbound Southbound 11 12 Volume (veh/h) 10 10 10 10 10 Peak-Hour Factor, PHF 0.92 0.92 0.92 0.92 0.92 Hourly Flow Rate, HFR 10 10 10 10 10 10 Percent Heavy Vehicles 0 0 0 0 0 0 Percent Grade (%) 0 0 0 0 0 0 Storage 0 1 0 0 1 0 Configuration LTR LTR LTR 1 1 Approach Eastbound Westboun	Median Type				Undivide	ed				
Lanes 0 1 0 0 1 0 Configuration LTR LTR LTR 0 Upstream Signal 0 0 0 0 Minor Street Northbound Southbound Movement 1 12 L T R L T R Northbound 10	RT Channelized			0					0	
Configuration LTR LTR 0 Upstream Signal 0 0 0 0 Minor Street Northbound Southbound Movement 7 8 9 10 11 12 L T R L T R L T R Volume (veh/h) 10 10 10 10 10 10 10 10 Peak-Hour Factor, PHF 0.92	Lanes	0	1	0		0	1		0	
Upstream Signal 0 0 Minor Street Northbound Southbound Movement 7 8 9 10 11 12 Movement 1 R L T R Control 7 8 9 10 11 12 Wolume (veh/h) 10	Configuration	LTR				LTR				
Minor Street Northbound Southbound Movement 7 8 9 10 11 12 Volume (veh/h) 10 10 10 10 10 10 10 Peak-Hour Factor, PHF 0.92 0.92 0.92 0.92 0.92 0.92 0.92 Hourly Flow Rate, HFR 10 10 10 10 10 10 10 10 Percent Heavy Vehicles 0 0 0 0 0 0 Percent Grade (%) 0 0 0 0 0 0 Storage 0 1 0 0 1 0 Configuration LTR N 0 1 0 Configuration LTR LTR LTR Delay, Queue Length, and Level of Service Approach Eastbound Westbound Northbound Southbound Movement 1 4 7 8 9 10 11 1	Upstream Signal		0	0						
Movement 7 8 9 10 11 12 L T R L T R I T R Volume (veh/h) 10 10 10 10 10 10 10 10 Peak-Hour Factor, PHF 0.92	Minor Street		Northbound	Southbound			Ind			
L T R L T R Volume (veh/h) 10 10 10 10 10 10 10 Peak-Hour Factor, PHF 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92 Hourly Flow Rate, HFR 10 <td>Movement</td> <td>7</td> <td>8</td> <td>9</td> <td></td> <td>10</td> <td>11</td> <td></td> <td>12</td>	Movement	7	8	9		10	11		12	
Volume (veh/h) 10 11 11 12 12 12 14 7 8		L	Т	R		L	Т		R	
Peak-Hour Factor, PHF 0.92	Volume (veh/h)	10	10	10		10	10		10	
Hourly Flow Rate, HFR (veh/h) 10 11 12 12 12 12 12 12 12 12 12 12 12 12 12 11 12 12 13 14 17 18 19 10 11 12 12 12 13 13	Peak-Hour Factor, PHF	0.92	0.92	0.92		0.92	0.92		0.92	
Percent Heavy Vehicles00000Percent Grade (%)0000Flared ApproachNN0Storage000RT Channelized000Lanes010ConfigurationLTRLTRDelay, Queue Length, and Level of Service01ApproachEastboundWestboundNorthboundMovement147814789Lane ConfigurationLTRLTRV(veh/h)101030C (m) (veh/h)4259673895% queue length0.070.032.89205% queue length0.070.032.89LOSBAFFApproach Delay (s/veh)241.8252.9	Hourly Flow Rate, HFR (veh/h)	10	10	10	10 10		10		10	
Percent Grade (%)00Flared ApproachNNStorage00RT Channelized00Lanes01O10ConfigurationLTRDelay, Queue Length, and Level of ServiceApproachEastboundMovement147891011114789101112Lane ConfigurationLTR1147891010103030C (m) (veh/h)104259673837V(c0.020.010.7995% queue length0.070.032.892.95LOSBAApproach Delay (s/veh)241.8252.9	Percent Heavy Vehicles	0	0	0		0	0		0	
N N N Storage 0 0 0 RT Channelized 0 0 0 0 Lanes 0 1 0 0 0 Configuration LTR 0 1 0 0 Delay, Queue Length, and Level of Service LTR LTR LTR 0 11 12 Approach Eastbound Westbound Northbound Southbound Movement 1 12 12 Lane Configuration LTR LTR LTR LTR LTR VTR VTR 11 12 Lane Configuration LTR LTR LTR LTR VTR VTR 12 12 14 10 10 30 30 12 12 14 12 12 12 14 12 14 12 12 12 12 12 11 12 12 12 11 12 12 12 11	Percent Grade (%)		0				0			
Storage 0 0 0 RT Channelized 0	Flared Approach		N	1			N	Î		
Storage 0 1 </td <td>Storage</td> <td></td> <td>0</td> <td>+</td> <td></td> <td></td> <td>0</td> <td></td> <td></td>	Storage		0	+			0			
Interview Interview <t< td=""><td>DT Chappalizad</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	DT Chappalizad									
Larres 0 1 0 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 <td></td> <td>-</td> <td>1</td> <td></td> <td></td> <td>0</td> <td>1</td> <td></td> <td>0</td>		-	1			0	1		0	
Delay, Queue Length, and Level of Service Approach Eastbound Westbound Northbound Southbound Movement 1 4 7 8 9 10 11 12 Lane Configuration LTR LTR LTR LTR LTR I v (veh/h) 10 10 30 </td <td>Lanes</td> <td>0</td> <td></td> <td>0</td> <td></td> <td>0</td> <td></td> <td></td> <td>0</td>	Lanes	0		0		0			0	
Delay, Queue Length, and Level of Service Approach Eastbound Westbound Northbound Southbound Movement 1 4 7 8 9 10 11 12 Lane Configuration LTR LTR LTR LTR LTR 1 12 v (veh/h) 10 10 30 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>LIK</td> <td></td> <td></td>							LIK			
Approach Eastbound Westbound Northbound Southbound Southbound Movement 1 4 7 8 9 10 11 12 Lane Configuration LTR LTR LTR LTR LTR LTR v (veh/h) 10 10 30	Delay, Queue Length, a	Level of Se	rvice		Jorthhour			outhhour	4	
Movement 1 4 7 8 9 10 11 12 Lane Configuration LTR LTR LTR LTR LTR LTR Image: Configuration of the second of	Approach	Eastbound	vvestbound				3		1	
Lane Configuration LTR LTR LTR LTR LTR v (veh/h) 10 10 30 30 30 C (m) (veh/h) 425 967 38 37 37 v/c 0.02 0.01 0.79 0.81 37 95% queue length 0.07 0.03 2.89 2.95 38 Control Delay (s/veh) 13.7 8.8 241.8 252.9 38 LOS B A F F F Approach Delay (s/veh) 241.8 252.9	Novement	1	4	/	8	9	10	11	12	
v (veh/h) 10 10 30 30 30 C (m) (veh/h) 425 967 38 37 37 v/c 0.02 0.01 0.79 0.81 30 37 95% queue length 0.07 0.03 2.89 2.95 38 37 Control Delay (s/veh) 13.7 8.8 241.8 252.9 38 37 LOS B A F F F 7 Approach Delay (s/veh) 241.8 252.9 38	Lane Configuration	LTR	LTR		LTR			LTR		
C (m) (veh/h) 425 967 38 37 v/c 0.02 0.01 0.79 0.81 95% queue length 0.07 0.03 2.89 2.95 Control Delay (s/veh) 13.7 8.8 241.8 252.9 LOS B A F F Approach Delay (s/veh)	v (veh/h)	10	10		30			30		
v/c 0.02 0.01 0.79 0.81 95% queue length 0.07 0.03 2.89 2.95 Control Delay (s/veh) 13.7 8.8 241.8 252.9 LOS B A F F F Approach Delay (s/veh) 241.8 252.9	C (m) (veh/h)	425	967		38			37		
95% queue length 0.07 0.03 2.89 2.95 Control Delay (s/veh) 13.7 8.8 241.8 252.9 LOS B A F F F Approach Delay (s/veh) 241.8 252.9	v/c	0.02	0.01		0.79			0.81		
Control Delay (s/veh) 13.7 8.8 241.8 252.9 LOS B A F F F Approach Delay (s/veh) 241.8 252.9 252.9	95% queue length	0.07	0.03	2.89 2.9		2.95				
LOS B A F F Approach Delay (s/veh) 241.8 252.9	Control Delay (s/veh)	13.7	8.8		241.8			252.9	1	
Approach Delay (s/veh) 241.8 252.9	LOS	В	A		F		1	F		
	Approach Delay (s/veh)			241.8 252.9		252.9				
Approach LOS F F	Approach LOS				F			F		

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	TW	O-WAY STOP	CONTR	OL SI	JMN	IARY				
General Informatio	า		Site Ir	nform	atio	on				
Analyst	BMF		Interse	ection			Wallings	Rd/Ma	ariann	a Blvd
Agency/Co.	GPD Grou	ıp	Jurisdi	ction			City of Br	oadvie	w He	eights
Date Performed	3/2/2015		Analys	is Yea	r		2020 'No-	-Build'		
Analysis Time Period	PM Peak	Hour								
Project Description Wa	allings Road Saf	ety & Corridor St	udy							
East/West Street: Walling	ngs Road		North/S	South S	stree	t: <i>Mariann</i>	na Boulevar	ď		
Intersection Orientation:	East-West		Study F	Period	(hrs)	: 0.25				
Vehicle Volumes ar	nd Adjustmer	nts								
Major Street		Eastbound	· · · · ·				Westbou	nd		
Movement	1	2	3			4	5			6
	L	1	R				T			R
Volume (ven/n)	0.90	570	10			10	1440			76
Peak-Hour Factor, PHF	0.80	0.92	0.92			0.92	0.92			.70
(veh/h)	0	619	10			10	1565			0
Percent Heavy Vehicles	2					1				
Median Type		-		Undiv	<i>idea</i>	1				
RT Channelized			0							0
Lanes	0	1	0			0	1			0
Configuration			TR			LT				
Upstream Signal		0					0			
Minor Street		Northbound					Southbou	ind		
Movement	7	8	9 10 11		11			12		
	L	Т	R			L	Т			R
Volume (veh/h)	10		10							
Peak-Hour Factor, PHF	0.92	1.00	0.92			0.70	1.00		C	0.70
Hourly Flow Rate, HFR (veh/h)	10	0	10		0 0				0	
Percent Heavy Vehicles	0	0	0			0	0			0
Percent Grade (%)		0	•				0			
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0							0
Lanes	0	0	0			0	0			0
Configuration		LR								
Delay, Queue Length, a	nd Level of Sei	vice								
Approach	Eastbound	Westbound	1	Northbo	ound		S	outhb	ound	
Movement	1	4	7	8		9	10	1	1	12
Lane Configuration		LT		LR						
v (veh/h)		10		20						
C (m) (veh/h)		958	87							
v/c		0.01	0.23							
95% queue length		0.03		0.82	2					
Control Delay (s/veh)		8.8		58	3					
LOS		A		F						
Approach Delav (s/veh)			58.3							
Approach LOS				F	•					
	-	-		1			I			

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	TW	O-WAY STOP	CONTR	OL SI	JMN	MARY				
General Information	า		Site I	nform	atio	on				
Analyst	BMF		Interse	ection			Wallings	Rd/Cra	aia Li	1
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadvie	ew He	eights
Date Performed	3/2/2015	,	Analys	sis Yea	r		2020 'No-	Build'		-
Analysis Time Period	PM Peak	Hour								
Project Description Wa	allings Road Sa	fetv & Corridor Si	tudv							
East/West Street: Walli	ngs Road		North/S	South S	Stree	t: Craig L	ane			
Intersection Orientation:	East-West		Study I	Period	(hrs)	: 0.25				
Vehicle Volumes ar	nd Adjustme	ents								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5			6
	L	Т	R			L	Т			R
Volume (veh/h)		580	10			10	1450			
Peak-Hour Factor, PHF	0.80	0.92	0.92	·		0.92	0.92		0).76
Hourly Flow Rate, HFR (veh/h)	0	630	10			10	1576			0
Percent Heavy Vehicles	2					3				
Median Type				Undiv	videa	1				
RT Channelized			0							0
Lanes	0	1	0			0	1			0
Configuration			TR			LT				
Upstream Signal		0					0			
Minor Street		Northbound	•			Southbou	ind			
Movement	7	8	9		10 Sou		11	T		12
	L	Т	R			L	Т			R
Volume (veh/h)	10		10							
Peak-Hour Factor, PHF	0.92	1.00	0.92			0.70	1.00		0).70
Hourly Flow Rate, HFR (veh/h)	10	0	10	0 0				0		
Percent Heavy Vehicles	7	0	7			0	0			0
Percent Grade (%)		0				-	0			-
Flared Approach		N N					N	1		
Storage		0					0			
			0				0			0
			0			0	0			0
Lanes	0	0	0			0	0			0
Configuration										
Delay, Queue Length, a	nd Level of Se	ervice	1							
Approach	Eastbound	Westbound	1	Northbo	ound		S	outhb	ound	
Movement	1	4	7	8		9	10	1	1	12
Lane Configuration		LT		LR						
v (veh/h)		10		20						
C (m) (veh/h)		939		82						
v/c		0.01		0.24	1					
95% queue lenath		0.03		0.87	7					
Control Delay (s/yeh)		80		62 4	5					
		0.3 A		- 02.0	, 					
		A			_					
Approach Delay (s/veh)			62.5							
Approach LOS			F							

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TWO-WAY STOP CONTROL SUMMARY											
General Information	n		Site I	nforma	ation						
Analyst	BMF		Interse	ection		Wallings	Rd/Skyline	Dr			
Agency/Co.	GPD Gro	ир	Jurisdi	ction		City of Br	oadview He	eights			
Date Performed	3/2/2015	•	Analys	is Year		2020 'No	-Build'				
Analysis Time Period	PM Peak	Hour									
Project Description W	allings Road Sa	fety & Corridor St	udy								
East/West Street: Walli	ngs Road		North/S	South St	reet: Sky	line Drive					
Intersection Orientation:	East-West		Study I	Period (I	hrs): 0.25						
Vehicle Volumes ar	nd Adjustme	ents									
Major Street		Eastbound				Westbou	nd				
Movement	1	2	3		4	5		6			
	L	Т	R		L	Т		R			
Volume (veh/h)	10	580				1450		10			
Peak-Hour Factor, PHF	0.92	0.92	0.81		0.78	0.92	().92			
Hourly Flow Rate, HFR (veh/h)	10	630	0		0	1576		10			
Percent Heavy Vehicles	1				3						
Median Type		_		Undivi	ded						
RT Channelized			0					0			
Lanes	0	1	0		0	1		0			
Configuration	LT				-			TR			
Upstream Signal		0				0					
Minor Street			<u> </u>		Southbor	Ind					
Movement	7	8	9		10	11		12			
		T	R			Т		R			
Volume (veh/h)					10			10			
Peak-Hour Factor. PHF	0,63	1.00	0.63		0.92	1.00	().92			
Hourly Flow Rate, HFR	0	0	0		10	0		10			
Percent Heavy Vehicles	7	0	7		4	0		4			
Percent Grade (%)		0			-	0					
		N N	1			Ň					
Storago	_	0				0					
	_					0		<u> </u>			
			0					0			
Lanes	0	0	0		0	0		0			
Configuration						LR					
Delay, Queue Length, a	and Level of Se	ervice									
Approach	Eastbound	Westbound		Northbo	und	S	outhbound				
Movement	1	4	7	8	9	10	11	12			
Lane Configuration	LT						LR				
v (veh/h)	10						20				
C (m) (veh/h)	417						67				
v/c	0.02						0.30				
95% queue length	0.07						1.08				
Control Doloy (a/yah)	12 0						00 1				
	13.0				_		00.1 F				
LUS	В	ļ					F				
Approach Delay (s/veh)			<u> </u>				80.1				
Approach LOS							F				

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	TW	O-WAY STOP	CONTR		JMI	MARY				
General Information	า		Site I	nform	atio	on				
Analyst	BMF		Interse	ection			Wallings	Rd/W	Mill F	Rd
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadvie	w He	eights
Date Performed	3/2/2015	•	Analys	is Yea	r		2020 'No-	Build'		
Analysis Time Period	PM Peak	Hour								
Project Description Wa	allings Road Sa	fety & Corridor Si	tudy							
East/West Street: Wallin	ngs Road		North/S	South S	Stree	t: West M	lill Road			
Intersection Orientation:	East-West		Study I	Period	(hrs)	: 0.25				
Vehicle Volumes ar	nd Adjustme	ents								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5			6
	L	Т	R			L	Т			R
Volume (veh/h)		580	10			10	1450			
Peak-Hour Factor, PHF	0.80	0.92	0.92			0.92	0.92		0).63
Hourly Flow Rate, HFR (veh/h)	0	630	10			10	1576			0
Percent Heavy Vehicles	1					3				
Median Type		-		Undiv	videc	1				
RT Channelized			0							0
Lanes	0	1	0			0	1			0
Configuration			TR			LT				
Upstream Signal		0					0			
Minor Street		Northbound					Southbou	ind		
Movement	7	8	9			10	11			12
		Т	R			10	т			R
Volume (veh/h)	10	· ·	10			-	· ·			
Peak-Hour Factor, PHF	0.92	1.00	0.92			0.79	1.00		0	.79
Hourly Flow Rate, HFR	10	0	10	10		0	0		-	0
(VEII/II) Percent Heavy Vehicles	2	0	2			4	0			4
Dereent Crede (%)	2		2			7	0			7
	_		1					-		
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0							0
Lanes	0	0	0			0	0			0
Configuration		LR								
Delay, Queue Length, a	nd Level of Se	ervice								
Approach	Eastbound	Westbound	1	Northbo	ound		S	outhb	ound	
Movement	1	4	7	8		9	10	1	1	12
Lane Configuration		LT		LR						
v (veh/h)		10		20						
C(m)(yeb/b)		030		81						
		939		0.2	1					
		0.01		0.24	+					
95% queue length		0.03		0.85	>					
Control Delay (s/veh)		8.9		60.8	3					
LOS		A		F						
Approach Delay (s/veh)				60.8	3					
Approach LOS				F						

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OPENING YEAR 2020 'BUILD' CONDITIONS

General Inform	nation									Int	tersect	ion Infe	ormatio	on	4	***	þá l <u>a</u>
Agency		GPD Group								Du	uration,	h	0.25		1	414	
Analyst		BMF		Analys	is Da	te Mar	2, 2	2015		Ar	ea Typ	е	Other		4		4
Jurisdiction		City of Broadview H	leights	Time F	Period	AM I	Pea	ak Hou	r	PH	HF		0.92			w∔e	• <u></u> ↓
Intersection		Wallings Road/Broa	dview F	Analys	is Ye	ar 2020)			An	nalysis	Period	1> 7:0	00			×_+ *
File Name		1. Wallings Rd Broa	adview	Rd Ope	ening	Year 20	20	'Build'	AM.×	us						5 † †	
Project Descrip	tion	Opening Year 2020	'Build' A	AM Peal	k Hou	r										111 11471	<u>۲</u>
· · ·								1				1					
Demand Inform	nation				EE	3			N	/B			NB			SB	
Approach Move	ement			L	Т	R		L		Г	R	L	Т	R	L	Т	R
Demand (v), ve	h/h			320	56) 70)	80	20	00	80	50	560	380	70	190	80
					1 1				- i				_				
Signal Informa	tion		-	e	5	, 2 45	a .		3	. 8							Ð-
Cycle, s	120.0	Reference Phase	2		5	1	12		B	. E					2	3	4
Offset, s	0	Reference Point	End	Green	5.0	40.1		5.0	47	<i>.</i> 5	0.0	0.0		•			
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	3.6	3.6		3.6	3.0	6	0.0	0.0			$\mathbf{\nabla}$		-
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	2.0		2.0	2.0	0	0.0	0.0		5	6	7	Y 8
Timer Desults						EDT				14		NDI					ODT
Accidented Deco				EBL	-	EBI	╉			V	VBI	NBL	-	NBI	SBL	-	SB1
Assigned Phase	8			3		0	╉	/		~	4			0			2
Case Number				1.1		4.0	╉	10.6		5	5.U	1.1	<u>.</u>	4.0	1.1	_	4.0
Change Duration	(<u>X</u> , D)	•		10.6	<u> </u>	53.1	╉	10.0)	5	3.1 - C	10.0)	45.7 5.0	10.6	, ,	45.7
	Aax Allow Headway (MAH), s			5.0		J.0	╉	0.0	-+-	2	0.0 4 1	3.0		0.0 4 0	3.0	_	1.0
	Queue Clearance Time (g_s) , s			4.1		4.1	╉	4.1	\rightarrow	4	+.1	4.5		4.3	4.3		4.3
Groop Extensio	Queue Clearance Time (g_s), s Green Extension Time (g_e) s			7.0		1.0	╉	0.0	-		1.7	4.4		25	0.0		9.5
Phase Call Pro	hability	(<i>ge</i>), 5		1.00		1.00	╉	1.00		1	+.5	1.00		2.5	1.00		1.00
Max Out Proba	bility			1.00		1.00	╉	1.00		0	.00	1.00	,	0.94	1.00		0.04
	onity			1.00		1.00		1.00	· .	0	.00	1.00	/	0.34	1.00		0.04
Movement Gro	oup Res	ults			EB		Т		WE	3			NB			SB	
Approach Move	ement			L	Т	R	T	L	Т		R	L	Т	R	L	Т	R
Assigned Move	ment			3	8	18	T	7	4		14	1	6	16	5	2	12
Adjusted Flow I	Rate (v)	, veh/h		348	685		Т	87	217	7	87	54	548	474	76	151	143
Adjusted Satura	ation Flo	w Rate (s), veh/h/ln		1792	1844	1		1757	184	5	1563	1774	1863	1610	1774	1900	1712
Queue Service	Time (g	s), S		5.0	42.8	3		3.5	9.7	7	4.3	2.4	33.3	33.3	3.4	6.9	7.3
Cycle Queue C	learance	e Time (<i>g</i> c), s		5.0	42.8	3		3.5	9.7	7	4.3	2.4	33.3	33.3	3.4	6.9	7.3
Green Ratio (g/	(C)			0.44	0.40)		0.44	0.4	0	0.40	0.38	0.33	0.33	0.38	0.33	0.33
Capacity (c), ve	⊳h/h			484	730			150	730)	619	412	622	538	156	635	572
Volume-to-Cap	acity Ra	tio (<i>X</i>)		0.719	0.93	8		0.580	0.29	8	0.141	0.132	0.880	0.881	0.488	0.237	0.249
Available Capa	city (<i>C</i> a),	veh/h		484	730			150	730	2	619	412	622	538	156	635	572
Back of Queue	(<i>Q</i>), veł	n/In (50th percentile)		7.2	22.5	5		1.7	4.2	2	1.6	1.0	17.5	15.4	1.7	3.2	3.1
Queue Storage	Ratio (RQ) (50th percentile)	0.48	0.00)		0.11	0.0	0	0.12	0.12	0.00	0.00	0.17	0.00	0.00
Uniform Delay ((<i>d</i> 1), s/ve	əh		32.5	34.8	3		29.1	24.	8	23.2	24.5	37.7	37.7	30.4	28.9	29.0
Incremental De	lay (<i>d2</i>),	s/veh		5.1	19.7	7		5.5	0.2	2	0.1	0.1	13.8	15.5	2.4	0.2	0.2
Initial Queue De	əlay (<i>d</i> 3)	, s/veh		0.0	0.0			0.0	0.0)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (Control Delay (<i>d</i>), s/veh			37.6	54.6	3		34.6	25.	1	23.3	24.6	51.4	53.2	32.8	29.1	29.2
Level of Service	e (LOS)			D	D			С	С		С	С	D	D	С	С	С
Approach Delay	, s/veh	/ LOS		48.8		D		26.8	;		С	50.9)	D	29.9		С
Intersection De	lay, s/ve	h / LOS				4	14.	2							D		
Multimodal Re	Multimodal Results				EB				WE	3			NB			SB	
Pedestrian LOS	Score	/ LOS															
Bicycle LOS Sc	ore / LC	DS															

General Inform	nation									Inte	ersecti	on Inf	ormatio	on		***	la la
Agency		GPD Group								Dur	ration.	h	0.25				
Analyst		BMF		Analys	is Da	te N	/ar 2.	2015		Are	a Type) 	Other		- <u>-</u> -		۲. ا
Jurisdiction		City of Broadview H	leiahts	Time F	Period		M Pe	ak Hou	ır	PH	F		0.92			w ‡ e	↓ ↓
Intersection		Wallings Road/Wva	tt Road	Analys	is Yea	ar 2	2020			Ana	alvsis F	Period	1>7:	00			+ ∀
File Name		7. Wallings Rd Wva	att Rd (Dpenina	Year	202	0 'Buil	ld' AM.>	kus	-	,					đ ơ	
Project Descrip	tion	Opening Year 2020	'Build' /	AM Peal	< Hou	Ir		-								T ব↑কŸ	14
-, p		- Fr - 3															
Demand Inform	nation				EE	3			W	В			NB			SB	
Approach Move	ement			L	Т		R	L	Г	-	R	L	Т	R	L	Т	R
Demand (v), ve	h/h				970	0	10	50	33	30		40	0	240			
				11								-					
Signal Informa	tion	1		-		\leftarrow	÷										-+-
Cycle, s	110.0	Reference Phase	2			7	₹"	1 sa	2						₹ 2	3	\mathbf{Y}_{4}
Offset, s	0	Reference Point	End	Green	5.0	(63.1	25.1	0.0)	0.0	0.0					
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	3.6	3	3.6	3.6	0.0)	0.0	0.0					
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	2	2.0	2.0	0.0)	0.0	0.0		5	6	7	8
									1								
Timer Results				EBL	-	EE	3T	WB	L	W	'BT	NBI	-	NBT	SBI	-	SBT
Assigned Phase	e					2	:	1		6	6			4			
Case Number						8.3	3	1.0		4.	.0			12.0			
Phase Duration	hase Duration, s change Period, (<i>Y+Rc</i>), s					68.	.7	10.6	3	79	9.3			30.7			
Change Period,	Change Period, (<i>Y+Rc</i>), s					5.0	6	5.6		5.	.6			5.6			
Max Allow Head	Ax Allow Headway (<i>MAH</i>), s					1.(0	1.1		1.	.0			1.5			
Queue Clearan	Queue Clearance Time (gs), s					64.	.9	3.3		11	1.0			21.9			
Green Extensio	n Time	(<i>g</i> _e), s				0.0	0	0.0		0.	.0			0.0			
Phase Call Prob	oability					1.0	00	1.00)	1.(00			1.00			
Max Out Probal	bility					1.0	00	0.15	5	0.0	00			0.04			
Movement Gro	un Res	aulte	_		FB	2			W/F	2			NB	_		SB	
Approach Move	ment				Т	, 	B	1	Т	,	B	1	Т	B		Т	B
Assigned Move	ment				2	+	12	1	6	+		7	4	14		<u> </u>	
Adjusted Flow F	Rate (v)	veh/h			1065	5		54	359	,			304				
Adjusted Satura	ation Flo	w Rate (s), veh/h/ln			1859	9		1723	181	0			1604				
Queue Service	Time (a				62.9	о Э		1.3	9.0				19.9				
Cycle Queue C	learanc	e Time (<i>a</i> c), s			62.9	3		1.3	9.0	+			19.9				
Green Ratio (<i>q</i> /	(C)	(30), 0			0.57	7		0.64	0.67	7		_	0.23				
Capacity (c), ve	h/h				1067	7		145	121	2			366				
Volume-to-Capa	acitv Ra	tio (<i>X</i>)			0.99	9		0.376	0.29	6			0.832				
Available Capa	city (<i>C</i> a).	veh/h			1067	7		145	121	2			366				
Back of Queue	(<i>Q</i>), vel	n/In (50th percentile)			32.8	3		0.8	3.1				9.3				
Queue Storage	Ratio (RQ) (50th percentile))		0.00)		0.10	0.00)			0.00				
Uniform Delay ((d1), s/v	eh			23.4	1		26.7	7.5				40.4				
Incremental De	$ay(d_2)$	s/veh			27.2	2		0.6	0.0	+			14.1				
Initial Queue De	elay (da)	, s/veh			0.0			0.0	0.0				0.0				\square
Control Delay (d), s/veł	<u>,</u> ו			50.6	3		27.3	7.5	╈			54.6				
Level of Service	e (LOS)				D			С	Α				D				
Approach Delay	, s/veh	/ LOS		50.6		D)	10.1		E	в	54.6	5	D	0.0		
Intersection Del	lay, s/ve	h / LOS					41.	.9)		
Multimodal Re	sults				EB	5			WE	3			NB			SB	
Pedestrian LOS	Score	/ LOS															
Bicycle LOS Sc	ore / LC	DS															

	Theo zo to dignalized intersection nesatts outliniary															
General Inform	nation								Inter	secti	ion Info	rmatio	n		4.L	به لي
Agency	ation	GPD Group							Durat	tion	h	0 25	///		174	
Analyst		BME		Analys	is Date	Mar 2	2015		Area	Type	<u>د</u>	Other		- 1 - 14		€
Jurisdiction		City of Broadview H	oiahte	Time	Poriod		, 2010 aak Hou	ır	DUE	турс	,	0 02		- <u>→</u> -→	w↓e	↓
Intersection		Wallings Boad / I-77				2020			Analy	veie F	Pariod	1 > 7.0	0			
File Name		16 Wallings Bd 1-7	7.SB ()nenina	Vear 2	020 'Bui		116	7 (1)(1)	y 515 T	chou	127.				<u>~</u>
Project Descrip	tion	Opening Year 2020	'Build' A					.us						-	41471	× (*
T Toject Descrip	lion	Opening real 2020	Dulla 7	NNT Ca	Tiour											
Demand Inform	nation				EB			W	'B			NB			SB	
Approach Move	ment			L	Т	R	L	٦		R	L	Т	R	L	Т	R
Demand (v), ve	h/h				950	220	60	22	20					140	10	150
				ir-								0				
Signal Informa	tion	1		-	₆	1216										
Cycle, s	90.0	Reference Phase	2		₿°	<u> </u>							1	\mathbf{d}	3	4
Offset, s	0	Reference Point	End	Green	44.8	33.2	0.0	0.0		0.0	0.0	_			-	
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	4.0	4.0	0.0	0.0) (0.0	0.0				×	Φ
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	2.0	0.0	0.0) (0.0	0.0		5	6	7	8
							1									_
Timer Results				EBL	-	EBT	WB		WB.	Т	NBL		NBT	SBL		SBT
Assigned Phase	9					2			6	_						8
Case Number	ase Number					8.0			6.0							11.0
Phase Duration	Phase Duration, s					50.8			50.8	3						39.2
Change Period,	(Y+Rc)	, S				6.0			6.0							6.0
Max Allow Head	Max Allow Headway (MAH), s					2.3		\rightarrow	2.3							4.2
Queue Clearan	ce Time	e (<i>gs</i>), s				26.4	<u> </u>		39.0)						7.9
Green Extensio	n Time	(<i>g</i> e), s				1.5		_	1.2							1.3
Phase Call Prol	bability					1.00			1.00)						1.00
Max Out Proba	bility					0.00			0.28	3						0.00
Movement Gro	up Res	aults			FB			WF	3			NB			SB	
Approach Move	ement				T	B	1	Т	F	3	1	T	B		T	B
Assigned Move	ment				2	12	1	6	+	·	_	·		3	8	18
Adjusted Flow F	Rate (v)	. veh/h	_		655	616	65	239	,					-	163	163
Adjusted Satura	ation Flo	w Rate (<i>s</i>), veh/h/ln			1881	1758	425	179	2						1745	1370
Queue Service	Time (a	ls), S			24.0	24.4	12.6	7.0							5.9	3.6
Cycle Queue C	learance	e Time (<i>q</i> c), s			24.0	24.4	37.0	7.0							5.9	3.6
Green Ratio (g/	(C)	(0 //			0.50	0.50	0.50	0.50	5						0.37	0.37
Capacity (c), ve	h/h				936	875	176	892	2						644	1011
Volume-to-Capa	acity Ra	tio (X)			0.700	0.704	0.370	0.26	8						0.253	0.161
Available Capa	city (<i>C</i> a),	, veh/h			936	875	176	892	2						644	1011
Back of Queue	(<i>Q</i>), veł	n/In (50th percentile)			10.0	9.5	1.3	2.6							2.3	1.1
Queue Storage	Ratio (RQ) (50th percentile))		0.00	0.00	0.33	0.00	2						0.08	0.04
Uniform Delay (d1), s/ve	eh			17.4	17.5	31.8	13.	1						19.8	19.1
Incremental De	lay (<i>d2</i>),	s/veh			2.0	2.2	0.5	0.1							0.2	0.1
Initial Queue De	elay (d3)	, s/veh			0.0	0.0	0.0	0.0							0.0	0.0
Control Delay (d), s/veł	า			19.4	19.7	32.3	13.2	2						20.0	19.1
Level of Service	e (LOS)				В	В	С	В							В	В
Approach Delay	, s/veh	/ LOS		19.5		В	17.3	3	В		0.0			19.6	;	В
Intersection De	lay, s/ve	h / LOS				19	9.2							B		
Multimodal Re	sults				EB			WE	3			NB			SB	
Pedestrian LOS	Score	/ LOS														
Bicycle LOS Sc	ore / LC	DS														

	nes zere signalized intersection nesults Summary																	
General Inform	nation									In	ntersect	ion Info	ormati	on		비석학학	t bi	ų.
Agency		GPD Group									Juration	h	0.25	511				
Analyst		BME		Analys	is D	ate	Mar 2	2015			rea Typ	<u></u>	Othe					۲. 4
Jurisdiction		City of Broadview H	leiahts	Time F	Perio	d	ΔM Pe	ak Hou	r	P		<u> </u>	0.92			N ₩1		
Intersection		Wallings Boad/I-77	NR/Mill	Analys		ear	2020				nalveis	Period	1 \ 7.	00	*			+ →
File Name		17 Wallings Bd 1-7)nor	nina	Voar 2	020 'Bu	ild' Δ		vue	renou	127.	00				
Project Descrip	tion	Opening Vear 2020	' ND_N		vhei vhei	ing		020 Du		(IVI.)	xus				- 4	ি] বিকিক	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	r i
Project Descrip	lion	Opening real 2020	Bullu F	AIVI Fear		ui												-
Demand Inform	nation				E	В			٧	VB			NB			SI	3	
Approach Move	ement			L	-	Т	R	L		Т	R	L	Т	R	L	Т		R
Demand (v), ve	h/h			840	1	70	80	20	1	10	260	170	230	70				
				1	1		1		- j		_	_						
Signal Informa	tion		-	-	L		La	- E	4									к†л
Cycle, s	90.0	Reference Phase	2			Ľ	R	R		Γ	2			1	Z 2		3	\mathbf{Y}_{4}
Offset, s	0	Reference Point	End	Green	7.0)	16.0	21.1	2	1.9	0.0	0.0			<u>×</u>			
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	4.0)	4.0	4.0	4.	.0	0.0	0.0		~ `				
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0)	2.0	2.0	2.	.0	0.0	0.0		5	6		7	8
Timer Deculto							DT					NDI		NIDT	00			
Assigned Phase				EBL	-	E	2BI	VVBI 1		1	vvвi 6	INBL	-		5B		- 3	,BT
Assigned Phase	8			5			2	1	-		0			4		\rightarrow		
Case Number				2.0			+.U	2.0			3.0			27.0		\rightarrow		
Change Duration	(V, D.)	<u>^</u>		6.0		4	-9.1 3.0	6.0	,		60			60		\rightarrow		
Max Allow Hear	dway (N	, 5 1ΔΗΛ ς		0.0			2.0	2.1	-		22			5.2		\rightarrow		
	/lax Allow Headway (<i>MAH</i>), s Queue Clearance Time (<i>a</i> s), s			24.0		1	0.5	3.1	-	-	16.7			17.4		\rightarrow		
Green Extensio	n Time	(ge), s		2.0		. (0.5	0.0	-		0.3			1.3		-		
Phase Call Pro	bability	(3+), -		1.00		1	.00	1.00)	1	1.00			1.00		\rightarrow		
Max Out Proba	bility			0.82	2	0	.00	0.01		(0.17			1.00				
	,				11											فعد		
Movement Gro	oup Res	ults			E	В			W	В			NB			SE	3	
Approach Move	ement			L	Т		R	L	Т	·	R	L	Т	R	L	Т		R
Assigned Move	ment			5	2	:	12	1	6		16	7	4	14			4	
Adjusted Flow I	Rate (v)	, veh/h		913	27	2		22	12	0	283	185	326				\rightarrow	
Adjusted Satura	ation Flo	w Rate (s), veh/h/ln		1723	17	79		1740	188	31	1610	1810	1770			<u> </u>	4	
Queue Service	Time (g	/s), S		22.0	8.	5		1.1	4.	7	14.7	7.7	15.4				_	
Cycle Queue C	learance	e Time (<i>g</i> c), s		22.0	8.	5		1.1	4.7	7	14.7	7.7	15.4			<u> </u>	_	
Green Ratio (g/	(C)			0.32	0.4	18		0.08	0.2	23	0.23	0.24	0.24			<u> </u>	_	
Capacity (c), ve	h/h			1110	85	2		135	44	1	377	440	431			<u> </u>	4	
Volume-to-Capa	acity Ra	tio (X)		0.822	0.3	19		0.161	0.2	/1	0.749	0.420	0.757		<u> </u>	<u> </u>	+	
Available Capa	(O) vol	ven/n		0.4	80	2		135	44	• I •	3//	440	431			├──	+	
Duque Storage	(Q), ver	RO(50th percentile))	9.4	3.	2		0.4	2.	1	0.2	3.5	7.5			<u> </u>	+	
Liniform Delay	$(d_1) s/v_1$	ha) (Join percentile)	28.1	14	4	_	38.8	28	2	32.0	28.7	31.6				+	
Incremental De	(dr), s/v	s/veh		51	0	1		0.2	0.	· <i>L</i> 1	72	0.9	8.0				+	
Initial Queue De	ay (d2), alav (d3)	s/veh	_	0.0	0.	0		0.0	0.	0	0.0	0.0	0.0				+	
Control Delay (a s/vot	1		33.2	14	5		39.0	28	3	39.2	29.6	39.6				+	
Level of Service	e (LOS)			C	P	3		D	C	;	D	 C	D				-	
Approach Delay	/. s/veh	/ LOS		28.9		·	С	36.1		·	D	36.0		D	0.0			
Intersection De	lav. s/ve	h / LOS				_	- 32	.1			-	00.0		_	C 0.0			
															-			
Multimodal Re	sults				E	В			W	Β			NB			SE	3	
Pedestrian LOS	Score	/ LOS																
Bicycle LOS Sc	ore / LC	DS																

	TW	O-WAY STOP	CONTR	OL SI	JMN	IARY				
General Informatio	า		Site Ir	nform	atio	on				
Analyst	BMF		Interse	ection			Wallings I	Road/El	nhui	rst
Agency/Co.	GPD Grou	ир	luriedi	otion			City of Br	adview	Hoi	abte
Date Performed	3/2/2015				r		2020 'Bui		nei	gnis
Analysis Time Period	AM Peak	Hour		13 104	1		2020 Dui	u		
Proiect Description Wa	allings Road Sat	fetv & Corridor Stu	ıdv							
East/West Street: Walli	ngs Road		North/S	South S	Street	: Elmhurs	t Drive			
Intersection Orientation:	East-West		Study F	Period	(hrs):	: 0.25				
Vehicle Volumes ar	nd Adjustme	nts								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5			6
	L	Т	R			L	Т			R
Volume (veh/h)	50	960					350		1	0
Peak-Hour Factor, PHF	0.92	0.92	1.00			1.00	0.92		0.	92
Hourly Flow Rate, HFR (veh/h)	54	1043	0			0	380		1	0
Percent Heavy Vehicles	1					0			-	-
Median Type				Undi	/ided					
RT Channelized			0	0					()
Lanes	1	1	0			0	1		()
Configuration	L	Т							T	R
Upstream Signal						0				
Minor Street		Northbound					Southbou	nd		
Movement	7	8	9			10	11		1	12
	L	Т	R			L	Т			R
Volume (veh/h)	(00			1.00		10			1	0
Peak-Hour Factor, PHF	1.00	1.00	1.00			0.92	1.00		0.	92
(veh/h)	0	0	0			10	0		1	0
Percent Heavy Vehicles	0	0	0			0	0		(2
Percent Grade (%)		0				-	0			
Flared Approach		N	T				N			
Storage		0					0			
RT Channelized	_		0							<u>າ</u>
	0	0	0			0	0			, ר
Configuration			Ť			0	IR			,
Delay Queue Length a	nd Level of Se	rvice					_/.			
Approach	Fastbound	Westbound	1	Jorthb	ound		S	outhboi	nd	
Movement	1	A	7	8		Q	10	11		12
	1		1	0		5	10			12
	E 54							20		
v (vell/ll)	1171							20		
C (m) (ven/n)	1174							208	+	
V/C	0.05							0.10	+	
95% queue length	0.14							0.31		
Control Delay (s/veh)	8.2							24.1		
LOS	A							С		
Approach Delay (s/veh)	h)							24.1		
Approach LOS								С		

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	TW	O-WAY STOP	CONTR	OL SI	JMN	IARY				
General Informatio	า		Site I	nform	atic	on				
Analyst	BMF		Interse	ection			Wallings I Road	Road/Lo	ngvi	ew
Agency/Co.	GPD Gro	ир	lurisdi	ction			City of Br	nadview	Hoir	ahts
Date Performed	3/2/2015		Analys	is Yea	r		2020 'Bui	Id'	TICI	<u>jins</u>
Analysis Time Period	AM Peak	Hour			1		2020 Dui	u –		
Project Description Wa	allings Road Sa	fety & Corridor St	udy							
East/West Street: Walling	ngs Road		North/S	South S	Street	t: Longvie	w Road			
Intersection Orientation:	East-West		Study I	Period	(hrs)	: 0.25				
Vehicle Volumes ar	nd Adjustme	nts								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5			6
	L	Т	R			L	T			R
Volume (veh/h)	30	940					350		1	0
Peak-Hour Factor, PHF	0.92	0.92	1.00			1.00	0.92		0.	92
Hourly Flow Rate, HFR (veh/h)	32	1021	0			0	380		1	0
Percent Heavy Vehicles	1					0			-	-
Median Type		-		Undiv	/ided					
RT Channelized			0						()
Lanes	1	1	0			0	1		()
Configuration	L	Т							T	R
Upstream Signal						0				
Minor Street		Northbound					Southbou	ind		
Movement	7	8	9			10	11		1	2
	L	Т	R			L	Т			R
Volume (veh/h)						10			1	0
Peak-Hour Factor, PHF	1.00	1.00	1.00			0.92	1.00		0.:	92
Hourly Flow Rate, HFR (veh/h)	0	0	0			10	0		1	0
Percent Heavy Vehicles	0	0	0			0	0		()
Percent Grade (%)		0					0			
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0						()
Lanes	0	0	0			0	0		()
Configuration							LR			
Delay, Queue Length, a	nd Level of Se	rvice								
Approach	Eastbound	Westbound		Northbo	ound		S	outhbou	nd	
Movement	1	4	7	8		9	10	11		12
Lane Configuration	L							LR		
v (veh/h)	32							20		
C (m) (veh/h)	1174							229	╈	
v/c	0.03							0.09	╈	
95% queue length	0.08							0.28	+	
Control Delay (s/yeh)	8.00							22.2		
	0.2							22.2	-	
LUJ	А									
Approach Delay (s/veh)								22.2		
Approach LOS										

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	тw	O-WAY STOP	CONTR	OL SI	JMN	IARY				
General Information	า		Site I	nform	atio	on				
Analyst	BMF		Interse	ection			Wallings	Rd/Ch	nestni	ut Blvd
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadvie	ew He	eights
Date Performed	3/2/2015	,	Analys	sis Year	r		2020 'Bui	ild'		-
Analysis Time Period	AM Peak	Hour								
Project Description Wa	allings Road Sa	fetv & Corridor Si	tudv							
East/West Street: Walli	ngs Road		North/S	South S	tree	: Chestn	ut Boulevar	ď		
Intersection Orientation:	East-West		Study I	Period ((hrs)	: 0.25				
Vehicle Volumes ar	nd Adjustme	ents								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5			6
	L	Т	R			L	Т			R
Volume (veh/h)		940	10			10	340			
Peak-Hour Factor, PHF	0.88	0.92	0.92			0.92	0.92		().86
Hourly Flow Rate, HFR (veh/h)	0	1021	10			10	369			0
Percent Heavy Vehicles	2					1				
Median Type			-	Undiv	rided					
RT Channelized			0							0
Lanes	0	1	0			1	1			0
Configuration			TR			L	Т			-
Upstream Signal		0					0			
Minor Street	Northbound						Southbor	ind		
Movement	7	8	9			10	11			12
		Т	R			1	т			R
Volume (veh/h)	20	· · ·	30			-	· ·			
Peak-Hour Factor, PHF	0.92	1.00	0.92			0.67	1.00		(0.67
Hourly Flow Rate, HFR	21	0	32			0	0			0
(veh/h)		0	02			0	0			0
	0		0			0	0			0
Percent Grade (%)	_	0	1				0			
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0							0
Lanes	0	0	0			0	0			0
Configuration		LR								
Delay, Queue Length, a	nd Level of Se	ervice								
Approach	Eastbound	Westbound	1	Northbo	ound		S	outhb	ound	
Movement	1	4	7	8		9	10	1	1	12
Lane Configuration		L		LR						
v (veh/h)		10		53						
C (m) (veh/h)		678		212						
v/c		0.01		0.25	5					
95% queue length		0.04		0.95	5					
Control Delay (s/veh)		10.4		27.5	5					
LOS		В		D						
Approach Delav (s/veh)				27.5	5			8		
Approach LOS				D			1			
	1 LOS			-			1			

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	TW	O-WAY STOP	CONTR	OL SI	JMN	MARY				
General Information	า		Site I	nform	atio	on				
Analyst	BMF		Interse	ection			Wallings	Rd/Ov	/erloo	k Ave
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadvie	ew He	eights
Date Performed	3/2/2015		Analys	is Yea	r		2020 'Bui	ld'		-
Analysis Time Period	AM Peak	Hour								
Project Description Wa	allings Road Sa	fety & Corridor Si	tudy							
East/West Street: Walli	ngs Road		North/S	South S	Stree	t: Overloo	ok Avenue			
Intersection Orientation:	East-West		Study I	Period	(hrs)	: 0.25				
Vehicle Volumes ar	nd Adjustme	ents								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5			6
	L	Т	R			L	Т			R
Volume (veh/h)		960	10			10	340			
Peak-Hour Factor, PHF	0.88	0.92	0.92			0.92	0.92		().86
Hourly Flow Rate, HFR (veh/h)	0	1043	10			10	369			0
Percent Heavy Vehicles	2					1				
Median Type				Undiv	videa	1				
RT Channelized			0							0
Lanes	0	1	0			1	1			0
Configuration			TR			L	Т			
Upstream Signal		0					0			
Minor Street	Northbound						Southbou	ind		
Movement	7	8	9			10	11			12
	L	Т	R			L	Т			R
Volume (veh/h)	10		30							
Peak-Hour Factor, PHF	0.92	1.00	0.92			0.67	1.00		().67
Hourly Flow Rate, HFR (veh/h)	10	0	32			0	0			0
Percent Heavy Vehicles	0	0	0			0	0			0
Percent Grade (%)		0					0			
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0							0
	0	0	0			0	0			0
Configuration		I R				0				0
Approach	Eastbound	Westbound	,	Jorthha	aund			outbb	ound	
Approach Movement		4	7	8	Juna	9	10	1	00110 1	12
Lane Configuration	•		· ·	IR					•	
Lanc Coningulation		10		12						
		10		42						
C (m) (ven/n)		005		229	/ ~					
V/C		0.02		0.18	3					
95% queue length		0.05		0.66	5					
Control Delay (s/veh)		10.5		24.2	2					
LOS		В		С						
Approach Delay (s/veh)				24.2	2					
Approach LOS					С					

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	TW	O-WAY STOP	CONTR	OL SI	JMN	MARY			
General Information	n		Site I	nform	atio	on			
Analyst	BMF		Interse	ection			Wallings	Rd/McCr	earv Rd
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadview	Heights
Date Performed	3/2/2015	•	Analys	is Year	r		2020 'Bui	ld'	
Analysis Time Period	AM Peak	Hour							
Project Description W	allings Road Sa	fety & Corridor St	tudy						
East/West Street: Walli	ngs Road		North/S	South S	stree	t: <i>McCrea</i>	ry Road		
Intersection Orientation:	East-West		Study I	Period ((hrs)	: 0.25			
Vehicle Volumes ar	nd Adjustme	ents							
Major Street		Eastbound					Westbou	nd	
Movement	1	2	3			4	5		6
		T	R			L	T		R
Volume (veh/h)	30	960					340		30
Peak-Hour Factor, PHF	0.92	0.92	0.89			0.82	0.92		0.92
(veh/h)	32	1043	0			0	369		32
Percent Heavy Vehicles	1					2	-		
Median Type				Undiv	ridea	1			
RT Channelized			0						0
Lanes	1	1	0			0	1		1
Configuration	L	Т					Т		R
Upstream Signal		0					0		
Minor Street		Northbound	•				Southbou	ind	
Movement	7	8	9			10	11		12
	L	Т	R			L	Т		R
Volume (veh/h)						20			10
Peak-Hour Factor, PHF	0.57	1.00	0.57			0.92	1.00		0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0			21	0		10
Percent Heavy Vehicles	4	0	4			0	0		0
Percent Grade (%)		0					0		
Flared Approach		N					N		
Storage		0					0		
RT Channelized			0						0
lanes	0	0	0			0	0		0
Configuration			-			-	LR		-
Delav. Queue Length. a	nd Level of Se	ervice							
Approach	Eastbound	Westbound		Northbo	ound		S	outhbou	nd
Movement	1	4	7	8		9	10	11	12
Lane Configuration	L							LR	
v (veh/h)	32							31	
C (m) (veh/h)	1163							183	
v/c	0.03					0.17			
95% queue length	0.08							0.59	
Control Delav (s/veh)	8.2							28.6	
	A							_ <u></u>	
Approach Delay (s/yoh)								28.6	
Approach LOS	ren)		+					20.0	
								U	

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	TW	O-WAY STOP	CONTR	OL SI	JMN	IARY				
General Informatio	า		Site I	nform	atio	n				
Analyst	BMF		Interse	ection			Wallings I	Rd/Maje	stic O	aks
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadview	Heia	hts
Date Performed	3/2/2015		Analys	is Year	r		2020 'Bui	Id'	ricigi	113
Analysis Time Period	AM Peak	Hour					2020 Dai			
Project Description Wa	allings Road Sa	fety & Corridor St	udy							
East/West Street: Wallin	ngs Road		North/S	South S	Street	: Majestic	: Oaks Trail			
Intersection Orientation:	East-West		Study I	Period	(hrs):	0.25				
Vehicle Volumes ar	nd Adjustme	nts								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5		6	
	L	T	R			L	Т		R	
Volume (veh/h)	10	1200					370		10	
Peak-Hour Factor, PHF	0.92	0.92	0.89			0.82	0.92		0.9	2
Hourly Flow Rate, HFR (veh/h)	10	1304	0			0	402		10)
Percent Heavy Vehicles	1					2				
Median Type				Undiv	vided					
RT Channelized			0						0	
Lanes	1	1	0			0	1		0	
Configuration	L	Т							TF	2
Upstream Signal		0					0			
Minor Street		Northbound					Southbou	ind		
Movement	7	8	9			10	11		12	2
	L	Т	R			L	Т		R	1
Volume (veh/h)						10			10)
Peak-Hour Factor, PHF	0.57	1.00	0.57	·		0.92	1.00		0.9	2
Hourly Flow Rate, HFR (veh/h)	0	0	0			10	0		10	
Percent Heavy Vehicles	4	0	4			0	0		0	
Percent Grade (%)		0					0			
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0						0	
lanes	0	0	0			0	0		0	
Configuration			1 ·			•	LR			
Delay, Queue Length, a	nd Level of Se	rvice		I						
Approach	Fastbound	Westbound		Northbo	ound		s	outhbou	nd	
Movement	1	4	7	8		9	10	11		12
Lane Configuration	L					-		LR		
v (veh/h)	10							20		
C. (m) (veh/h)	1152				_			169		
	0.01							0.12		
95% queue length	0.03							0.72	+	
Control Dolou (chich)	0.00							0.09	+	
Control Delay (s/ven)	0.2							29.1		
	A							D		
Approach Delay (s/veh)	pproach Delay (s/veh)							29.1		
Approach LOS						D				

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	тw	O-WAY STOP	CONTR	DL SU	JMN	IARY				
General Informatior	1		Site Ir	nform	atic	on				
Analyst	BMF		Interse	ction			Wallings	Rd/Cre	eeksi	de Trce
Agency/Co.	GPD Grou	ıp	Jurisdi	ction			City of Br	oadvie	w He	eights
Date Performed	3/2/2015		Analys	is Year	•		2020 'Bui	ld'		
Analysis Time Period	AM Peak	Hour								
Project Description Wa	allings Road Saf	ety & Corridor Stu	udy							
East/West Street: Wallir	ngs Road		North/S	South S	treet	t: Creeksi	de Terrace			
Intersection Orientation:	East-West		Study F	Period ((hrs)	: 0.25				
Vehicle Volumes an	d Adjustme	nts								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5	$ \rightarrow $		6
		1000	R				T 070			R
Volume (ven/n)	0.00	1200	10			10	370	\rightarrow		70
Peak-Hour Factor, PHF	0.80	0.92	0.92			0.92	0.92		l	0.70
(veh/h)	0	1304	10			10	402			0
Percent Heavy Vehicles	2					1				
Median Type				Undiv	rided					
RT Channelized			0							0
Lanes	0	1	0			1	1			0
Configuration			TR			L	Т			
Upstream Signal		0					0			
Minor Street		Northbound					Southbou	Ind		
Movement	7	8	9			10	11			12
	L	Т	R			L	Т			R
Volume (veh/h)	10		40							
Peak-Hour Factor, PHF	0.92	1.00	0.92			0.70	1.00		0).70
Hourly Flow Rate, HFR (veh/h)	10	0	43			0	0			0
Percent Heavy Vehicles	5	0	5			0	0			0
Percent Grade (%)		0	1				0			
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0							0
Lanes	0	0	0			0	0			0
Configuration		LR								
Delay, Queue Length, a	nd Level of Sei	rvice								
Approach	Eastbound	Westbound	1	Northbo	ound		S	outhb	ound	
Movement	1	4	7	8		9	10	1	1	12
Lane Configuration		L		LR						
v (veh/h)		10		53						
C (m) (veh/h)		530		160						
v/c		0.02		0.33	}					
95% aueue lenath		0.06		1.35	5					
Control Delay (s/veh)		11.9		38.3	}			1		
LOS		В		E						
Approach Delay (s/veh)				38.3	}					
Approach LOS				Е			1			

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	TWO-WAY STOP CONTROL SUMMARY												
General Information	า		Site Ir	nformati	on								
Analyst	BMF		Interse	ection		Wallings I Rd/Eirebo	Rd/Joyce						
Agency/Co.	GPD Gro	ир	Jurisdi	ction		City of Br	oadview H	eiahts					
Date Performed	3/2/2015		Analys	is Year		2020 'Bui	ld'	cigino					
Analysis Time Period	AM Peak	Hour		10 1 001		2020 20							
Project Description Wa	allings Road Sa	fety & Corridor St	udy										
East/West Street: Wallin	ngs Road		North/S	South Stree	et: Joyce R	Road/Fireho	use						
Intersection Orientation:	East-West		Study F	Period (hrs	s): 0.25								
Vehicle Volumes ar	nd Adjustme	nts											
Major Street		Eastbound				Westbou	nd						
Movement	1	2	3		4	5		6					
	L	T	R		L	<u> </u>		R					
Volume (veh/h)	10	1200	30		10	360		10					
Peak-Hour Factor, PHF	0.92	0.92 0.92			0.92	0.92		0.92					
(veh/h)	10	10 1304			10	391		10					
Percent Heavy Vehicles	1				1								
Median Type				Undivide	d								
RT Channelized			0					0					
Lanes	1	1	1		1	1		0					
Configuration	L	Т	R		L			TR					
Upstream Signal		0				0							
Minor Street		Northbound				Southbou	Ind						
Movement	7	8	9		10	11		12					
	L	Т	R		L	Т		R					
Volume (veh/h)	10	10	10		10	10		10					
Peak-Hour Factor, PHF	0.92	0.92	0.92		0.92	0.92		0.92					
Hourly Flow Rate, HFR (veh/h)	10	10	10		10	10		10					
Percent Heavy Vehicles	0	0	0		0	0		0					
Percent Grade (%)		0				0							
Flared Approach		N				N							
Storage		0				0							
RT Channelized			0					0					
Lanes	0	1	0		0	1		0					
Configuration		LTR				LTR							
Delay, Queue Length, a	nd Level of Se	rvice	•			-							
Approach	Eastbound	Westbound	1	Northboun	d	s	outhbound	1					
Movement	1	4	7	8	9	10	11	12					
Lane Configuration	L	L		LTR			LTR						
v (veh/h)	10	10		30			30						
C (m) (veh/h)	1163	520		89			95						
v/c	0.01	0.02		0.34			0.32						
95% queue length	0.03	0.02		1 30	<u> </u>		1 21						
Control Doloy (alyab)	Q 1	12.1		64.9	+		50.5						
	0.1	12.1		04.0 F			59.5						
	A	В											
Approach Delay (s/veh)				64.8			59.5						
Approach LOS				F			F						

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	TW	O-WAY STOP	CONTR	OL SU	MMARY			
General Informatio	า		Site II	nforma	ation			
Analyst	BMF		Interse	ction		Wallings	Rd/Marian	na Blvd
Agency/Co.	GPD Grou	ир	Jurisdi	ction		City of Br	oadview H	eights
Date Performed	3/2/2015	-	Analys	is Year		2020 'Bui	ld'	
Analysis Time Period	AM Peak	Hour						
Project Description Wa	allings Road Sat	ety & Corridor St	udy					
East/West Street: Walli	ngs Road		North/S	South St	reet: <i>Maria</i>	anna Boulevar	d	
Intersection Orientation:	East-West		Study F	Period (h	nrs): 0.25			
Vehicle Volumes ar	nd Adjustme	nts						
Major Street		Eastbound				Westbou	nd	
Movement	1	2	3		4	5		6
	L	Т	R		L	Т		R
Volume (veh/h)		1210	10		10	370		
Peak-Hour Factor, PHF	0.80	0.92	0.92		0.92	0.92		0.76
Hourly Flow Rate, HFR (veh/h)	0	1315	10		10	402		0
Percent Heavy Vehicles	2				1			
Median Type				Undivi	ded			
RT Channelized			0					0
Lanes	0	1	0		1	1		0
Configuration			TR		L	Т		
Upstream Signal		0				0		
Minor Street		Northbound				Southbou	Ind	
Movement	7	8	9		10	11		12
	L	Т	R		L	Т		R
Volume (veh/h)	10		10					
Peak-Hour Factor, PHF	0.92	1.00	0.92		0.70	1.00		0.70
Hourly Flow Rate, HFR (veh/h)	10	0	10		0	0		0
Percent Heavy Vehicles	0	0	0		0	0		0
Percent Grade (%)		0	•			0	•	
Flared Approach		N	1			N		
Storage		0				0		
RT Channelized			0					0
Lanes	0	0	0		0	0		0
Configuration		LR						
Delay, Queue Length, a	nd Level of Se	rvice	•			•	•	
Approach	Eastbound	Westbound	1	Vorthbo	und	S	outhbound	1
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L		LR				
v (veh/h)		10		20				
$C_{\rm (m)}$ (veh/h)		525		127				
		0.02		0.16				
95% quoue longth		0.02		0.10				
So /0 queue lengtin		12.0		20.07	_	_		
		12.0		30.0		_		
		В						
Approach Delay (s/veh)				38.6				
Approach LOS				E				

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General Information Site Information Analyst BMF Intersection Wallings Rd/Wright Rd Agency/Co. GPD Group Jurisdiction City of Broadview Heights Date Performed 3/2/2015 Analysis Time 2020 Build" Analysis Time Period AM Peak Hour 2020 Build" Analysis Year 2020 Build" Project Description Wallings Road Study Period (trs): 0.25 9 Vehicle Volumes and Adjustments Study Period (trs): 0.25 9 9 Wallors Street L T R L T R Volume (veh/h) 20 1190 10 10 360 10 Percent Heavy Vehicles 1 - - 3 - - Mourine (veh/h) 20 192 0.92 0.92 0.92 0.92 0.92 Houry Flow Rate, HFR 21 1293 10 10 380 10 Percent Heavy Vehicles 1 - - - <t< th=""><th></th><th>TW</th><th>O-WAY STOP</th><th>CONTR</th><th></th><th>IMARY</th><th></th><th></th><th></th></t<>		TW	O-WAY STOP	CONTR		IMARY			
Analyst BMF Intersection Wallings Rd/Wight Rd Agency/Co. GPD Group Jurisdiction City of Broadview Heights Date Performed 3/2/2015 Analysis Year 2/20 Broadview Heights Analysis Time Period AM Peak Hour 2/2015 Analysis Year 2/20 Broadview Heights Project Description Wellings Road Safety & Corridor Study 2/20 Broadview Heights 2/20 Broadview Heights Topicst Description Wellings Road Safety & Corridor Study 2/20 Broadview Heights EastNexet Study Period (hrs): 0.25 9/20 Broadview Heights Movement 1 2 3 4 5 6 Mole (welnh) 20 1190 10 10 380 10 Percent Heavy Vehicles 1 - - 3 - - RT Channelized 0 1 1 0 1 1 0 Configuration L T R L T R Upsteant Signal 0 <th>General Information</th> <th>n</th> <th></th> <th>Site I</th> <th>nformat</th> <th>tion</th> <th></th> <th></th> <th></th>	General Information	n		Site I	nformat	tion			
AgericyCo. GPD Group Jurisdiction City of Broadview Heights Date Performed 32/2015 Analysis Time Period North/South Street: Worth/South Street: Westbound Major Street Eastbound North/South Street: Westbound Movement 1 2 3 4 5 6 Movement 1 2 3 4 5 6 1 7 R 10 10 360 10 Percent Heavy Vehicles 1 - - 3 - <td< td=""><td>Analyst</td><td>BMF</td><td></td><td>Interse</td><td>ection</td><td></td><td>Wallings</td><td>Rd/Wriaht</td><td>Rd</td></td<>	Analyst	BMF		Interse	ection		Wallings	Rd/Wriaht	Rd
Date Performed 3/2/2015 Analysis Time Period Image Period Analysis Time Period Image Period <thimage period<="" th=""> Image Period Imag</thimage>	Agency/Co.	GPD Gro	ир	Jurisdi	ction		City of Br	oadview H	eights
Analysis Time Period Image Mailings Road Safety & Corridor Study Image Mailings Road North/South Street: Wright Road Project Description Wailings Road North/South Street: Wright Road Intersection Orientation: East-West Its Study Period (hrs): 0.25 Vehicle Volumes and Adjustments Mevement 1 2 3 4 5 6 Movement 1 2 3 4 5 6 Movement 1 2 3 4 5 6 Pose-Hour Factor, PHF 0.92 0.92 0.92 0.92 0.92 0.92 Houry Flow Rate, HFR 2.1 1293 10 10 380 10 Percent Heavy Vehicles 1 - - - - - R C Channelized 0 1 1 1 1 1 Lanes 1 1 0 1 1 1 Lanes 1 1 0 1 1	Date Performed	3/2/2015	•	Analys	sis Year		2020 'Bui	ld'	
Project Description Wallings Road Safety & Corridor Study East/West Street: Wallings Road Safety & Corridor Study Period (hrs): 0.28 Vehicle Volumes and Adjustments Major Street East-West Study Period (hrs): 0.28 Vehicle Volumes and Adjustments Movement 1 2 3 4 5 6 North/South Network Net	Analysis Time Period	AM Peak	Hour						
East.West Street: Worth/South Street: Wright Road Intersection Orientation: Eastbound Study Period (rrs): 0.25 Vehicle Volumes and Adjustments Eastbound Westbound Normania Movement 1 2 3 4 5 6 Vehicle Volumes and Adjustments T R L T R Vehicle Volumes and Adjustments 0 100 350 10 Peak-Hour Factor, PHF 0.92 0.92 0.92 0.92 0.92 Houry Flow Rate, HFR 21 1293 10 10 380 10 Peak-Hour Factor, PHF 0 0 0 0 0 Lanes 1 1 0 1 1 1 1 Configuration L T R N R 1 Upstream Signal 0 10 11 12 10 50 10 10 Upstream Signal 0 20	Project Description W	allings Road Sa	fety & Corridor Si	tudy					
Intersection Orientation: East-West Study Period (hrs): 0.25 Vehicle Volumes and Adjustments Eastbound Westbound Movement 1 2 3 4 5 6 Volume (veh/h) L T R L T R Volume (veh/h) 20 1190 10 10 350 10 Peak-Hour Factor, PHF 0.92 0.9	East/West Street: Walli	ngs Road		North/S	South Stre	eet: Wright	Road		
Vehicle Volumes and Adjustments Major Street Eastbound Westbound Movement 1 2 3 4 5 6 Novement L T R L T R Outume (veh/h) 20 1190 10 10 350 10 Peak-Hour Factor, PHF 0.92 0.92 0.92 0.92 0.92 0.92 0.92 Houry Flow Rate, HFR 21 1293 10 10 380 10 Percent Heavy Vehicles 1 3 Median Type T C 1 1 1 1 1 Configuration L D 17 R U T R Upsteem Signal 0 10 11 12 12 Movement 7 8 9 10 11 12 Upsteam Signal 0 20 20 <td>Intersection Orientation:</td> <td>East-West</td> <td></td> <td>Study I</td> <td>Period (hr</td> <td>rs): 0.25</td> <td></td> <td></td> <td></td>	Intersection Orientation:	East-West		Study I	Period (hr	rs): 0.25			
Major Street Eastbound Wetsbound Movement 1 2 3 4 5 6 Volume (veh/h) 20 1190 10 10 350 10 Peak-Hour Factor, PHF 0.92 0.92 0.92 0.92 0.92 0.92 Houry Flow Rate, HFR 21 1293 10 10 380 10 Percent Heavy Vehicles 1 3 Median Type Undivided T 1 1 1 1 1 Percent Heavy Vehicles 1 3 Median Type Undivided T R 0 0 - 0 Lanes 1 1 0 1 1 1 1 1 1 Upsteam Signal 0 I T R L T R 10 10 Porteet Northbound	Vehicle Volumes ar	nd Adjustme	ents						
Movement 1 2 3 4 5 6 Volume (veh/h) L T R L T R Volume (veh/h) 20 1190 10 10 350 10 Peak-Hour Factor, PHF 0.92 0.93 0 11 1 </td <td>Major Street</td> <td></td> <td>Eastbound</td> <td></td> <td></td> <td></td> <td>Westbou</td> <td>nd</td> <td></td>	Major Street		Eastbound				Westbou	nd	
Volume (veh/h) L T R L T R Volume (veh/h) 20 1190 10 1350 10 Peak-Hour Factor, PHF 0.92 0.92 0.92 0.92 0.92 0.92 Hourly Flow Rate, HFR 21 1293 10 10 380 10 Percent Heavy Vehicles 1 3 Median Type Undivided T 1 1 1 1 Lanes 1 1 0 1 1 1 1 Upstream Signal 0 - 0 - 0 - Winor Street Northbound Southbound Southbound 10 11 12 Volume (veh/h) 20 20 10 50 10 10 Peak-Hour Factor, PHF 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92 <t< td=""><td>Movement</td><td>1</td><td>2</td><td>3</td><td></td><td>4</td><td>5</td><td></td><td>6</td></t<>	Movement	1	2	3		4	5		6
Volume (veh/h) 20 1190 10 10 350 10 Peak-Hour Factor, PHF 0.92 </td <td></td> <td>L</td> <td>T</td> <td>R</td> <td></td> <td></td> <td>T</td> <td></td> <td>R</td>		L	T	R			T		R
Peak-Hour Factor, PHF 0.92 0.9	Volume (veh/h)	20	1190	10		10	350		10
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	Peak-Hour Factor, PHF	0.92	0.92	0.92		0.92	0.92	(0.92
Percent Heavy Vehicles 1 3 Median Type Undivided RT Channelized 0 0 0 Lanes 1 1 0 1 1 1 Configuration L TR L T R 1 1 1 1 Upstream Signal 0 0 11 1 <td>(veh/h)</td> <td>21</td> <td>1293</td> <td>10</td> <td></td> <td>10</td> <td>380</td> <td></td> <td>10</td>	(veh/h)	21	1293	10		10	380		10
Median Type Undivided RT Channelized 0 0 0 Lanes 1 1 0 1 1 0 Configuration L TR L T R 0 Upstream Signal 0 0 0 0 0 0 Minor Street Northbound Southbound 0 10 11 12 Wowment 7 8 9 10 11 12 10 Volume (veh/h) 20 20 10 50 10 10 Peak-Hour Factor, PHF 0.92 0.92 0.92 0.92 0.92 0.92 Volume (veh/h) 20 0 2 4 0 4 Percent Gactor, PHF 0.92 0.92 0.92 0.92 0.92 Percent Grade (%) 0 0 10 10 10 Eared Approach N LTR LTR D D	Percent Heavy Vehicles	1				3			
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Median Type				Undivid	ed			
Lanes 1 1 0 1 <td>RT Channelized</td> <td></td> <td></td> <td>0</td> <td></td> <td></td> <td></td> <td></td> <td>0</td>	RT Channelized			0					0
Configuration L TR L T R Upstream Signal 0 0 0 0 0 0 Minor Street Northbound Southbound Southbound Movement 7 8 9 10 11 12 L T R L T R Northbound 10 10 Volume (veh/h) 20 20 10 50 10 10 Peak-Hour Factor, PHF 0.92	Lanes	1	1	0		1	1		1
Upstream Signal 0 0 0 Minor Street Northbound Southbound Movement 7 8 9 10 11 12 Movement 7 8 9 10 11 12 Volume (veh/h) 20 20 10 50 10 10 Peak-Hour Factor, PHF 0.92 0.92 0.92 0.92 0.92 0.92 0.92 Hourly Flow Rate, HFR 21 21 10 54 10 10 Percent Heavy Vehicles 2 0 2 4 0 4 Percent Grade (%) 0 0 0 0 10 Storage 0 1 0 0 1 0 Configuration LTR 0 0 1 0 Configuration L L LTR 11 12 Lane Configuration L L LTR 11 12 Lane Config	Configuration	L		TR		L	Т		R
Minor Street Northbound Southbound Movement 7 8 9 10 11 12 L T R L T R L T R Volume (veh/h) 20 20 10 50 10 10 Peak-Hour Factor, PHF 0.92	Upstream Signal		0				0		
Movement 7 8 9 10 11 12 L T R L T R L T R Volume (veh/h) 20 20 10 50 10 10 Peak-Hour Factor, PHF 0.92 0.93 0 1.0	Minor Street		Northbound		<u> </u>		Southbou	und	
L T R L T R Volume (veh/h) 20 20 10 50 10 10 Peak-Hour Factor, PHF 0.92 0.92 0.92 0.92 0.92 0.92 0.92 Hourly Flow Rate, HFR 21 21 10 54 10 10 Percent Heavy Vehicles 2 0 2 4 0 4 Percent Grade (%) 0 0 0 0 10 10 Flared Approach N 0 0 0 10 10 Storage 0 1 0 0 0 0 10	Movement	7	8	9		10	11		12
Volume (veh/h) 20 20 10 50 10 10 Peak-Hour Factor, PHF 0.92		L	Т	R		L	Т		R
Peak-Hour Factor, PHF 0.92	Volume (veh/h)	20	20	10		50	10		10
Hourly Flow Rate, HFR (veh/h) 21 21 10 54 10 10 Percent Heavy Vehicles 2 0 2 4 0 4 Percent Grade (%) 0 0 0 0 4 Percent Grade (%) 0 0 0 0 4 Storage 0 0 0 0 0 10 Storage 0 1 0 0 0 10 0 Lanes 0 1 0 0 1 0 0 0 10 0 0 10 0 0 10 0 0 10 0 0 10 0 0 10 0 0 10 0 0 10 0 0 10 0 0 10 10 10 10 10 10 11 12 12 10 11 12 11 11 12 12 10	Peak-Hour Factor, PHF	0.92	0.92	0.92	· · · · ·	0.92	0.92	(0.92
Control Percent Heavy Vehicles202404Percent Grade (%)0000Flared ApproachNN00Storage0000RT Channelized0010Lanes01001ConfigurationLTRLTRLTRDelay, Queue Length, and Level of ServiceApproachEastboundWestboundNorthboundSouthboundMovement14789101112Lane ConfigurationLLLTRLTRLTRV (veh/h)211052741012310C (m) (veh/h)117452878601.231095% queue length0.050.063.086.221.2311LOSABFFF4Approach LOS75307.4115.7	Hourly Flow Rate, HFR (veh/h)	21	21	10		54	10		10
Percent Grade (%)Percent Grade (%)00Flared ApproachNNStorage00RT Channelized00Lanes01O01ConfigurationLTRDelay, Queue Length, and Level of ServiceApproachEastboundWovement14147891011114789101111105274C (m) (veh/h)117452878603.08603.08603.086111.9115.7307.4Control Delay (s/veh)8.1Approach Delay (s/veh)FF	Percent Heavy Vehicles	2	0	2		4	0		4
Flared ApproachNNStorage00RT Channelized00Lanes01O10ConfigurationLTRDelay, Queue Length, and Level of ServiceApproachEastboundWestboundNorthboundMovement114789101112Lane ConfigurationLLLTRLane ConfigurationLLLTRC (m) (veh/h)2111745287860V(ceh/h)117452878600V/c0.020.020.67115.7307.4LOSAApproach LOSFFF	Percent Grade (%)		0				0		
Storage 0 0 0 RT Channelized 0	Flared Approach		N	1			N		
RT Channelized000Lanes01001Configuration LTR LTR LTR LTR Delay, Queue Length, and Level of ServiceApproachEastboundWestboundNorthboundSouthboundMovement14789101112Lane Configuration L L LTR LTR LTR LTR v (veh/h)21105274 C O C (m) (veh/h)11745287860 V/c 95% queue length0.050.063.08 6.22 O Control Delay (s/veh)8.111.9115.7 307.4 I LOSABF F F A Approach LOS F F F	Storage		0				0		
Lanes010010ConfigurationLTRLTRLTR010Delay, Queue Length, and Level of ServiceApproachEastboundWestboundNorthboundSouthboundMovement14789101112Lane ConfigurationLLLTRLTRLTRVV (veh/h)211052740C (m) (veh/h)117452878600v/c0.020.020.671.23095% queue length0.050.063.086.220Control Delay (s/veh)8.111.9115.7307.41LOSABFFApproachFApproachApproach LOS74F500	RT Channelized			0					0
ConfigurationLTRLTRDelay, Queue Length, and Level of ServiceApproachEastboundWestboundNorthboundMovement14789101112Lane ConfigurationLLLTRLTRLTRV (veh/h)211052741C (m) (veh/h)11745287860V/c0.020.020.671.2395% queue length0.050.063.086.22Control Delay (s/veh)8.111.9115.7307.4LOSABFFApproach Delay (s/veh)Approach LOSFF	Lanes	0	1	0		0	1		0
Delay, Queue Length, and Level of ServiceApproachEastboundWestboundNorthboundSouthboundMovement14789101112Lane ConfigurationLLLTRLTRLTRv (veh/h)2110527410C (m) (veh/h)11745287860v/c0.020.020.671.2395% queue length0.050.063.086.22Control Delay (s/veh)8.111.9115.7307.4LOSABFFFApproach LOSFF	Configuration		LTR			-	LTR		-
Approach Eastbound Westbound Northbound Southbound Movement 1 4 7 8 9 10 11 12 Lane Configuration L L LTR LTR LTR LTR v (veh/h) 21 10 52 74 C (m) (veh/h) 1174 528 78 60	Delay, Queue Length, a	nd Level of Se	ervice						
Movement 1 4 7 8 9 10 11 12 Lane Configuration L L LTR LTR LTR LTR V V V(veh/h) 21 10 52 74 V	Approach	Eastbound	Westbound		Northbou	nd	S	outhbound	
Lane Configuration L L LTR LTR v (veh/h) 21 10 52 74 C (m) (veh/h) 1174 528 78 60 v/c 0.02 0.02 0.67 1.23 95% queue length 0.05 0.06 3.08 6.22 Control Delay (s/veh) 8.1 11.9 115.7 307.4 LOS A B F F F Approach Delay (s/veh) F F	Movement	1	4	7	8	9	10	11	12
v (veh/h) 21 10 52 74 C (m) (veh/h) 1174 528 78 60 v/c 0.02 0.02 0.67 1.23 95% queue length 0.05 0.06 3.08 6.22 Control Delay (s/veh) 8.1 11.9 115.7 307.4 LOS A B F F Approach Delay (s/veh) Approach LOS F F	Lane Configuration	L	L		LTR			LTR	
C (m) (veh/h) 1174 528 78 60 V/c 0.02 0.02 0.67 1.23 95% queue length 0.05 0.06 3.08 6.22 Ontrol Delay (s/veh) 8.1 11.9 115.7 307.4 LOS A B F F Approach Delay (s/veh) 75.7 307.4	v (veh/h)	21	10		52			74	
V/c 0.02 0.02 0.02 0.67 1.23 95% queue length 0.05 0.06 3.08 6.22 Control Delay (s/veh) 8.1 11.9 115.7 307.4 LOS A B F F Approach Delay (s/veh) 115.7 307.4	C (m) (veh/h)	1174	528		78			60	
95% queue length 0.05 0.06 3.08 6.22 Control Delay (s/veh) 8.1 11.9 115.7 307.4 LOS A B F F Approach Delay (s/veh) 115.7 307.4 Approach Delay (s/veh) F F F	v/c	0.02	0.02		0.67			1.23	
Control Delay (s/veh) 8.1 11.9 115.7 307.4 LOS A B F F F Approach Delay (s/veh) 115.7 307.4 Approach Delay (s/veh) 115.7 307.4 Approach LOS F F	95% queue length	0.05	0.06		3.08			6.22	
LOS A B F F Approach Delay (s/veh) 115.7 307.4 Approach LOS F F	Control Delay (s/veh)	8.1	11.9		115.7			307.4	
Approach Delay (s/veh) 115.7 307.4 Approach LOS F F	LOS	A	В		F			F	
Approach LOS F F	Approach Delav (s/veh)				115.7			307.4	
	Approach LOS				F		1	F	

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	TW	O-WAY STOP	CONTR	OL SU	MMARY			
General Information	า		Site I	nforma	ation			
Analyst	BMF		Interse	ection		Wallings	Rd/Craia	Ln
Agency/Co.	GPD Gro	ир	Jurisdi	ction		City of Br	oadview	Heights
Date Performed	3/2/2015		Analys	is Year		2020 'Bui	ild'	
Analysis Time Period	AM Peak	Hour						
Project Description Wa	allings Road Sa	fety & Corridor Si	tudy					
East/West Street: Walli	ngs Road	-	North/S	South St	reet: Craig	Lane		
Intersection Orientation:	East-West		Study I	Period (h	nrs): 0.25			
Vehicle Volumes ar	nd Adjustme	ents						
Major Street		Eastbound				Westbou	nd	
Movement	1	2	3		4	5		6
	L	Т	R		L	Т		R
Volume (veh/h)		1240	10		10	360		
Peak-Hour Factor, PHF	0.80	0.92	0.92		0.92	0.92		0.76
Hourly Flow Rate, HFR (veh/h)	0	1347	10		10	391		0
Percent Heavy Vehicles	2				3			
Median Type				Undivid	ded			
RT Channelized			0					0
Lanes	0	1	0		1	1		0
Configuration			TR		L	Т		
Upstream Signal		0				0		
Minor Street		Northbound		Ī		Southbou	und .	
Movement	7	8	9		10	11		12
	L	Т	R		L	Т		R
Volume (veh/h)	10		40					
Peak-Hour Factor, PHF	0.92	1.00	0.92		0.70	1.00		0.70
Hourly Flow Rate, HFR (veh/h)	10	0	43		0	0		0
Percent Heavy Vehicles	7	0	7		0	0		0
Percent Grade (%)		0				0		
Flared Approach		N				N		
Storage		0				0		
RT Channelized			0					0
	0	0	0		0	0		0
Configuration		I R	Ť					
Delay Queue Length	I aval of Se							
Approach	Eastbound	Westbound		Jorthboi	ind		outhhour	od.
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L		LR				
v (veh/h)		10		53				
C(m)(veh/h)		504		150				
		0.02		0.25				
		0.02		0.35		_		
95% queue length		0.06		1.46	_			
Control Delay (s/veh)		12.3		41.6				
LOS		В		E				
Approach Delay (s/veh)				41.6				
Approach LOS				E				

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	TWO-WAY STOP CONTROL SUMMARY												
General Information	n		Site I	nform	atio	n							
Analyst	BMF		Interse	ection			Wallings	Rd/Skyline	Dr				
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadview H	eights				
Date Performed	3/2/2015		Analys	is Year	•		2020 'Bui	ld'					
Analysis Time Period	AM Peak	Hour											
Project Description W	allings Road Sa	fety & Corridor St	udy										
East/West Street: Walli	ngs Road		North/S	South S	treet	: Skyline	Drive						
Intersection Orientation:	East-West		Study I	Period ((hrs):	0.25							
Vehicle Volumes ar	nd Adjustme	ents											
Major Street		Eastbound					Westbou	nd					
Movement	1	2	3			4	5		6				
	L	Т	R			L	Т		R				
Volume (veh/h)	20	1260					360		10				
Peak-Hour Factor, PHF	0.92	0.92	0.81			0.78	0.92		0.92				
Hourly Flow Rate, HFR (veh/h)	21	1369	0			0	391		10				
Percent Heavy Vehicles	1					3	-						
Median Type				Undiv	ided								
RT Channelized			0						0				
Lanes	1	1	0			0	1		0				
Configuration	L	Т							TR				
Upstream Signal		0					0						
Minor Street		Northbound	•				Southbou	ind					
Movement	7	8	9			10	11		12				
	L	Т	R			L	Т		R				
Volume (veh/h)						10			10				
Peak-Hour Factor, PHF	0.63	1.00	0.63			0.92	1.00		0.92				
Hourly Flow Rate, HFR (veb/b)	0	0	0			10	0		10				
Percent Heavy Vehicles	7	0	7			4	0		4				
Percent Grade (%)		0				-	0		-				
Flared Approach		N	1				Ň						
Storage		0					0						
DT Channelized	_		0				0		0				
			0			0			0				
Lanes	0	0	0			0			0				
Conliguration	<u> </u>	-					LR						
Delay, Queue Length, a	ind Level of Se	ervice											
Approach Mavamant	Lastbound	Westbound	7	Northbo	bund	0	10 S		10				
	· ·	4	1	0		9	10	11	12				
	L												
v (veh/h)	21							20					
C (m) (veh/h)	1163							149					
v/c	0.02							0.13					
95% queue length	0.06							0.45					
Control Delay (s/veh)	8.2							32.9					
LOS	A							D					
Approach Delay (s/veh)	proach Delay (s/veh)							32.9					
Approach LOS							D						

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General Information Site Information Analyst BMF Intersection Wailings Rd/W Mill Rd Agency/Co. GPD Group Unrisdiction City of Broadview Heights Date Performed 3/2/2015 Analysis The Period MW Peak Hour Project Description Wailings Road Safety & Corridor Study Analysis The Safety & Sa		TW	O-WAY STOP	CONTR	OL SU	JMM	ARY				
Analyst BMF Intersection Wallings Rd/W Mill Rd Agency/Co. GPD Group Jurisdiction City of Broadvew Heights Analysis Time Period AV Peak Hour 202 Braidvew Heights Project Description Wallings Road: Safety & Condor Study 202 Braidvew Heights East/West Street: Wellings Road: Safety & Condor Study 202 Braidvew Heights Major Street East/West Study Period (hrs): 0.25 Vehicle Volumes and Adjustments Westbound Westbound Worement 1 2 3 4 5 6 Volume (veh/h) 1120 150 10 360 - - Veloce Volumes and Adjustments Undivided Westbound - - - - - Veloce Volume (veh/h) 1120 150 10 360 - - Veloce Volumes and Adjustments 0 1217 163 10 391 0 Course factor, PHF 0.80 1 - - - -	General Information	n		Site I	nform	atio	n				
AgercyCo. GPD Group Jurisdiction City of Broadview Heights Date Performed 32/2015 Analysis Time Period North/South Street: Westhound Time Period Analysis Time Period North/South Street: Westhound North/South Street: Westhound North/South Street: Noal Street North/South Street: <td< td=""><td>Analyst</td><td>BMF</td><td></td><td>Interse</td><td>ection</td><td></td><td></td><td>Wallings</td><td>Rd/W</td><td>Mill F</td><td>Rd </td></td<>	Analyst	BMF		Interse	ection			Wallings	Rd/W	Mill F	Rd
Date Performed 3/2/2015 Analysis Time Period Difference Analysis Time Period Wellings Road Stety & Corridor Study North/South Street: Westbound More Meridian Reserved East/West Study Period (hrs): 0.25 - Vehicle Volumes and Adjustments Westbound Westbound - - More Meridian L T R L T R Vehicle Volume (weh/h) 1120 150 10 360 - - Verinity Flow Rate, HFR 0 1217 163 10 391 0 Percent Heavy Vehicles 1 - - 3 - - - - Wedian Type Undivided T R L T - - - - - - - - - - - -	Agency/Co.	GPD Gro	up	Jurisdi	ction			City of Br	oadvie	ew He	eights
Analysis Time Period Image Management Image Mailings Road Safety & Corridor Study Project Description Wailings Road North/South Street: West Mill Road Intersection Orientation: East-West Isolation Study Period (hrs): 0.25 Vehicle Volumes and Adjustments Mevement 1 2 3 4 5 6 Movement 1 2 3 4 5 6 Movement 1 2 3 4 5 6 Post-Hour Scott, PHF 0.80 0.92 0.92 0.92 0.92 0.63 Houry Flow Rate, HFR 0 1217 163 10 391 0 Percent Heavy Vehicles 1 - - 3 - - RT Channelized 0 1 1 1 0 0	Date Performed	3/2/2015	•	Analys	sis Year			2020 'Bui	ild'		-
Project Description Wallings Road North/South Street: Werkings Road North/South Street: Werkings Road North/South Street: Werkings Road Morth/South Street: Werkings Road Werkings Road Safety & Condor Study Period (hrs): 0.26 Werkings Road Safety & Condor Study Wortment 1 2 3 4 5 Werkings Road Safety & Condor Study Werkings Road Safety & Condor Study Wortment 1 2 3 4 5 Verkiele View(h) 10 3 - Undivided T - - Verkings Road Safety & Condor Study Undivided Condor 0 Condor 0 O 1 0 <td>Analysis Time Period</td> <td>AM Peak</td> <td>Hour</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	Analysis Time Period	AM Peak	Hour								
East/West Street: West Mill Road Intersection Orientation: East-West Study Period (hrs): 0.25 Vehicle Volumes and Adjustments Eastbound Westbound Movement 1 2 3 4 5 6 Value L T R L T R Value 0.80 0.92 0.92 0.92 0.63	Project Description Wa	allings Road Sa	afety & Corridor Si	tudy							
Intersection Orientation: East-West Study Period (hrs): 0.25 Vehicle Volumes and Adjustments Eastbound Westbound Movement 1 2 3 4 5 6 Movement L T R L T R Volume (veh/h) 1120 150 10 360 - Peak-Hour Factor, PHF 0.80 0.92 0.92 0.92 0.92 0.63 Veh/h) 10 163 10 391 0 - Peak-Hour Factor, PHF 0.80 0.92 0.92 0.92 0.63 Veh/h) 1 - - 3 - - Peacent Heavy Vehicles 1 - - 3 - - Ontroburd 0 11 1 1 0 0 - Velican Type Undivided 0 1 1 1 0 Onfuration T R L	East/West Street: Walli	ngs Road		North/S	South St	treet:	West M	lill Road			
Vehicle Volumes and Adjustments Major Street Eastbound Westbound Movement 1 2 3 4 5 6 Volume (veh/h) L T R L T R Ordume (veh/h) 1120 150 10 360 Peak-Hour Factor, PHF 0.80 0.92 0.92 0.92 0.92 0.63 Houry Flow Rate, HFR 0 1217 163 10 391 0 Peak-Hour Factor, PHF 0.80 0.92 0.92 0.92 0.63 Houry Flow Rate, HFR 0 1217 163 10 391 0 Percent Heavy Vehicles 1 - - 3 - - Utation 0 1 1 1 1 1 1 1 0 Opstream Signal 0 1 1 2 0 0 0 Opstream Signal 0 1 1	Intersection Orientation:	East-West		Study I	Period ((hrs):	0.25				
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Volume (veh/h) 10 50 Peak-Hour Factor, PHF 0.92 1.00 0.92 0.79 1.00 0.79 Hourly Flow Rate, HFR (veh/h) 10 0 54 0 0 0 Percent Heavy Vehicles 2 0 2 4 0 4 Percent Grade (%) 0 0 0 0 0 Flared Approach N 0 0 0 0 Storage 0 0 0 0 0 Channelized 0 0 0 0 0 Lanes 0 0 0 0 0 Configuration LR 1 4 7 8 9 10 11 12 ane Configuration L LR L LR 1 2 2 0.34 1 2 2 2 33.3 1 </td <td></td> <td>L</td> <td>Т</td> <td>R</td> <td></td> <td></td> <td>L</td> <td>Т</td> <td></td> <td></td> <td>R</td>		L	Т	R			L	Т			R
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N N N Storage 0 </td <td>Percent Grade (%)</td> <td></td> <td>0</td> <td></td> <td></td> <td></td> <td></td> <td>0</td> <td></td> <td></td> <td></td>	Percent Grade (%)		0					0			
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Larres 0 1 <td></td> <td></td> <td></td> <td>0</td> <td></td> <td></td> <td>0</td> <td>0</td> <td></td> <td></td> <td>0</td>				0			0	0			0
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Movement I <thi< th=""> I<!--</td--><td>Approacn Movement</td><td>Lastbound</td><td>Vvestbound</td><td>7</td><td></td><td>ouna</td><td>0</td><td>10</td><td></td><td>ouna 1</td><td>10</td></thi<>	Approacn Movement	Lastbound	Vvestbound	7		ouna	0	10		ouna 1	10
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HCS+TM Version 5.3 Generated: 3/20/2015 8:43 AM

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	ation	GPD Group									ration	h	0.25	<i>/</i> //		417	
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Analysi		City of Dreadyious L	aiahta	Time			DM Da				за турі іг	5			- <u>-</u>	w1⊧	*_ <u>}</u> ⊱
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Project Descrip	lion	Opening Year 2020	Dulla r	-w Pea		ur										. 1. 1. 1. 1.	
Demand Inform	nation				E	B			٧	VB			NB			SB	
Approach Move	ement			L	Т	-	R	L		Т	R	L	Т	R	L	Т	R
Demand (v), ve	h/h			130	24	10	100	360	7	40	160	130	440	140	210	620	270
Signal Informa	tion				Ţ	2	215	2		2						_	A
Cycle, s	130.0	Reference Phase	2		5		- 542	, - ^ e		è	₩°	3		∕ ∖⊾₁	_		×.
Offset, s	0	Reference Point	End	Green	50	\square	39.8	50	0	4	51.8	0.0	_	•	2	3	4
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	3.6		3.6	3.6	3.	6	3.6	0.0	- L		512		<u> </u>
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0		2.0	2.0	2.	0	2.0	0.0		5	6	7	
Timer Results				EBL	-	El	BT	WBI		W	/BT	NBL		NBT	SBL	-	SBT
Assigned Phase	e			3		8	3	7			4	1		6	5		2
Case Number				1.1		4.	.0	1.1		3	3.0	1.1		4.0	1.1		4.0
Phase Duration	, S			10.6	;	57	7.4	16.6	5	63	3.4	10.6	;	45.4	10.6	; .	45.4
Change Period,	hange Period, (Y+Rc), s			5.6		5	.6	5.6		5	5.6	5.6		5.6	5.6		5.6
Max Allow Head	/lax Allow Headway (<i>MAH</i>), s			4.1		4	.1	4.1		4	.1	4.3		4.3	4.3		4.3
Queue Clearan	Queue Clearance Time (g_s), s			7.0		22	2.4	13.0)	57	7.8	7.0		21.5	7.0		35.1
Green Extensio	n Time	(<i>g</i> e), s		0.0		6	.5	0.0		0	0.0	0.0		6.9	0.0		2.9
Phase Call Prob	oability			1.00		1.0	00	1.00)	1.	.00	1.00		1.00	1.00		1.00
Max Out Proba	bility			1.00		0.	05	1.00)	1.	.00	1.00		0.28	1.00		0.96
No.			_			۰ ۲			14/	D				_		00	_
Movement Gro	oup Res	suits			<u>Е</u> Е т	5	Р		VV T	В	Р	1		Р		5B T	Р
Approach Move	ment				1	+	П 10		1	+	п 14	L -1	I C	п 10	E	1	10
Adjusted Flow		voh/h			270	2	10	/ 201	90	1	174	1/1	207	202	229	2 510	12
Adjusted Flow I	ation Flo	, ven/n wy Bate (s) veh/h/ln		1792	178	27	_	1757	18/	+	1563	177/	1863	1708	1774	1900	1703
	Time (o			5.0	20.	Λ		11.0	55	р. 2	9.0	5.0	10.00	19.5	5.0	33.1	33.1
	learance	a Time (a_{a}) s		5.0	20.	4		11.0	55	8	9.0	5.0	19.2	19.5	5.0	33.1	33.1
Green Batio (a)	$\langle C \rangle$			0.44	0.4	- 0	_	0.50	0.4	4	0.44	0.34	0.31	0.31	0.34	0.31	0.31
Canacity (c) ve	h/h			124	712	2	_	445	82	0	695	145	570	523	235	582	521
Volume-to-Cap	acity Ba	tio (X)		1 1.37	0.51	-	_	0.879	0.98	о 81 С	0 250	0.978	0 574	0.580	0.970	0.877	0.877
Available Capa	city (C_a) .	veh/h		124	712	2		445	82	0	695	145	570	523	235	582	521
Back of Queue	(<i>Q</i>), veł	n/In (50th percentile)		8.5	8.8	3		9.0	30.	3	3.4	2.7	9.1	8.5	3.3	17.9	16.3
Queue Storage	Ratio (RQ) (50th percentile)	0.57	0.0	0		0.58	0.0	0	0.26	0.31	0.00	0.00	0.33	0.00	0.00
Uniform Delay (d1), s/ve	eh	,	34.9	29.	7	_	32.8	35.	6	22.6	44.2	38.0	38.0	47.9	42.8	42.8
Incremental De	lav (<i>d</i> ₂).	s/veh		122.2	0.7	7		17.9	26.	6	0.2	67.9	1.4	1.6	49.9	14.2	15.5
Initial Queue De	elay (da)	, s/veh		0.0	0.0)		0.0	0.0	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (Control Delay (d), s/veh			157.1	30.3	3		50.7	62	2	22.7	112.1	39.4	39.7	97.8	56.9	58.3
Level of Service (LOS)				F	C	-		D	E	-	С	F	D	D	F	E	E
Approach Delay, s/veh / LOS			65.4		E		53.9)		D	52.8		D	65.3		E	
Intersection Delay, s/veh / LOS					58	.7							E				
,																	
Multimodal Re	Aultimodal Results			EE	3			W	В			NB			SB		
Pedestrian LOS	Score	/ LOS															
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Analyst		BMF		Analys	is Da	te Mai	r 2.	2015		Are	a Type	<i>.</i>	Othe	r				<u>ل</u> ے
Jurisdiction		City of Broadview H	leiahts	Time F	Period	I PM	Pe	ak Hou	r	PH	F	-	0.92		-→ 	w te	t t	7
Intersection		Wallings Road/Wva	tt Road	Analys	is Ye	ar 202	20		-	Ana	alvsis F	Period	1>7:	00			4	4
File Name		7. Wallings Rd Wva	att Rd (Dpenina	Year	2020 '	Bui	ld' PM.>	kus							.	×	-
Project Descrip	tion	Opening Year 2020	'Build' I	PM Peal	k Hou	Ir									1 4	। 1414)	7 7 7	
		111 3 111 1																
Demand Inform	nation				EE	3			W	В			NB			SE		
Approach Move	ement			L	Т	F	۲	L	Т	-	R	L	Т	R	L	Т	R	
Demand (v), ve	h/h				53	0 7	0	190	12	70		50	0	50				
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Signal Informa	tion	vV		e		← .	÷										-+-	
Cycle, s	90.0	Reference Phase	2			R	E	l sa	2							3	Y	4
Offset, s	0	Reference Point	End	Green	7.0	56.	.2	10.0	0.0)	0.0	0.0			-		•	
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	3.6	3.6	6	3.6	0.0)	0.0	0.0						
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	2.0)	2.0	0.0)	0.0	0.0		5	6	7	8	В
															1			
Timer Results				EBL	-	EBT		WBI		W	BT	NBI	-	NBT	SB		SBT	4
Assigned Phase	e					2		1	_	6	3			4				4
Case Number						8.3		1.0		4.	.0			12.0				
Phase Duration	, S					61.8		12.6	\$	74	1.4			15.6				
Change Period,	Change Period, (<i>Y</i> + <i>R</i> _c), s					5.6		5.6		5.	.6			5.6				
Max Allow Head	Max Allow Headway (<i>MAH</i>), s					1.0		1.1		1.	.0			1.4				
Queue Clearan	Queue Clearance Time (g_s), s					20.8		5.4		70).2			7.6				
Green Extensio	n Time	(<i>g</i> _e), s				0.0	_	0.0		0.	.0			0.0				
Phase Call Prob	oability					1.00		1.00)	1.(00			1.00				
Max Out Proba	bility					0.00		0.30)	1.(00			0.07				
Movement Gro	un Ros	sulte			EB				W/F	ξ			NB			SB		٩
Approach Move	mont				Т	B	+	1	T	,	R	1	Т	B	1	Т	B	۲
Assigned Move	ment				2	12		1	6	┿		7	4	14		<u> </u>	+	-
Adjusted Flow F	Rate (v)	veh/h	_		652	,		207	138	2		,	109	<u> </u>			+	٦
Adjusted Satura	ation Flo	w Rate (s) veh/h/ln			1824	1		1723	181	2			1671					1
Queue Service	Time (a				18.8	3		3.4	68 2	> >			5.6					٦
Cycle Queue C	learanc	e Time (a_c) s			18.8	2		3.4	68.2	- ,			5.6				+	1
Green Batio (a/	(C)	(go), c	_		0.62	>		0.72	0.76	3			0.11					1
Capacity (c), ve	h/h				1139	- 9	╡	528	138	3			186					1
Volume-to-Cap	acitv Ra	tio (<i>X</i>)			0.57	2		0.391	0.99	8			0.586					1
Available Capa	city (Ca)	, veh/h			1139	Э		528	138	3			186					-
Back of Queue	(<i>Q</i>). vel	n/In (50th percentile)			6.5			0.9	25.2	2			2.4					٦
Queue Storage	Ratio (RQ) (50th percentile))		0.00)		0.10	0.00	5			0.00					
Uniform Delay (d1), s/v	eh	,		9.9			7.2	10.5	5			38.0					٦
Incremental De	lav (<i>d</i> ₂).	s/veh			0.5			0.2	23.7	7			3.2				+	
Initial Queue De	elay (da)	, s/veh			0.0			0.0	0.0				0.0					٦
Control Delay (Control Delay (d), s/veh				10.3	3		7.4	34.2	2			41.2				1	1
Level of Service (LOS)					В			Α	С				D					1
Approach Delay, s/veh / LOS			10.3	-	В		30.7	7	0	2	41.2	2	D	0.0			-	
Intersection Del	Intersection Delay, s/veh / LOS						25	.5							С			٦
Multimodal Re	Iultimodal Results			EB				WE	3			NB			SB		1	
Pedestrian LOS	Score	/ LOS																1
Bicycle LOS Sc	edestrian LOS Score / LOS icycle LOS Score / LOS																	

		HOO E	510 0	ignun	2001		201101	i ne.	Sunto	Janni	ul y				
General Inform	nation								Interse	tion In	format	ion		▲나�↓.	þá ly
Agency	ation	GPD Group							Duratio	h h	0 25			114	
Analyst		BME		Analys	ie Date	Mar 2	2015			ne	Othe	, or			~
Jurisdiction		City of Broadview H	loiahte	Time	Poriod		, 2010 Dak Hou	ır		pe	0 02)	- → +	w‡e	↓
Intersection		Wallings Boad / I-77				2020			Analysi	Period	1 \ 7	7.00			
File Name		16 Wallings Rd L-7	7 SB ()nenina	Voar 2	02020		116	Analysi	s i enou		.00			¢.
Project Description	tion	Opening Vear 2020	'Build' I		k Hour	020 Dui		.us					-	국 수 수 전 ·	۲ (¹
T Toject Descrip	lion	Opening real 2020	Dulia	WI Ca	RTIOUI										
Demand Inform	nation				EB			W	B		NE	3		SB	
Approach Move	ment			L	Т	R	L	Т	R	L	Т	R	L	Т	R
Demand (v), ve	h/h				370	110	40	35	0				270	10	820
														<u> </u>	
Signal Informa	tion	1		-	_€	1216									
Cycle, s	70.0	Reference Phase	2		₿°							1	$\mathbf{\nabla}_{2}$	3	4
Offset, s	0	Reference Point	End	Green	27.2	30.8	0.0	0.0	0.0	0.0					
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	4.0	4.0	0.0	0.0	0.0	0.0				•	Φ
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	2.0	0.0	0.0	0.0	0.0	_	5	6	7	8
							1				1				_
Timer Results				EBI	-	EBT	WB		WBT	NE	SL	NBT	SBL	-	SBT
Assigned Phase	9					2			6					_	8
Case Number						8.0			6.0						11.0
Phase Duration	hase Duration, s					33.2			33.2					_	36.8
Change Period, (Y+Rc), s						6.0			6.0						6.0
Max Allow Head	Max Allow Headway (<i>MAH</i>), s					2.1			2.1					_	4.3
Queue Clearan	ce Time	e (<i>gs</i>), s				9.3			13.5						20.9
Green Extensio	n Time	(<i>g</i> e), s				0.7		_	0.7						4.2
Phase Call Prol	bability					1.00		_	1.00						1.00
Max Out Proba	bility					0.00			0.00						0.44
Movement Gro	up Res	aults			FB			WP			NB			SB	
Approach Move	ement				Т	B	1	Т	B		Т	B	1	Т	B
Assigned Move	ment				2	12	1	6		-	<u> </u>		3	8	18
Adjusted Flow F	Rate (v)	. veh/h	_		269	252	43	380	-				-	304	891
Adjusted Satura	ation Flo	w Rate (<i>s</i>), veh/h/ln			1881	1733	860	1792	2					1743	1370
Queue Service	Time (a	ls), S			7.1	7.3	2.7	11.5						8.3	18.9
Cycle Queue C	learance	e Time (<i>q</i> c), s			7.1	7.3	10.0	11.5						8.3	18.9
Green Ratio (g/	(C)	(0 //			0.39	0.39	0.39	0.39	,					0.44	0.44
Capacity (c), ve	h/h				731	674	347	696						767	1206
Volume-to-Capa	acity Ra	tio (<i>X</i>)			0.368	0.375	0.125	0.54	6					0.397	0.739
Available Capa	city (<i>C</i> a),	, veh/h			731	674	347	696						767	1206
Back of Queue	(<i>Q</i>), veł	n/In (50th percentile)			2.8	2.6	0.5	4.3						2.9	5.5
Queue Storage	Ratio (RQ) (50th percentile))		0.00	0.00	0.13	0.00)					0.10	0.19
Uniform Delay (d1), s/ve	eh			15.3	15.3	18.9	16.6	;					13.3	16.3
Incremental De	lay (<i>d</i> 2),	s/veh			0.1	0.1	0.1	0.5						0.3	2.4
Initial Queue De	elay (d3)	, s/veh			0.0	0.0	0.0	0.0						0.0	0.0
Control Delay (Control Delay (d) , s/veh				15.4	15.4	18.9	17.1						13.6	18.7
Level of Service	Level of Service (LOS)				В	В	В	В						В	В
Approach Delay, s/veh / LOS				15.4		В	17.3	3	В	0.0)		17.4		В
Intersection De	Intersection Delay, s/veh / LOS					16	6.9						В		
Multimodal Re	Iultimodal Results				EB			WB			NB			SB	
Pedestrian LOS	Score	/ LOS													
Bicycle LOS Sc	ore / LC	DS													

				.g											
General Inform	nation								Interse	tion Inf	ormatic	n	4	4 남 4 十	ta la
Agency	lation	GPD Group							Duration	h h	0.25				
Analyst		BME		Analys	is Dat	e Mar 2	2015		Area Tv	n, n. ne	Other				۲. 4
Jurisdiction		City of Broadview H	eiahts	Time F	Period		eak Hou	ır	PHF		0.92			w↓e	-
Intersection		Wallings Boad/I-77	NB/Mill	Analys	is Yea	r 2020			Analysis	Period	1>7:(00	₩ ▼		+ *
File Name		17. Wallings Bd 1-7	7 NB () Denina	Year	2020 'Bui	ild' PM.)	(US	, and join					5.1	<u> </u>
Project Descrip	tion	Opening Year 2020	'Build' I	PM Peal	k Hou	r								ין אילילי	1× 1
		oponing roai 1010	Dania .	iii ea											
Demand Inform	nation				EB			W	/B		NB			SB	
Approach Move	ement			L	Т	R	L		ΓR	L	Т	R	L	Т	R
Demand (v), ve	h/h			250	370	130	10	18	30 120	410	70	60			
				1										<u> </u>	
Signal Informa	tion			-	2	2	E E	4							
Cycle, s	70.0	Reference Phase	2		Ľ,	TŘ –	- ⊨		517				\mathbf{d}	3	Y
Offset, s	0	Reference Point	End	Green	7.0	1.0	23.8	20	.2 0.0	0.0			x		• •
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	4.0	0.0	4.0	4.0	0.0 C	0.0		▶			
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	0.0	2.0	2.0	0.0	0.0		5	6	7	8
											ii				
Timer Results				EBL	-	EBT	WB	L	WBT	NB		NBT	SBL	-	SBT
Assigned Phase	Э			5		2	1		6			4			
Case Number				2.0		4.0	2.0		3.0			10.0			
Phase Duration	, S			14.0		30.8	13.0)	29.8			26.2			
Change Period,	hange Period, (<i>Y+Rc</i>), s			6.0		6.0	6.0		6.0			6.0			
Max Allow Head	Max Allow Headway (MAH), s					2.1	2.1		2.1			5.3			
Queue Clearan	Queue Clearance Time (g_s), s			7.3		21.6	2.4		7.4			18.3			
Green Extensio	n Time	(<i>g</i> _e), s		0.1		0.4	0.0		0.6			0.7			
Phase Call Prol	oability			1.00		1.00	1.00	כ	1.00			1.00			
Max Out Proba	bility			1.00		0.47	0.00	ו כ	0.00			1.00			
Movement Gra	un Boo	ulto	_		ED			۱۸/۵	<u>ר</u>		ND	_		CD	_
Approach Move	mont	buits			ED T				, 			D		JD T	
Approach Move	mont			<u></u> Б	ו ס	10 12		6	16		1	п 14	<u> </u>	1	n
Adjusted Flow		veh/h		272	5/3	12	11	106	130	116	4	14			
Adjusted Flow I	tion Flo	, ven/n wy Rate (c) veh/h/ln		1723	1707		1740	188	1 1610	1810	1703				
	Time (o		_	53	19.6	+	0.4	54	4 1	16.3	4 5				
	learance	a Time (a_{c}) s		53	19.6		0.4	5.4	4 1	16.3	4.5				
Green Batio (a)	$\langle C \rangle$			0.11	0.35		0.4	0.3	1 0 34	0.29	0.29				
Capacity (c) ve	h/h			394	637	+	174	640) 547	522	491				$\left \right $
Volume-to-Cap	acity Ba	tio (X)		0.690	0.854	L	0.062	0.30	6 0 238	0.853	0.287				
Available Capa	city (C_a)	veh/h		394	637		174	640) 547	522	491				
Back of Queue	(<i>Q</i>), veł	/In (50th percentile)	_	2.4	9.2	-	0.2	2.1	1.4	8.5	1.8				
Queue Storage	Ratio (RQ) (50th percentile))	0.07	0.00		0.02	0.0	0 0.13	0.47	0.00				
Uniform Delay (d1). s/ve	eh		29.8	20.9	-	28.5	17.	0 16.6	23.5	19.3				
Incremental De	a_{2} (d_{2})	s/veh		5.1	10.4		0.1	0.1	0.1	13.3	0.5				
Initial Queue De	elav (<i>d</i> 3)	. s/veh	_	0.0	0.0		0.0	0.0	0.0	0.0	0.0				
Control Delay (d), s/veł	<u>, -</u>		34.9	31.3		28.6	17	1 16.7	36.8	19.8				
Level of Service	Level of Service (LOS)			C	C		C	B	B	D	В				
Approach Delay, s/veh / LOS			32.5		С	17.3	3	B	32.7	7	С	0.0		-	
Intersection De	Intersection Delay, s/veh / LOS				29	9.6		_				C			
					-			1 							
Multimodal Re	Iultimodal Results			EB			W	3		NB			SB		
Pedestrian LOS	Score	/ LOS													
Bicycle LOS Sc	vycle LOS Score / LOS														

	TW	O-WAY STOP	CONTR	OL SI	JMM	ARY			
General Informatio	า		Site I	nform	atio	n			
Analyst	BMF		Interse	ection			Wallings I Drive	Road/Elm	hurst
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	nadview H	leiahts
Date Performed	3/2/2015		Analys	is Year	r		2020 'Bui	ld'	loiginto
Analysis Time Period	PM Peak	Hour					2020 20	4	
Project Description Wa	allings Road Sa	fety & Corridor St	udy						
East/West Street: Wallin	ngs Road		North/S	South S	street:	Elmhurs	t Drive		
Intersection Orientation:	East-West		Study I	Period ((hrs):	0.25			
Vehicle Volumes ar	nd Adjustme	nts							
Major Street		Eastbound					Westbou	nd	
Movement	1	2	3			4	5		6
	L	T	R			L	T		R
Volume (veh/h)	10	580	1.00				1240		10
Peak-Hour Factor, PHF	0.92	0.92	1.00		1	.00	0.92		0.92
(veh/h)	10	630	0			0	1347		10
Percent Heavy Vehicles	1					0			
Median Type		1		Undiv	vided				
RT Channelized			0						0
Lanes	1	1	0			0	1		0
Configuration	L	Т							TR
Upstream Signal		0					0		
Minor Street		Northbound				Southbound			
Movement	7	8	9			10	11		12
	L	Т	R			L	Т		R
Volume (veh/h)						10			20
Peak-Hour Factor, PHF	1.00	1.00	1.00		0).92	1.00		0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0			10	0		21
Percent Heavy Vehicles	0	0	0			0	0		0
Percent Grade (%)		0					0		
Flared Approach		N					N		
Storage		0					0		
RT Channelized			0						0
Lanes	0	0	0			0	0		0
Configuration		-				-	LR		-
Delav, Queue Length, a	nd Level of Se	rvice						•	
Approach	Eastbound	Westbound		Northbo	ound		S	outhboun	d
Movement	1	4	7	8		9	10	11	12
Lane Configuration	L							LR	
v (veh/h)	10							31	
C (m) (veh/h)	510							116	
v/c	0.02							0.27	
95% queue lenath	0.06				1.00				
Control Dolay (alyoh)	12.00							1.00	
	12.2 R		 			47.U			
	В								
Approach Delay (s/veh)								47.0	
Approach LOS						E			

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	TW	O-WAY STOP	CONTR	OL SI	JMN	IARY			
General Informatio	า		Site I	nform	atio	n			
Analyst	BMF		Interse	ection			Wallings I Road	Road/Long	gview
Agency/Co.	GPD Gro	ир	luriedi	ction			City of Br	adview L	loiahts
Date Performed	3/2/2015			is Yea	r		2020 'Bui	Id'	leigints
Analysis Time Period	PM Peak	Hour			1		2020 Dui	ŭ	
Project Description Wa	allings Road Sa	fety & Corridor St	udy						
East/West Street: Wallin	ngs Road		North/S	South S	Street	: Longvie	w Road		
Intersection Orientation:	East-West		Study I	Period	(hrs):	0.25			
Vehicle Volumes ar	nd Adjustme	nts							
Major Street		Eastbound					Westbou	nd	
Movement	1	2	3			4	5		6
	L	Т	R			L	Т		R
Volume (veh/h)	10	580					1240		10
Peak-Hour Factor, PHF	0.92	0.92	1.00			1.00	0.92		0.92
Hourly Flow Rate, HFR (veh/h)	10	630	0			0	1347		10
Percent Heavy Vehicles	1					0			
Median Type				Undiv	/ided				
RT Channelized			0						0
Lanes	1	1	0			0	1		0
Configuration	L	Т							TR
Upstream Signal		0			0				
Minor Street		Northbound	Southbound			nd			
Movement	7	8	9			10	11		12
	L	Т	R			L	Т		R
Volume (veh/h)						10			10
Peak-Hour Factor, PHF	1.00	1.00	1.00			0.92	1.00		0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0			10	0		10
Percent Heavy Vehicles	0	0	0			0	0		0
Percent Grade (%)		0	-			-	0		-
Flared Approach		N	1				N		
Storage		0					0		
PT Channelized	_		0				<u> </u>		0
	0	0				0	0		0
Configuration	0	0				0	I P		0
Dolay Quous Longth							LN		
Approach	Eastbound	Westbound		Vorthby	ound			outhhour	4
Approach Movement	1		7		Junu	0	10	11	12
	i		I	0		3	10		12
	10							20	
	10							20	
c (m) (ven/n)	570							90	
V/C	0.02							0.21	
95% queue length	0.06				0.73				
Control Delay (s/veh)	12.2				52.1				
LOS	В				F				
Approach Delay (s/veh)							52.1		
Approach LOS							F		

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	TW	O-WAY STOP	CONTR	OL SI	JMN	IARY				
General Information	า		Site I	nform	atio	on				
Analyst	BMF		Interse	ection			Wallings	Rd/Ch	estni	ıt Blvd
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadvie	w He	eights
Date Performed	3/2/2015	,	Analys	sis Year	r		2020 'Bui	ld'		-
Analysis Time Period	PM Peak	Hour								
Project Description Wa	allings Road Sa	fety & Corridor Si	tudy							
East/West Street: Walli	ngs Road		North/S	South S	tree	t: Chestn	ut Boulevar	d		
Intersection Orientation:	East-West		Study I	Period ((hrs)	: 0.25				
Vehicle Volumes ar	nd Adjustme	ents								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5			6
	L	Т	R			L	Т			R
Volume (veh/h)		560	30			40	1240			
Peak-Hour Factor, PHF	0.88	0.92	0.92	·		0.92	0.92		0).86
Hourly Flow Rate, HFR (veh/h)	0	608	32			43	1347			0
Percent Heavy Vehicles	2					1				
Median Type			Undivided							
RT Channelized			0							0
Lanes	0	1	0			1	1			0
Configuration			TR			L	Т			
Upstream Signal		0					0			
Minor Street		Northbound					Southbound			
Movement	7	8	9			10	11			12
		Т	R			10	Т			R
Volume (veh/h)	10	· · ·	10			-				
Peak-Hour Factor, PHF	0.92	1.00	0.92			0.67	1.00		0	.67
Hourly Flow Rate, HFR	10	0	10		0		0		-	0
(veh/h)	0					0	0			0
Percent Grade (%)	0	0	0			0	0			0
	_	0	-					- T		
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0							0
Lanes	0	0	0			0	0			0
Configuration		LR								
Delay, Queue Length, a	nd Level of Se	ervice								
Approach	Eastbound	Westbound	1	Northbo	bund		S	outhbo	ound	
Movement	1	4	7	8		9	10	11	1	12
Lane Configuration		L		LR						
v (veh/h)		43		20						
C(m)(yeh/h)		0/0		104						
		0.05		0.10	,					
		0.03		0.79	, ,					
so% queue length		0.14	0.67							
Control Delay (s/veh)		9.0		47.7	′					
LOS		A		E						
Approach Delay (s/veh)			47.7							
Approach LOS				E						

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	TW	O-WAY STOP	CONTR	OL SI	JMN	MARY				
General Informatio	n		Site I	nform	natio	on				
Analyst	BMF		Interse	ection			Wallings	Rd/Ov	rerloo	k Ave
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadvie	ew He	eights
Date Performed	3/2/2015	-	Analys	is Yea	r		2020 'Bui	ild'		
Analysis Time Period	PM Peak	Hour								
Project Description W	allings Road Sa	fety & Corridor Si	tudy							
East/West Street: Walli	ngs Road		North/S	South S	Stree	t: Overloo	ok Avenue			
Intersection Orientation:	East-West		Study I	Period	(hrs)	: 0.25				
Vehicle Volumes ar	nd Adjustme	ents								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5			6
	L	Т	R			L	Т			R
Volume (veh/h)		560	10			30	1270			
Peak-Hour Factor, PHF	0.88	0.92	0.92	·		0.92	0.92		(0.86
Hourly Flow Rate, HFR (veh/h)	0	608	10			32	1380			0
Percent Heavy Vehicles	2					1				
Median Type			Undivided							
RT Channelized			0							0
Lanes	0	1	0			1	1			0
Configuration			TR			L	Т			
Upstream Signal		0					0			
Minor Street		Northbound		Southbound			ind			
Movement	7	8	9	9 10		11			12	
	L	Т	R			L T				R
Volume (veh/h)	10		20							
Peak-Hour Factor, PHF	0.92	1.00	0.92	0.67		0.67	1.00		C).67
Hourly Flow Rate, HFR (veh/h)	10	0	21			0	0			0
Percent Heavy Vehicles	0	0	0			0	0			0
Percent Grade (%)		0					0	-		
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0							0
Lanes	0	0	0			0	0			0
Configuration		LR								
Delay, Queue Length, a	nd Level of Se	ervice		I						
Approach	Eastbound	Westbound	1	Northbo	ound		S	outhb	ound	
Movement	1	4	7	8		9	10	1	1	12
Lane Configuration		L		LR						
v (veh/h)		32		31						
C (m) (veh/h)		967		146	6					
v/c		0.03		0.21	1					
95% queue length		0.10		0.77	7					
Control Delay (s/veh)		8.9	36.2							
LOS		A	E			1				
Approach Delay (s/veh)				36.2	2	E	1	-		
Approach LOS				Е						

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	TW	O-WAY STOP	CONTR		MMARY			
General Informatio	n		Site I	nforma	tion			
Analvst	BMF		Interse	ection		Wallings	Rd/McCrea	rv Rd
Agency/Co.	GPD Gro	ир	Jurisdi	ction		City of Br	oadview He	eights
Date Performed	3/2/2015	•	Analys	is Year		2020 'Bui	ld'	
Analysis Time Period	PM Peak	Hour						
Project Description W	allings Road Sa	fety & Corridor St	tudy					
East/West Street: Walli	ngs Road		North/S	South Str	eet: McCrea	ary Road		
Intersection Orientation:	East-West		Study I	Period (h	rs): 0.25			
Vehicle Volumes ar	nd Adjustme	ents						
Major Street		Eastbound				Westbou	nd	
Movement	1	2	3		4	5		6
	L	T	R		L	Т		R
Volume (veh/h)	10	570				1260		60
Peak-Hour Factor, PHF	0.92	0.92	0.89		0.82	0.92	().92
Hourly Flow Rate, HFR (veh/h)	10	619	0		0	1369		65
Percent Heavy Vehicles	1				2			
Median Type				Undivid	led			
RT Channelized			0					0
Lanes	1	1	0		0	1		1
Configuration	L	Т				Т		R
Upstream Signal		0				0		
Minor Street		Northbound				Southbou		
Movement	7	8	9		10	11		12
	L	Т	R		L	Т		R
Volume (veh/h)					20			40
Peak-Hour Factor, PHF	0.57	1.00	0.57		0.92	1.00	().92
Hourly Flow Rate, HFR (veh/h)	0	0	0		21	0		43
Percent Heavy Vehicles	4	0	4		0	0		0
Percent Grade (%)		0				0		
Flared Approach		N				N		
Storage		0				0		
RT Channelized			0					0
Lanes	0	0	0		0	0		0
Configuration						LR		
Delay, Queue Length, a	and Level of Se	ervice	•				•	
Approach	Eastbound	Westbound	1	Vorthbou	nd	S	outhbound	
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L						LR	
v (veh/h)	10						64	
C (m) (veh/h)	477						114	
v/c	0.02						0.56	
95% queue lenath	0.06						2.69	
Control Delay (s/yeb)	12 7				71 0			
	, 2. / B				F			
LUU Annraach Dalau (alush)	D					74.0		
Approach Delay (s/ven)							71.U F	
Approach LOS			F				<i>⊢</i>	

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	тw	O-WAY STOP	CONTR	OL S	UMN	IARY				
General Informatio	า		Site I	nform	natio	on				
Analyst	BMF		Interse	ection			Wallings I	Rd/Maje	stic	Oaks
Agency/Co.	GPD Gro	ир	luried	ction			City of Br	oodview	, Ho	iahts
Date Performed	3/2/2015		Analys	is Yea	r		2020 'Bui	Id'	TIC	gnis
Analysis Time Period	PM Peak	Hour					2020 Dui			
Project Description Wa	allings Road Sa	fety & Corridor St	udy							
East/West Street: Walling	ngs Road		North/S	South S	Street	t: <i>Majestic</i>	: Oaks Trail			
Intersection Orientation:	East-West		Study	Period	(hrs)	: 0.25				
Vehicle Volumes ar	nd Adjustme	nts								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5			6
	L	Т	R			L	Т			R
Volume (veh/h)	10	570					1450			10
Peak-Hour Factor, PHF	0.92	0.92	0.89			0.82	0.92		0	.92
Hourly Flow Rate, HFR (veh/h)	10	619	0			0	1576			10
Percent Heavy Vehicles	1					2				
Median Type				Undi	vided					
RT Channelized			0							0
Lanes	1	1	0			0	1			0
Configuration	L	Т							7	ſR
Upstream Signal		0			0					
Minor Street		Northbound	5	Southbound			Ind			
Movement	7	8	9			10	11			12
	L	Т	R			L	T			R
Volume (veh/h)	_				10				10	
Peak-Hour Factor, PHF	0.57	1.00	0.57	,		0.92	1.00		0.	.92
Hourly Flow Rate, HFR (veh/h)	0	0	0			10	0			10
Percent Heavy Vehicles	4	0	4			0	0			0
Percent Grade (%)		0					0			
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0							0
Lanes	0	0	0			0	0			0
Configuration							LR			
Delay, Queue Length, a	nd Level of Se	rvice								
Approach	Eastbound	Westbound		Northb	ound		S	outhbou	und	
Movement	1	4	7	8		9	10	11		12
Lane Configuration	L							LR		
v (veh/h)	10							20		
C (m) (veh/h)	417							70		
v/c	0.02							0.29		
95% queue length	0.07				1.03					
Control Delay (s/yeh)	13.8		-++		75.8	-				
	13.0				73.0 F	-+				
LUO Annanak Dalar ((Б						75 0			
Approach Delay (s/veh)								/5.8		
Approach LOS							F	F		

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	TW	O-WAY STOP	CONTR	OL SI	JWN	IARY				
General Informatio	n		Site Ir	nform	atio	on				
Analyst	BMF		Interse	ection			Wallings	Rd/Cr	eeksi	de Trce
Agency/Co.	GPD Grou	ıр	Jurisdi	ction			City of Br	oadvie	ew He	eights
Date Performed	3/2/2015		Analys	is Yea	r		2020 'Bui	ld'		
Analysis Time Period	PM Peak	Hour								
Project Description Wa	allings Road Saf	ety & Corridor St	udy							
East/West Street: Walli	ngs Road		North/S	South S	stree	t: Creeksi	de Terrace			
Intersection Orientation:	East-West		Study F	Period	(hrs)	: 0.25				
Vehicle Volumes ar	nd Adjustme	nts								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5			6
	L	1	R			L	T			R
Volume (ven/n)	0.00	570	10			10	1440			70
Peak-Hour Factor, PHF	0.80	0.92	0.92			0.92	0.92		ιι	.70
(veh/h)	0	619	10			10	1565			0
Percent Heavy Vehicles	2					1				
Median Type		Undivided								
RT Channelized			0							0
Lanes	0	1	0			1	1			0
Configuration			TR			L	Т			
Upstream Signal		0					0			
Minor Street		Northbound					Southbound			
Movement	7	8	9			10	11			12
	L	Т	R			L	T F		R	
Volume (veh/h)	20		10							
Peak-Hour Factor, PHF	0.92	1.00	0.92			0.70	1.00		C	0.70
Hourly Flow Rate, HFR (veh/h)	21	0	10			0	0			0
Percent Heavy Vehicles	5	0	5			0	0			0
Percent Grade (%)		0	•				0			
Flared Approach		N	1				N			
Storage		0					0			
RT Channelized			0							0
Lanes	0	0	0			0	0			0
Configuration		LR								
Delay, Queue Length, a	Ind Level of Sei	rvice								
Approach	Eastbound	Westbound	1	Northbo	ound		S	outhb	ound	
Movement	1	4	7	8		9	10	1	1	12
Lane Configuration		L		LR						
v (veh/h)		10		31						
C (m) (veh/h)		958		66						
v/c		0.01		0.47	7					
95% aueue lenath		0.03		1.86	6					
Control Delav (s/veh)		8.8	100.7							
LOS		A	F F							
Approach Delav (s/veh)			100 7							
Approach LOS				F						
			L	•			1			

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	тw	O-WAY STOP	CONTR	OL SUMI	MARY			
General Informatio	า		Site II	nformatio	on			
Analyst	BMF		Interse	ection		Wallings I Bd/Eirebo	Rd/Joyce	
Agency/Co.	GPD Gro	ир	luriedi	ction		City of Br	oodview H	eiahts
Date Performed	3/2/2015			is Year		2020 'Bui	Id'	eignis
Analysis Time Period	PM Peak	Hour				2020 Dui		
Project Description Wa	allings Road Sa	fetv & Corridor St	udv			1		
East/West Street: Walli	nas Road		North/S	South Stree	t: Jovce R	Road/Fireho	use	
Intersection Orientation:	East-West		Study F	Period (hrs): 0.25			
Vehicle Volumes ar	nd Adiustme	nts						
Major Street	j	Eastbound				Westbou	nd	
Movement	1	2	3		4	5		6
	L	Т	R		L	Т		R
Volume (veh/h)	10	560	10		10	1430		10
Peak-Hour Factor, PHF	0.92	0.92	0.92		0.92	0.92		0.92
Hourly Flow Rate, HFR (veh/h)	10	608	10		10	1554		10
Percent Heavy Vehicles	1				1			
Median Type				Undivided	d			
RT Channelized			0					0
Lanes	1	1	1		1	1		0
Configuration	L	Т	R		L			TR
Upstream Signal		0				0		
Minor Street		Northbound				Southbound		
Movement	7	8	9		10	11		
	L	Т	R		L	Т		R
Volume (veh/h)	10	10	10		10			10
Peak-Hour Factor, PHF	0.92	0.92	0.92		0.92	0.92		0.92
Hourly Flow Rate, HFR (veh/h)	10	10	10		10	10		10
Percent Heavy Vehicles	0	0	0		0	0		0
Percent Grade (%)		0	•			0		
Flared Approach		N				N		
Storage		0				0		
RT Channelized			0					0
Lanes	0	1	0		0	1		0
Configuration		LTR				LTR		
Delay, Queue Length, a	nd Level of Se	rvice						
Approach	Eastbound	Westbound	1	Northbound	ł	s	outhbound	1
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L		LTR			LTR	
v (veh/h)	10	10	30		30			
C (m) (veh/h)	425	967	45			42		
v/c	0.02	0.01	0.67			0.71		
95% queue length	0.07	0.03	2.55			2.69		
Control Delay (s/yeh)	13.7	8.80	182.1			204 4		
	P 13.1	δ.0		- 102.1 E			E	
LUU Approach Delay (a/yeh)	U	~		100 1			204.4	
Approach LCC				102.1	102.1 204.4		204.4	
Approach LOS				F F				

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	TWO-WAY STOP CONTROL SUMMARY									
General Informatio	า		Site II	nform	ation					
Analvst	BMF		Interse	ection		l	Vallinas	Rd/Mari	anna E	3lvd
Agency/Co.	GPD Grou	qu	Jurisdi	ction			City of Br	oadvien	/ Heigh	nts
Date Performed	3/2/2015	,	Analys	is Year		2	2020 'Bui	ld'		
Analysis Time Period	PM Peak	Hour								
Project Description Wa	allings Road Sat	etv & Corridor St	udv							
East/West Street: Wallin	ngs Road		North/S	South St	reet: Ma	rianna	Boulevar	d		
Intersection Orientation:	East-West		Study F	Period (hrs): 0.25	5				
Vehicle Volumes ar	nd Adjustme	nts								
Major Street		Eastbound				1	Westbou	nd		
Movement	1	2	3		4		5		6	
	L	Т	R		L		Т		R	
Volume (veh/h)	_	570	10		10		1440			
Peak-Hour Factor, PHF	0.80	0.92	0.92		0.92		0.92		0.76	5
Hourly Flow Rate, HFR (veh/h)	0	619	10		10		1565		0	
Percent Heavy Vehicles	2				1					
Median Type				Undivided						
RT Channelized			0						0	
Lanes	0	1	0		1		1		0	
Configuration			TR		L		Т			
Upstream Signal		0					0			
Minor Street		Northbound		Southbound						
Movement	7	8	9 10			11		12	2	
	L	Т	R		L	L T			R	
Volume (veh/h)	10		10							
Peak-Hour Factor, PHF	0.92	1.00	0.92		0.70		1.00		0.70)
Hourly Flow Rate, HFR (veh/h)	10	0	10		0		0		0	
Percent Heavy Vehicles	0	0	0		0		0		0	
Percent Grade (%)		0	-				0			
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0						0	
Lanes	0	0	0		0		0		0	
Configuration		LR								
Delay, Queue Length, a	nd Level of Se	rvice	•			-				
Approach	Eastbound	Westbound	1	Northbo	und		S	outhbou	und	
Movement	1	4	7	8	9		10	11		12
Lane Configuration		L		LR						
v (veh/h)		10		20						
C (m) (veh/h)		958		87						
v/c		0.01		0.23						
95% queue length		0.03		0.82						
Control Delav (s/veh)		8.8		58.3						
LOS		A		F						
Approach Delav (s/veh)				58.3						
Approach LOS				F						
			F							

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	TW	O-WAY STOP	CONTR	OL SUI	MMARY			
General Informatio	n		Site I	nforma	tion			
Analyst	BMF		Interse	ection		Wallings	Rd/Wright I	Rd
Agency/Co.	GPD Gro	ир	Jurisdi	ction		City of Br	oadview He	eights
Date Performed	3/2/2015		Analys	sis Year		2020 'Bui	ld'	
Analysis Time Period	PM Peak	Hour						
Project Description Wa	allings Road Sa	fety & Corridor Si	tudy					
East/West Street: Walli	ngs Road		North/S	South Str	eet: Wright	Road		
Intersection Orientation:	East-West		Study I	Period (h	rs): 0.25			
Vehicle Volumes ar	nd Adjustme	ents						
Major Street		Eastbound				Westbou	nd	
Movement	1	2	3		4	5		6
	L	T	R		L	Т		R
Volume (veh/h)	10	560	10		20	1410		30
Peak-Hour Factor, PHF	0.92	0.92	0.92		0.92	0.92	(0.92
Hourly Flow Rate, HFR (veh/h)	10	608	10		21	1532		32
Percent Heavy Vehicles	1				3			
Median Type			Undivided					
RT Channelized			0					0
Lanes	1	1	0		1	1		1
Configuration	L		TR		L	Т		R
Upstream Signal		0				0		
Minor Street		Northbound		Southbound			Ind	
Movement	7	8	9	9 10		11		12
	L	Т	R		L	Т		R
Volume (veh/h)	20	10	10		20	10		20
Peak-Hour Factor, PHF	0.92	0.92	0.92		0.92	0.92	().92
Hourly Flow Rate, HFR (veh/h)	21	10	10		21	10		21
Percent Heavy Vehicles	2	0	2		4	0		4
Percent Grade (%)		0	•			0		
Flared Approach		N				N		
Storage		0				0		
RT Channelized			0					0
Lanes	0	1	0		0	1		0
Configuration		LTR				LTR		
Delay, Queue Length, a	Ind Level of Se	ervice						
Approach	Eastbound	Westbound	1	Northbou	nd	S	outhbound	
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L		LTR			LTR	
v (veh/h)	10	21		41			52	
C (m) (veh/h)	425	957		31			41	
v/c	0.02	0.02	1.32		1.27			
95% queue length	0.07	0.07	4.60		5.16			
Control Delay (s/veh)	13.7	8.8	466.4		385.0			
LOS	В	A		F		1	F	
Approach Delay (s/veh)				466.4			385.0	
Approach LOS				F				
				1			1	

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	TW	O-WAY STOP	CONTR	OL SU	MN	IARY				
General Information			Site I	nforma	atio	n				
Analvst	BMF		Interse	ection			Wallings	Rd/Cr	aia Li	1
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadvie	ew He	eights
Date Performed	3/2/2015	•	Analys	is Year			2020 'Bui	ld'		<u> </u>
Analysis Time Period	PM Peak	Hour								
Proiect Description Wallir	nas Road Sa	fetv & Corridor St	tudv							
East/West Street: Wallings	Road		North/S	South St	reet	: Craig La	ane			
Intersection Orientation: E	ast-West		Study F	Period (I	hrs):	0.25				
Vehicle Volumes and	Adjustme	ents								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5			6
	L	Т	R			L	Т			R
Volume (veh/h)		580	10			10	1450			
Peak-Hour Factor, PHF	0.80	0.92	0.92			0.92	0.92		0	0.76
Hourly Flow Rate, HFR (veh/h)	0	630	10			10	1576			0
Percent Heavy Vehicles	2					3				
Median Type			Undivided							
RT Channelized			0							0
Lanes	0	1	0			1	1			0
Configuration			TR			L	Т			
Upstream Signal		0					0			
Minor Street		Northbound		Southbound			ind			
Movement	7	8	8 9 10		11			12		
	L	Т	R			L	Т			R
Volume (veh/h)	10		10							
Peak-Hour Factor, PHF	0.92	1.00	0.92		(0.70	1.00		C).70
Hourly Flow Rate, HFR (veh/h)	10	0	10			0	0			0
Percent Heavy Vehicles	7	0	7			0	0			0
Percent Grade (%)		0					0			
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0							0
lanes	0	0	0			0	0			0
	•	LR				•	-			•
Delay, Queue Length, and	Level of Se	ervice								
Approach E	astbound	Westbound	1	Vorthbo	und		S	outhb	ound	
Movement	1	4	7	8		9	10	1	1	12
Lane Configuration		L		LR						
v (veh/h)		10		20						
C (m) (veh/h)		939		82						
v/c		0.01		0.24						
95% queue length		0.03		0.87						
Control Delay (s/veh)		8.9	62.5							
LOS		A		F						
Approach Delay (s/veh)			62.5					-		
Approach LOS				F						

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	TWO-WAY STOP CONTROL SUMMARY								
General Informatio	n		Site I	nforma	ation				
Analyst	BMF		Interse	ection		Wallings	Rd/Skyline	Dr	
Agency/Co.	GPD Gro	ир	Jurisdi	ction		City of Br	oadview He	eights	
Date Performed	3/2/2015	•	Analys	sis Year		2020 'Bui	ild'	-	
Analysis Time Period	PM Peak	Hour							
Project Description W	allings Road Sa	fety & Corridor St	tudy						
East/West Street: Walli	ngs Road		North/S	South St	treet: Skylir	ne Drive			
Intersection Orientation:	East-West		Study I	Period (I	hrs): 0.25				
Vehicle Volumes aı	nd Adjustme	ents							
Major Street		Eastbound				Westbou	nd		
Movement	1	2	3		4	5		6	
	L	Т	R		L	Т		R	
Volume (veh/h)	10	580				1450		10	
Peak-Hour Factor, PHF	0.92	0.92	0.81		0.78	0.92	(.92	
Hourly Flow Rate, HFR (veh/h)	10	630	0		0	1576		10	
Percent Heavy Vehicles	1				3				
Median Type		•		Undivi	ded				
RT Channelized			0					0	
Lanes	1	1	0		0	1		0	
Configuration	1	T			•			TR	
Upstream Signal		0				0			
Minor Street		Northbound				Southbou	Ind		
Minor Street Movement	7		9		10	11		12	
Wovement	· · ·	т	R		10	т Г		R	
Volume (veh/h)		-			10	· ·		10	
Peak-Hour Factor PHF	0.63	1.00	0.63		0.92	1.00	(10	
Hourly Flow Rate HFR	0.00	1.00	0.00		0.92	1.00			
(veh/h)	0	0	0		10	0		10	
Percent Heavy Vehicles	7	0	7		4	0		4	
Percent Grade (%)		0				0			
Flared Approach		N				N			
Storage		0				0			
RT Channelized			0					0	
Lanes	0	0	0		0	0		0	
Configuration					-	LR		-	
Delay, Queue Length, a	nd Level of Se	ervice							
Approach	Eastbound	Westbound		Northbo	und	s	outhbound		
Movement	1	4	7	8	9	10	11	12	
Lane Configuration	L						LR		
v (veh/h)	10						20		
C (m) (veh/h)	417						67		
v/c	0.02						0.30		
95% queue length	0.07						1.08		
Control Delay (s/veh)	13.8						80.1		
LOS	В					F			
Approach Delav (s/veh)			80.1			80.1			
Approach LOS							F		

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	TW	O-WAY STOP	CONTR	OL SI	JMN	IARY				
General Information	า		Site I	nform	atio	on				
Analyst	BMF		Interse	ection			Wallings	Rd/W	Mill F	Rd
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadvie	w He	eights
Date Performed	3/2/2015	,	Analys	sis Year	r		2020 'Bui	ld'		-
Analysis Time Period	PM Peak	Hour								
Project Description Wa	allings Road Sa	fetv & Corridor Si	tudv							
East/West Street: Walli	ngs Road		North/S	South S	tree	t: West M	lill Road			
Intersection Orientation:	East-West		Study I	Period ((hrs)	: 0.25				
Vehicle Volumes ar	nd Adjustme	ents								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5			6
	L	Т	R			L	Т			R
Volume (veh/h)		580	10			10	1450			
Peak-Hour Factor, PHF	0.80	0.92	0.92			0.92	0.92		0	0.63
Hourly Flow Rate, HFR (veh/h)	0	630	10			10	1576			0
Percent Heavy Vehicles	1					3				
Median Type				Undiv	ridea	1				
RT Channelized			0							0
Lanes	0	1	1			1	1			0
Configuration		Т	R			L	Т			
Upstream Signal		0					0			
Minor Street		Northbound	•				Southbou	ind		
Movement	7	8	9			10	11			12
	L	Т	R			L	Т			R
Volume (veh/h)	10	-	10							
Peak-Hour Factor, PHF	0.92	1.00	0.92			0.79	1.00		(.79
Hourly Flow Rate, HFR	10	0	10			0	0		-	0
Percent Heavy Vehicles	2	0	2			4	0			4
Percent Grade (%)	-		-				0			
							0 N			
	-	N					N 0			
Storage		0					0			
RT Channelized			0							0
Lanes	0	0	0			0	0			0
Configuration										
Delay, Queue Length, a	nd Level of Se	ervice	n							
Approach	Eastbound	Westbound	1	Northbo	ound		S	outhb	ound	
Movement	1	4	7	8		9	10	1'	1	12
Lane Configuration		L		LR						
v (veh/h)		10		20						
C (m) (veh/h)		939		84						
		0.01		0.24	1					
05% quous longth		0.01		0.24	r -					
		0.03		0.05	<u>,</u>					
Control Delay (s/ven)		<i>8.9</i>		60.8	5					
LOS		A		F						
Approach Delay (s/veh)				60.8	}					
Approach LOS				F						

HCS+TM Version 5.3 Generated: 3/20/2015 9:21 AM

DESIGN YEAR 2040 'NO-BUILD' CONDITIONS

General Inform	nation									Int	tersect	ion Inf	ormatio	n	4	***	þá l <u>a</u>
Agency		GPD Group								Du	uration,	h	0.25		1	414	
Analyst		BMF		Analys	is Da	te Mar	2,	2015		Are	ea Typ	e	Other		4		
Jurisdiction		City of Broadview H	leights	Time F	Period	I AM	Pe	ak Hou	r	PH	HF		0.92			w ↓ E	
Intersection		Wallings Road/Broa	dview F	Analys	is Ye	ar 2040)			An	alysis	Period	1> 7:0	00			2 2 2
File Name		1. Wallings Rd_Broa	adview	Rd_Des	ign Y	ear 204	0 'I	No-Buil	d' AN	/l.xu	IS					<u>ካተ</u> ⊭	
Project Descrip	tion	Design Year 2040 'I	No-Build	' AM Pe	ak H	our										4 † 4 Y '	7
								ł				1					
Demand Inform	nation				EE	3			W	/B	1		NB			SB	1/
Approach Move	ement			L	Т	R		L		Г	R		Т	R	L	Т	R
Demand (v), ve	h/h			350	62	0 80)	90	22	20	90	60	620	420	80	210	90
Cignal Informa	tion			1		b 1				щ	n - m	<u>m</u>					-
Signal Informa		Deference Dhees	0	-	5	a 243	ц,		_	÷	1 .2 }					~	\rightarrow
Cycle, s	154.4	Reference Phase	2 Final		5		<u>↑</u> 7			E.	Ľ,	°		1	2	3	4
Offset, s	0	Reference Point	Ena	Green	22.0) 35.0)	22.0	12	2.4	35.0	0.0			•		
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	3.6	3.6		3.6	3.0	6	3.6	0.0	_ `		$\mathbf{\Psi}$	-	\mathbf{A}
Force Mode	Fixed	Simult. Gap N/S	On	Rea	2.0	2.0		2.0	2.0	0	2.0	0.0		5	6	7	8
Timor Booulto			_	EDI		EDT	T	W/DI		١٨		NDI		NIDT	CDI		CDT
Assigned Phase	0				-	<u>CDI</u>	÷	7		•				6	501	-	2
Caso Number	5					4.0	╉	1 1	\rightarrow	2	4			4.0	11		2
Phase Duration	. e			27.6		4.0	╉	1.1	: +	5	8.6	27.6		4.0	27.6		4.0
Change Period	$(V_{\perp}B_{\alpha})$	c		5.6	-	5.6	╉	5.6	<u>+</u>	5	5.6	5.6	, .	5.6	5.6		5.6
Max Allow Hear	, (17110) dway (A	, 3 1ΔΗΛ ς		0.0 / 1		<u> </u>	÷	J.0	-+-		1 1	1.3		13	13		4.3
Queue Clearan	ce Time	$(a_{\rm s})$ s		24.0		37.0	╈	6.6	-+	1	71	5.7		37.0	7.0		14.2
Green Extension Time (g_e) , s		_	0.0		0.0	Ŧ	0.0	-		15	0.1		0.0	0.2		6.8	
Green Extension Time (<i>g</i> e), s Phase Call Probability			1.00		1.00	╉	1.00	<u>,</u>	1	00	1.00	, –	1.00	1.00		1.00	
Max Out Proba	bility			1.00		1.00	t	0.00)	0	10	0.00)	1.00	0.00		0.19
	onity			1.00		1.00		0.00	,	0.	.10	0.00	,	1.00	0.00		0.10
Movement Gro	oup Res	ults			EB				WE	3			NB			SB	
Approach Move	ement			L	Т	R		L	Т		R	L	Т	R	L	Т	R
Assigned Move	ment			3	8	18		7	4		14	1	6	16	5	2	12
Adjusted Flow F	Rate (v)	, veh/h		380	761			98	239	9	98	65	605	525	87	168	158
Adjusted Satura	ation Flo	w Rate (s), veh/h/ln		1792	1843	3		1757	184	5	1563	1774	1863	1611	1774	1900	1710
Queue Service	Time (g	/s), S		22.0	35.0)		4.6	15.	1	6.8	3.7	35.0	35.0	5.0	11.6	12.2
Cycle Queue C	learance	e Time (<i>g</i> c), s		22.0	35.0)		4.6	15.	1	6.8	3.7	35.0	35.0	5.0	11.6	12.2
Green Ratio (g/	(C)			0.37	0.23	3		0.50	0.3	4	0.34	0.37	0.23	0.23	0.37	0.23	0.23
Capacity (c), ve	eh/h			562	418	;		502	633	3	537	441	422	365	299	431	388
Volume-to-Capa	acity Ra	tio (<i>X</i>)		0.677	1.82	1		0.195	0.37	78	0.182	0.148	1.433	1.438	0.290	0.390	0.408
Available Capa	city (<i>c</i> a),	veh/h		562	418	;		502	633	3	537	441	422	365	299	431	388
Back of Queue	(<i>Q</i>), veł	n/In (50th percentile)		12.2	60.2	2		1.9	7.0		2.6	1.7	41.1	35.9	2.3	5.7	5.4
Queue Storage	Ratio (RQ) (50th percentile)	3.07	0.00)		0.39	0.0	0	0.21	0.14	0.00	0.00	0.19	0.00	0.00
Uniform Delay ((<i>d</i> 1), s/ve	əh		39.2	59.7	7		25.0	38.	3	35.5	32.6	59.7	59.7	36.3	50.6	50.9
Incremental De	lay (<i>d2</i>),	s/veh		3.2	378.	7		0.2	0.4	ŀ	0.2	0.2	208.2	212.3	0.5	0.6	0.7
Initial Queue De	Initial Queue Delay (d3), s/veh			0.0	0.0			0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (Control Delay (<i>d</i>), s/veh			42.4	438.	4		25.2	38.	6	35.7	32.7	267.9	272.0	36.8	51.2	51.6
Level of Service	Level of Service (LOS)			D	F			С	D		D	С	F	F	D	D	D
Approach Delay, s/veh / LOS		306.4	4	F		34.9)		С	256.	9	F	48.3	6	D		
Intersection De	lay, s/ve	h / LOS				2	217	7.3							F		
																05	
Multimodal Re	Multimodal Results			EB				WE	3			NB			SB		
Pedestrian LOS	Score	/ LUS															
BICYCIE LOS SC	ycle LOS Score / LOS																

				3 -							.,				
General Inform	nation								Intersec	tion Inf	ormati	on	4	석 남 학 수	
Agency		GPD Group							Duration	. h	0.25				
Analyst		BMF		Analys	is Da	te Mar 2	. 2015		Area Tvr	,)e	Othe	r	4		₹
Jurisdiction		City of Broadview H	eiahts	Time F	Period	AM P	eak Hou	ır	PHF	-	0.92		→ 	wļe	↓ ↓ ↓
Intersection		Wallings Road/Wva	tt Road	Analys	is Yea	ar 2040			Analvsis	Period	1>7	:00			 ∀
File Name		7. Wallings Rd Wva	att Rd D	Design Y	'ear 2	040 'No-	Build' Al	M.xus						भौर	
Project Descrip	tion	Design Year 2040 'N	No-Build	I' AM Pe	ak Ho	our								ॉ ≼ ↑ क फ	<u>۲</u>
													-1		
Demand Inform	nation				EB	3		W	В		NB			SB	
Approach Move	ement			L	Т	R	L	Т	R	L	Т	R	L	Т	R
Demand (v), ve	h/h				107	0 10	60	36	0	50	0	260			
	-			Ĩ				11	i i		_				
Signal Informa	tion	[]				\in									-
Cycle, s	121.8	Reference Phase	2			°₿"	<u> </u>	2				1		3	
Offset, s	0	Reference Point	End	Green	15.0	60.0	30.0	0.0	0.0	0.0			_		•
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	3.6	3.6	3.6	0.0	0.0	0.0					
Force Mode	Fixed	Simult. Gap N/S	On	Red	Red 2.0 2		2.0	0.0	0.0	0.0		5	6	7	8
Timer Deculto						EDT			MOT			NDT			ODT
Timer Results	-			EBL		EBI	WB		WBI	NB		NBI	SBL		SBI
Assigned Phase	9				-	2		_	6	<u> </u>	_	4		+	
Case Number	-				\rightarrow	8.3	1.0		4.0	<u> </u>	_	12.0			
Phase Duration	, S					65.6	20.6	>	86.2	<u> </u>	\rightarrow	35.6		\rightarrow	
Change Period,	Max Allow Headway (MAH), s					5.6	5.6	_	5.6	<u> </u>		5.6			
	Queue Clearance Time (g_s) , s				-	62.0	3.8		13.4			26.4			
Green Extensio	Green Extension Time (g_e), s					0.0	0.0		0.0			0.0			
Phase Call Pro	Green Extension Time (<i>g</i> _e), s Phase Call Probability				+	1.00	1.00	,	1.00			1.00			
Max Out Proba	bility		_			1.00	0.00)	0.00			0.02	-		_
							0.00		0.00			0.01			
Movement Gro	oup Res	ults			EB			WE			NB			SB	
Approach Move	ement			L	Т	R	L	Т	R	L	Т	R	L	Т	R
Assigned Move	ment				2	12	1	6		7	4	14			
Adjusted Flow F	Rate (v)	, veh/h			1174	ŧ 📃	65	391			337				
Adjusted Satura	ation Flo	ow Rate (s), veh/h/ln			1860)	1723	1810)		1607				
Queue Service	Time (g	/s), S			60.0)	1.8	11.4			24.4				
Cycle Queue C	learance	e Time (<i>g</i> c), s			60.0)	1.8	11.4			24.4				
Green Ratio (g/	(C)				0.49)	0.63	0.66	;		0.25				
Capacity (c), ve	h/h				916		271	1197	7		396				
Volume-to-Capa	acity Ra	tio (<i>X</i>)			1.28	1	0.240	0.32	7		0.851				
Available Capa	city (<i>Ca</i>),	veh/h			916		271	1197	/		396				
Back of Queue	(<i>Q</i>), veł	n/In (50th percentile)			59.8	3	0.9	4.2			11.4				
Queue Storage	Ratio (I	RQ) (50th percentile))		0.00)	0.24	0.00)	<u> </u>	0.00				
Uniform Delay ((d1), S/V	eh			30.9		24.3	8.9			43.8				
Incremental De	$lay (d_2),$	s/veh			135.0	0	0.2	0.1	_	<u> </u>	15.4				
Initial Queue De	elay (d3)	, s/veh			0.0		0.0	0.0			0.0				
Control Delay (Control Delay (<i>d</i>), s/veh				165.9	9	24.5	8.9	_		59.1				
Level of Service	Level of Service (LOS)			105			C			50					
Approach Delay	/, s/veh	/ LOS		165.9	9	F	11.2	2	В	59.	1	E	0.0		
Intersection De	ay, s/ve	en / LOS				11	1./						F		
Multimodal Re	sulte				FR			W/F			NB			SB	
Pedestrian I OS	Aultimodal Results														
Bicycle LOS So	ore / I C)S													
.,															

				Ū									, i				
General Inform	nation									Int	tersect	ion Inf	ormati	on		444	bi lu
Agency		GPD Group								Dı	uration,	h	0.25			*	
Analyst		BMF		Analys	is Da	te N	/lar 2,	2015		Ar	rea Type	Э	Othe	r	4		~_ &
Jurisdiction		City of Broadview H	eights	Time F	Period	I A	M Pe	ak Hou	r	PH	HF		0.92			w∔e s	, <u>→</u> <u>↓</u>
Intersection		Wallings Road/Wrig	ht Roac	Analys	is Ye	ar 2	2040			Ar	nalysis I	Period	1>7:	00			4 1
File Name		12. Wallings Rd_Wr	ight Rd	_Desigr	Year	r 204	0 'No	-Build' /	AM.x	us						*	
Project Descrip	tion	Design Year 2040 'N	lo-Build	' AM Pe	ak H	our										1144Y	<u> </u>
								1				1					
Demand Inform	nation				EE	3			N	V B			NB			SB	1 _
Approach Move	ement			L	Т		R	L		Т	R	L	Т	R	L	Т	R
Demand (<i>v</i>), ve	h/h			20	132	20	10	10	39	90	10	20	20	10	60	10	10
Signal Informa	tion				1		5										
	09.4	Poforonoo Phaso	0	ī		<u> </u>	28		в						~		<u>ሉ</u>
Offect s	90.4	Reference Point	End			Ē	3		7					1	Y 2	3	4
Uncoordinated	Voc	Simult Con E/M	On	Green	15.0) 4	47.0	20.0	0.	0	0.0	0.0	_	_	A		
Earce Mode	Fixed	Simult Gap N/S	On	Yellow 3.6 3.6 Red 2.0 2.0		3.6	3.2	0.	0	0.0	0.0		5	¥ 6	7	Y	
	Tixeu	Simult. Gap N/S	On	neu	2.0		2.0	2.0	0.	0	0.0	0.0		3	0	1	•
Timer Results			_	FBI		FP	RT	WBI		v	WBT	NBI		NBT	SB		SBT
Assigned Phase	<u></u>			5	-	2		1		•	6		-	8		-	4
Case Number	<u> </u>			1 1		4 (0	11			4.0			8.0			8.0
Phase Duration	Phase Duration, s			20.6	;	52.	.6	20.6	;	5	52.6			25.2			25.2
Change Period, $(Y+R_c)$, s			5.6		5.6	6	5.6		5	5.6			5.2		-	5.2	
Max Allow Headway (<i>MAH</i>), s			3.1		6.0	0	3.1		(6.0			4.3			4.3	
Queue Clearance Time (g_s) , s			2.5		49.	.0	2.2		1	8.1			4.4			6.9	
Green Extension Time (g_e) , s			0.0		0.0	0	0.0		2	25.4			0.4			0.3	
Phase Call Prol	Phase Call Probability			1.00		1.0	00	1.00)	1	.00			1.00	1		1.00
Max Out Proba	bility			0.00		1.0	00	0.00)	0).86			0.00			0.00
	_				50		_			D						0.0	_
Movement Gro	oup Res	ults			EB	; 	<u> </u>		WI	B	_		NB		<u> </u>	SB	
Approach Move	ement			L	1	_	K 10	L	1	\rightarrow	R 10	L		R 10			R
Assigned Move		veb/b		5	2	_	12	- 1	6	-	16	3	8	18	/	4	14
Adjusted Flow F		, ven/n		1774	144	0	_	1740	43:	0	_		54			87	
Adjusted Satura	Time (a	w Rale (s), ven/n/in		0.5	1860		_	1/40	181	9			1623		<u> </u>	1429	
Queue Service	laarana	s_{j}, S_{j}		0.5	47.0	$\frac{1}{2}$	_	0.2	10.	1	_		0.0		<u> </u>	2.5	
Cycle Queue C		e nine (<i>g</i> c), s		0.5	47.0))	_	0.2	16.	1 0	_		2.4		<u> </u>	4.9	
Green Ralio (g/	() b/b			0.63	0.40		_	0.03	0.4	0	_		0.20		<u> </u>	0.20	
Volume-to-Cap	acity Ra	tio (X)		022	1 62	7	_	0.032	00	9	_		0 1/3			0.245	
Available Capa	city (Ca)	veh/h		622	889)		338	86	9	_		381			354	
Back of Queue	(<i>Q</i>), veł	/In (50th percentile)		0.2	89.9	, ,		0.1	6.6	3			1.1			1.8	
Queue Storage	Ratio (RQ) (50th percentile))	0.04	0.00)		0.04	0.0	0			0.00			0.00	
Uniform Delay ('d1). s/ve	eh		8.5	25.7	7		18.0	17.	6			32.2			33.1	
Incremental De	lav (<i>d</i> ₂).	s/veh		0.0	287.	3		0.0	1.0	5			0.2			0.4	
Initial Queue De	elav (<i>d</i> 3)	. s/veh	_	0.0	0.0			0.0	0.0	5			0.0			0.0	
Control Delay (<i>d</i>), s/veh			8.5	313.	0		18.0	18.	6			32.4			33.5		
Level of Service	Level of Service (LOS)			Α	F			В	В	1			С			С	
Approach Delay	Approach Delay, s/veh / LOS			308.	5	F		18.6	;		В	32.4	t I	С	33.5	5	С
Intersection De	lay, s/ve	h / LOS					226	6.7							F		
Multimodal Re	Iultimodal Results			EB	5			W	В			NB			SB		
Pedestrian LOS	S Score	/ LOS															
Bicycle LOS Sc	cycle LOS Score / LOS																

	HCS 2010 Signalized intersection Results Summary															
									1.1		1.6			1 1		L I
General Inform	hation								Inters	Secti	on Into	rmatic	on	_	ΨĻ	4*" <u>'</u>
Agency		GPD Group							Durat	tion, I	n	0.25				K_
Analyst		BMF		Analys	is Dat	e Mar 2	, 2015		Area	Туре	9	Other				A ⊁
Jurisdiction		City of Broadview H	leights	Time P	eriod	AM Pe	eak Hou	r	PHF			0.92		_ * → 	w‡e s	* ~ *
Intersection		Wallings Road / I-77	7 SB	Analys	is Yea	r 2040			Analy	/sis F	Period	1>7:0	00			¥ •
File Name		16. Wallings Rd_I-7	7 SB_D	esign Y	ear 20	40 'No-E	Build' AN	l.xus								
Project Descrip	tion	Design Year 2040 'N	No-Build	d' AM Pe	ak Ho	ur								1	4 1 4° Y	<u>† 1</u>
Domond Inform	nation				ED			10/	D			ND			CD.	
Approach Move	mont			1		D	1 1	VV T	D ·	D			D		<u>ЗБ</u>	D
Domand (1) vo	h/h			<u> </u>	1050	n 250	70	24	0	n	<u> </u>	1		160	10	170
Demand (V), ve	11/11				1050	250	70	24	.0					160	10	170
Signal Informa	tion		_			UIL.										
Cvcle. s	90.0	Reference Phase	2		Ьi	203	8							<u> </u>		
Offset, s	0	Reference Point	End		Ň								1	Y 2	3	4
Uncoordinated	Yes	Simult Gap F/W	On	Green	54.5	24.5	0.0	0.0		2.0	0.0	_		←		\mathbf{A}
Force Mode	Fixed	Simult Gap N/S	On	Red	Red 1.9 2.5		0.0	0.0).0) ()	0.0	-	5	6	7	×↓ [■] 8
	Тіхоц	official cap N/O	OII	1100	1.0	2.0	0.0	10.0	, 10	5.0	0.0					
Timer Results				EBL		EBT	WBI		WBT	τГ	NBL		NBT	SBL	_	SBT
Assigned Phase	e					2			6							8
Case Number	-					8.0		-	8.0							10.0
Phase Duration	nase Duration, s					60.0		-	60.0)						30.0
Change Period, (<i>Y+Rc</i>), s						5.5	<u> </u>	-	5.5	-						5.5
Change Period, (<i>Y+Rc</i>), s Max Allow Headway (<i>MAH</i>), s					23		-	23	-						1.2	
Max Allow Headway (<i>MAH</i>), s Queue Clearance Time (<i>g</i> s), s					56.5		-	56.5							11 /	
Queue Clearance Time (g_s), s Green Extension Time (g_s), s					0.0		-	0.0							1.1	
Phase Call Pro	hability	(<i>ge</i>), 3				1.00		-	1 00	<u> </u>				<u> </u>		1.00
Max Out Proba	bility					1.00			1.00	, ,						0.02
	onity					1.00			1.00	, II						0.02
Movement Gro	oup Res	ults			EB			WE	}			NB			SB	
Approach Move	ement			L	Т	R	L	Т	F	۲	L	Т	R	L	Т	R
Assigned Move	ment				2	12	1	6						3	8	18
Adjusted Flow I	Rate (v)	, veh/h			1413			337	·					174	196	
Adjusted Satura	ation Flo	w Rate (s), veh/h/ln			1818	1		225						1740	1561	
Queue Service	Time (g	/s), S			54.5			0.0						7.3	9.4	
Cycle Queue C	learance	e Time (gc), s			54.5			54.5	5					7.3	9.4	
Green Ratio (g/	(C)				0.61	1		0.61						0.27	0.27	
Capacity (c), ve	eh/h				1101			185						474	425	
Volume-to-Cap	acity Ra	tio (<i>X</i>)			1.283	:		1.81	7					0.367	0.460	
Available Capa	city (<i>Ca</i>),	veh/h			1101			185						474	425	
Back of Queue	(<i>Q</i>), veh	n/In (50th percentile)			60.0			22.8	3					3.0	3.5	
Queue Storage	Ratio (RQ) (50th percentile)		0.00			0.00)					0.00	0.00	
Uniform Delay ((d1), s/ve	əh			17.8			31.3	3					26.5	27.2	
Incremental De	lay (<i>d</i> ₂),	s/veh			134.5	5		388.	0					0.5	0.8	
Initial Queue De	elay (d3)	, s/veh			0.0			0.0						0.0	0.0	
Control Delay (d), s/veł	1			152.3	;		419.	3					27.0	28.0	
Level of Service	Level of Service (LOS)				F			F		-				С	С	
Approach Delay	Approach Delay, s/veh / LOS			152.3	3	F	419.3	3	F		0.0		<u>n</u>	27.5	5	С
Intersection De	lay, s/ve	h / LOS				17	3.0							F		
	intersection being, aven / 200															
Multimodal Re	sults				EB			WE	3			NB			SB	
Pedestrian LOS	Score	/ LOS														
Bicycle LOS Sc	icycle LOS Score / LOS															

		100 20		ignan	2001			110	ounto	oun	iiiia	, y				
General Inform	nation								Interse	ection	Info	rmatio	n		1 4 사 4	, þ. l.
Agency		GPD Group							Duratic	n h		0.25				
Analyst		BMF		Analys	is Date	Mar 2	2015		Area T	/ne		Other				۲. 4
Jurisdiction		City of Broadview H	eiahts	Time F	Period	AM Pe	ak Hou	r	PHF	190		0.92		→ -\$-	w∔e	+ > - ∳→
Intersection		Wallings Road/I-77	NB/Mill	Analys	is Year	· 2040	annieu		Analvs	is Peri	iod	1 > 7:0	0	₩		+- *
File Name		17. Wallings Rd I-7	7 NB N	fill Rd [Desian	Year 204	40 'No-E	Build'	AM.xus				-		.	<u> </u>
Project Descrip	tion	Design Year 2040 'N	No-Build	' AM Pe	ak Ho	ur								1 4	ፕ የቀና እና	1 1 1
· · • • • • • • • • • • • •																
Demand Inform	nation				EB			W	В			NB			SB	
Approach Move	ement			L	Т	R	L	Т	· F		L	Т	R	L	Т	R
Demand (v), ve	h/h			930	190	90	20	12	0 28	0	190	250	80			
				1	1	_	-						_			
Signal Informa	tion	r1			2	3								_		-+-
Cycle, s	90.0	Reference Phase	2		R	R	517	7					1		3	
Offset, s	0	Reference Point	End	Green	0.0	59.7	19.7	0.0) 0.0)	0.0			ĸ		-
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	4.0	3.6	3.0	0.0) 0.0	י כ	0.0		~			
Force Mode	Fixed	Simult. Gap N/S	On	Red 2.9 1.7		1.7	2.3	0.0) 0.0)	0.0		5	6	7	8
			_												. 1	
Timer Results				EBL	-	EBT	WBI		WBT	+-	NBL		NBT	SB	L	SBT
Assigned Phase	9			5		2		_	6	+			4			
Case Number				0.0		14.0		\rightarrow	8.3	+			12.0			
Phase Duration	, S			0.0		65.0		_	65.0	+		2	25.0			
Change Period,	Change Period, (<i>Y+Rc</i>), s /ax Allow Headway (<i>MAH</i>), s			6.9		5.3		_	5.3	+-			5.3			
Max Allow Head	/lax Allow Headway (<i>MAH</i>), s Queue Clearance Time (<i>a</i> s), s			0.0		2.9		_	2.9	+-			5.2			
Queue Clearan	Queue Clearance Time (g_s) , s					61.7		_	13.3	+-		4	21.7			
Green Extensio	Green Extension Time (g_e) , s			0.0		0.0		\rightarrow	2.8	+			0.0			
Phase Call Prol	Dability					1.00		_	1.00	_			1.00			
Max Out Proba	oility					1.00			0.58				1.00			
Movement Gro	up Res	ults	_		EB			WE	}			NB	_		SB	
Approach Move	ement			L	Т	R	L	Т	R			т	R	L	Т	B
Assigned Move	ment			5	2	12	1	6	16		7	4	14		<u> </u>	
Adjusted Flow F	Rate (v)	, veh/h			1315			457				565				
Adjusted Satura	ation Flo	w Rate (s), veh/h/ln			1016			174	3			1764				
Queue Service	Time (g	(), S			6.0			0.0				19.7				
Cycle Queue C	learance	e Time (<i>q</i> c), s			59.7			11.3	3		\rightarrow	19.7				
Green Ratio (g/	(C)				0.66			0.66	3			0.22				
Capacity (c), ve	h/h				745			120	2			386				
Volume-to-Capa	acity Ra	tio (<i>X</i>)			1.766			0.38	0			1.464				
Available Capa	city (<i>Ca</i>),	veh/h			745			120	2			386				
Back of Queue	(<i>Q</i>), veł	n/In (50th percentile)			87.4			3.4				32.2				
Queue Storage	Ratio (RQ) (50th percentile))		0.00			0.00)			0.00				
Uniform Delay ((d1), s/ve	əh			19.2			7.0				35.2				
Incremental De	lay (<i>d2</i>),	s/veh			350.0			0.1			:	222.7				
Initial Queue De	elay (d3)	, s/veh			0.0			0.0				0.0				
Control Delay (Control Delay (<i>d</i>), s/veh				369.2			7.1				257.8				
Level of Service	Level of Service (LOS)				F			Α				F				
Approach Delay	Approach Delay, s/veh / LOS			369.2	2	F	7.1		А	2	257.8		F	0.0		
Intersection De	lay, s/ve	h / LOS				27	1.5							F		
Multimodal Re	Iultimodal Results			EB			WE	3			NB			SB		
Pedestrian LOS	Score	/ LOS														
Bicycle LOS Sc	icycle LOS Score / LOS															

TWO-WAY STOP CONTROL SUMMARY												
General Informatior	າ		Site I	nforma	ation							
Analyst	BMF		Interse	ection		Wallings I Drive	Road/Elmh	urst				
Agency/Co.	GPD Gro	ир	Jurisdi	ction		City of Br	oadview H	eiahts				
Date Performed	3/2/2015		Analys	is Year		2040 'No-	Build'	Jigino				
Analysis Time Period	AM Peak	Hour				2040 110	Dulla					
Project Description Wa	allings Road Sa	fety & Corridor Stu	udy			-						
East/West Street: Wallin	ngs Road		North/S	South St	reet: <i>Elmhu</i>	ırst Drive						
Intersection Orientation:	East-West		Study F	Period (I	nrs): 0.25							
Vehicle Volumes ar	nd Adjustme	nts										
Major Street		Eastbound				Westbou	nd					
Movement	1	2	3		4	5		6				
	L	T	R		L	T		R				
Volume (veh/h)	60	1060			4.00	390		10				
Peak-Hour Factor, PHF	0.92	0.92	1.00		1.00	0.92		0.92				
(veh/h)	65	1152	0		0	423		10				
Percent Heavy Vehicles	2				0							
Median Type			-	Undivi	ded							
RT Channelized			0					0				
Lanes	0	1	0		0	1		0				
Configuration	LT							TR				
Upstream Signal		0				0						
Minor Street		Northbound				Southbou	ind					
Movement	7	8	9		10	11		12				
	L	Т	R		L	Т		R				
Volume (veh/h)					10			10				
Peak-Hour Factor, PHF	1.00	1.00	1.00		0.92	1.00		0.92				
Hourly Flow Rate, HFR (veh/h)	0	0	0		10	0		10				
Percent Heavy Vehicles	0	0	0		0	0		0				
Percent Grade (%)		0				0						
Flared Approach		N				N						
Storage		0				0						
RT Channelized			0					0				
Lanes	0	0	0		0	0		0				
Configuration						LR						
Delay, Queue Length, a	nd Level of Se	rvice										
Approach	Eastbound	Westbound	l	Northbo	und	S	outhbound					
Movement	1	4	7	8	9	10	11	12				
Lane Configuration	LT						LR					
v (veh/h)	65						20					
C (m) (veh/h)	1127						165					
v/c	0.06						0.12					
95% queue length	0.18						0.40					
Control Delay (s/veh)	8.4						29.8					
LOS	Α						D					
Approach Delav (s/veh)				8			29.8	•				
Approach LOS						D						

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TWO-WAY STOP CONTROL SUMMARY												
General Informatio	า		Site I	nforma	ation							
Analyst	BMF		Interse	ection		Wallings I Road	Road/Long	view				
Agency/Co.	GPD Gro	ир	Jurisdi	ction		City of Br	oadview H	eiahts				
Date Performed	3/2/2015		Analys	sis Year		2040 'No-	Build'	Jigino				
Analysis Time Period	AM Peak	Hour					Dana					
Project Description Wa	allings Road Sa	fety & Corridor Stu	udy									
East/West Street: Wallin	ngs Road		North/S	South St	reet: <i>Longvi</i>	ew Road						
Intersection Orientation:	East-West		Study I	Period (I	nrs): 0.25							
Vehicle Volumes ar	nd Adjustme	nts										
Major Street		Eastbound				Westbou	nd					
Movement	1	2	3		4	5		6				
	L	T	R		L	T		R				
Volume (veh/h)	30	1040	1.00		4.00	390		10				
Peak-Hour Factor, PHF	0.92	0.92	1.00	<u> </u>	1.00	0.92		0.92				
(veh/h)	32	1130	0		0	423		10				
Percent Heavy Vehicles	2				0							
Median Type				Undivi	ded							
RT Channelized			0					0				
Lanes	0	1	0		0	1		0				
Configuration	LT							TR				
Upstream Signal		0				0						
Minor Street		Northbound				Southbou	Ind					
Movement	7	8	9		10	11		12				
	L	Т	R		L	Т		R				
Volume (veh/h)					10			10				
Peak-Hour Factor, PHF	1.00	1.00	1.00	<u> </u>	0.92	1.00		0.92				
Hourly Flow Rate, HFR (veh/h)	0	0	0		10	0		10				
Percent Heavy Vehicles	0	0	0		0	0		0				
Percent Grade (%)		0				0						
Flared Approach		N				N						
Storage		0				0						
RT Channelized			0					0				
Lanes	0	0	0		0	0		0				
Configuration						LR						
Delay, Queue Length, a	nd Level of Se	rvice										
Approach	Eastbound	Westbound		Northbo	und	S	outhbound					
Movement	1	4	7	8	9	10	11	12				
Lane Configuration	LT						LR					
v (veh/h)	32						20					
C (m) (veh/h)	1127						189					
v/c	0.03						0.11					
95% queue length	0.09						0.35					
Control Delav (s/veh)	8.3						26.3					
10S	A					1	D					
Approach Delay (s/veh)				<u>I</u>		1	26.3					
Approach LOS						+	 D					
	==		1			1						

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	тw	O-WAY STOP	CONTR	OL SI	JMN	MARY				
General Information	า		Site I	nform	atio	on				
Analyst	BMF		Interse	ection			Wallings	Rd/Ch	nestni	ut Blvd
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadvie	ew He	eights
Date Performed	3/2/2015	•	Analys	sis Year	r		2040 'No-	-Build'	1	-
Analysis Time Period	AM Peak	Hour								
Project Description Wa	allings Road Sa	fety & Corridor Si	tudy							
East/West Street: Walli	ngs Road		North/S	South S	Stree	t: Chestn	ut Boulevar	ď		
Intersection Orientation:	East-West		Study I	Period	(hrs)	: 0.25				
Vehicle Volumes ar	nd Adjustme	ents								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5			6
	L	Т	R			L	Т			R
Volume (veh/h)		1040	10			10	380			
Peak-Hour Factor, PHF	0.88	0.92	0.92			0.92	0.92		(0.86
Hourly Flow Rate, HFR (veh/h)	0	1130	10			10	413			0
Percent Heavy Vehicles	2					4				
Median Type				Undiv	videa	1				
RT Channelized			0							0
Lanes	0	1	0			0	1			0
Configuration			TR			LT				
Upstream Signal		0					0			
Minor Street		Northbound	•				Southbou	und .		
Movement	7	8	9			10	11	T		12
	L	Т	R			L	Т			R
Volume (veh/h)	20		30							
Peak-Hour Factor, PHF	0.92	1.00	0.92			0.67	1.00		().67
Hourly Flow Rate, HFR	21	0	32			0	0			0
Percent Heavy Vehicles	0	0	0			0	0			0
Percent Grade (%)		0				-	0			-
Flared Approach		N N					N			
Storage		0					0			
DT Channelized			0							0
			0			0	0			0
Lanes	0		0			0	0			0
Conliguration										
Delay, Queue Length, a	ind Level of Se		r .							
Approach	Eastbound	Westbound		Northbo	ound	0	S 10	outhb	ound	10
	1	4	1	8		9	10	1	1	12
		LI								
v (veh/h)		10		53						
C (m) (veh/h)		606		175	5					
v/c		0.02		0.30)					
95% queue length		0.05		1.21	1					
Control Delay (s/veh)		11.0		34.3	3					
LOS		В		D						
Approach Delav (s/veh)				34.3	3		1			
Approach LOS				ס., כ						
							I			

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	TW	O-WAY STOP	CONTR	OL SI	JMN	MARY				
General Information	า		Site I	nform	atio	on				
Analyst	BMF		Interse	ection			Wallings	Rd/Ov	/erloo	k Ave
Agency/Co.	GPD Gro	up	Jurisdi	ction			City of Br	oadvie	ew He	eights
Date Performed	3/2/2015	•	Analys	sis Year	r		2040 'No	-Build'	,	<u> </u>
Analysis Time Period	AM Peak	Hour								
Project Description Wa	allings Road Sa	afety & Corridor Si	tudy							
East/West Street: Walli	ngs Road		North/S	South S	Stree	t: Overloo	ok Avenue			
Intersection Orientation:	East-West		Study I	Period	(hrs)	: 0.25				
Vehicle Volumes ar	nd Adjustme	ents								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5			6
	L	Т	R			L	Т			R
Volume (veh/h)		1060	10			10	380			
Peak-Hour Factor, PHF	0.88	0.92	0.92			0.92	0.92		(0.86
Hourly Flow Rate, HFR (veh/h)	0	1152	10			10	413			0
Percent Heavy Vehicles	2					2				
Median Type				Undiv	videa	1				
RT Channelized			0							0
Lanes	0	1	0			0	1			0
Configuration			TR			LT				
Upstream Signal		0					0			
Minor Street		Northbound					Southbou	ind		
Movement	7	8	9			10	11			12
	L	Т	R			L	Т			R
Volume (veh/h)	10		30							
Peak-Hour Factor, PHF	0.92	1.00	0.92			0.67	1.00		(0.67
Hourly Flow Rate, HFR (veh/h)	10	0	32			0	0			0
Percent Heavy Vehicles	4	0	4			0	0			0
Percent Grade (%)		0					0			
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0				<u> </u>			0
	0	0	0			0	0			0
Configuration		I R				0	<u> </u>			•
Delay Queue Length	I and Level of Se									
Approach	Fastbound	Westbound		Northbo	hund		S	outhb	ound	
Movement	1	4	7	8	Juni	9	10	1	1	12
I ane Configuration		LT		LR						
v (veh/h)		10		42						
C (m) (veh/h)		601		189)					
v/c		0.02		0.22	2					
95% queue length		0.05		0.82	>					
Control Delav (s/veh)		11.1		29.4	1					
LOS		В		D						
Approach Delay (s/yeh)				20 /	1					
Approach I OS				23.4 م						
				U						

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TWO-WAY STOP CONTROL SUMMARY												
General Information	n		Site I	nform	atic	on						
Analvst	BMF		Interse	ection			Wallings	Rd/McCre	arv Rd			
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadview H	leights			
Date Performed	3/2/2015	1	Analys	is Year			2040 'No-	·Build'				
Analysis Time Period	AM Peak	Hour										
Project Description W	allings Road Sa	fetv & Corridor St	tudv									
East/West Street: Walli	ngs Road		North/S	South St	treet	t: McCrea	ry Road					
Intersection Orientation:	East-West		Study I	Period (hrs)	: 0.25						
Vehicle Volumes ar	nd Adjustme	ents										
Major Street		Eastbound					Westbou	nd				
Movement	1	2	3			4	5		6			
	L	Т	R			L	Т		R			
Volume (veh/h)	30	1060					380		30			
Peak-Hour Factor, PHF	0.92	0.92	0.89			0.82	0.92		0.92			
Hourly Flow Rate, HFR (veh/h)	32	1152	0			0	413		32			
Percent Heavy Vehicles	2					2						
Median Type		_		Undivi	ided							
RT Channelized			0						0			
Lanes	0	1	0			0	1		0			
Configuration	LT								TR			
Upstream Signal		0					0					
Minor Street		Northbound	•				Southbou	Ind				
Movement	7	8	9			10	11		12			
	L	Т	R			L	Т		R			
Volume (veh/h)						20			10			
Peak-Hour Factor. PHF	0.57	1.00	0.57			0.92	1.00		0.92			
Hourly Flow Rate, HFR (veh/h)	0	0	0			21	0		10			
Percent Heavy Vehicles	4	0	4			0	0		0			
Percent Grade (%)	· · ·	0				-	0		-			
Flared Approach	_	N					N					
Storage		0					0					
PT Channelized			0				Ŭ		0			
			0			0	0		0			
Configuration		0	0			0			0			
	<u> </u>						LN					
Delay, Queue Length, a	and Level of Se											
Approach Movement	Lastbound	Westbound	7	Northbo	und	0	10 S		1 12			
	1					3	10		12			
v (ven/n)	32							31				
C (m) (veh/h)	1115							147				
v/c	0.03							0.21				
95% queue length	0.09							0.76				
Control Delay (s/veh)	8.3							35.9				
LOS	A							Е				
Approach Delav (s/veh)								35.9				
Approach LOS								F				
								-				

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	тw	O-WAY STOP	CONTR	OL SI	JMM	ARY						
General Information	n		Site I	nform	natior	ı						
Analyst	BMF		Interse	ection			Wallings I	Rd/Majes	stic Oaks			
Agency/Co.	GPD Gro	ир	luriod	otion			II City of Pr	odviow	Uniahta			
Date Performed	3/2/2015	•	Junsa		r			Dadview	neignis			
Analysis Time Period	AM Peak	Hour	Analys	is rea	1		2040 110-	Бина				
Project Description Wa	allings Road Sa	fety & Corridor St	udy									
East/West Street: Walli	ngs Road	•	North/S	South S	Street:	Majestic	: Oaks Trail					
Intersection Orientation:	East-West		Study	Period	(hrs):	0.25						
Vehicle Volumes ar	nd Adjustme	nts										
Major Street		Eastbound					Westbou	nd				
Movement	1	2	3			4	5		6			
	L	Т	R			L	Т		R			
Volume (veh/h)	10	1320					410		10			
Peak-Hour Factor, PHF	0.92	0.92	0.89		0	.82	0.92		0.92			
Hourly Flow Rate, HFR (veh/h)	10	1434	0	0 0			445		10			
Percent Heavy Vehicles	2					2						
Median Type				Undivided								
RT Channelized			0						0			
Lanes	0	1	0			0	1		0			
Configuration	LT								TR			
Upstream Signal		0					0					
Minor Street		Northbound					Southbou	ind				
Movement	7	8	9			10	11		12			
	L	Т	R			L	Т		R			
Volume (veh/h)					10				10			
Peak-Hour Factor, PHF	0.57	1.00	0.57	'	0.92		1.00		0.92			
Hourly Flow Rate, HFR (veh/h)	0	0	0		10		0		10			
Percent Heavy Vehicles	4	0	4			0	0		0			
Percent Grade (%)		0					0					
Flared Approach		N					N					
Storage		0					0					
RT Channelized			0						0			
lanes	0	0	0			0	0		0			
Configuration	Ť	Ť	- v			<u> </u>	I R		•			
Delay Queue Length a	nd Level of Se	rvice					_, ,					
Approach	Fastbound	Westbound		Northbo	ound		s	outhbour	nd			
Movement	1	4	7	8		9	10	11	12			
Lane Configuration	17		,			0	10	IR				
v (veh/h)	10							20				
(ven(n))	1106							125				
	1100							135				
V/C	0.01							0.15				
95% queue length	0.03			<u> </u>				0.50				
Control Delay (s/veh)	8.3			ļ				36.2				
LOS	Α							E				
Approach Delay (s/veh)							36.2					
Approach LOS									E			

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	ТМ	O-WAY STOP	CONTRO	DL SI	JMN	/IARY				
General Informatio		Site Ir	nform	atio	on					
Analyst	BMF 0. GPD Group			ction			Wallings	Rd/Cre	eksi	de Trce
Agency/Co.	GPD Grou	ıр	Jurisdi	ction			City of Br	oadvie	w He	eights
Date Performed	3/2/2015	•	Analys	is Yea	r		2040 'No-	Build'		-
Analysis Time Period	AM Peak	Hour								
Project Description Wa	allings Road Saf	ety & Corridor Stu	udy							
East/West Street: Wallin	ngs Road		North/S	South S	Stree	t: Creeksi	de Terrace			
Intersection Orientation:	East-West		Study F	Period	(hrs)	: 0.25				
Vehicle Volumes ar	nd Adjustmer	nts								
Major Street		Eastbound					Westbou			
Movement	1	2	3			4	5			6
	L	Т	R			L	Т			R
Volume (veh/h)		1320	10			10	410			
Peak-Hour Factor, PHF	0.80	0.92	0.92			0.92	0.92		0).76
Hourly Flow Rate, HFR (veh/h)	0	1434	10			10	445			0
Percent Heavy Vehicles	2			4						
Median Type				Undivi		1				
RT Channelized										0
Lanes	0	0 1				0	1			0
Configuration						LT				
Upstream Signal		0					0			
Minor Street		Northbound					Southbou	ind		
Movement	7	8	9			10	11			12
	L	Т	R			L	Т			R
Volume (veh/h)	10		50							
Peak-Hour Factor, PHF	0.92	1.00	0.92			0.70	1.00		C).70
Hourly Flow Rate, HFR (veh/h)	10	0	54			0	0			0
Percent Heavy Vehicles	3	0	3			0	0			0
Percent Grade (%)		0					0			
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0							0
Lanes	0	0	0			0	0			0
Configuration		LR								
Delay, Queue Length, a	nd Level of Ser	vice					•			
Approach	Eastbound	Westbound	١	Vorthbo	ound		S	outhbo	ound	
Movement	1	4	7	8		9	10	11	1	12
Lane Configuration		LT		LR						
v (veh/h)		10		64						
C (m) (veh/h)		463		136	6					
v/c		0.02		0.47	7					
95% aueue lenath		0.07		2.15	5					
Control Delay (s/veh)		12.9		53.0)				\neg	
108		B		F	-					
Approach Delay (s/yoh)				52 (n		<u> </u>			
Approach LOS				- JJ.U	,					
Approach LOS					F					

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	тw	O-WAY STOP	CONTR		MARY				
General Informatio	า		Site Ir	nformati	on				
Analyst	BMF		Interse	ection		Wallings I	Rd/Joyce		
Agency/Co.	GPD Gro	ир	luriodi	otion		City of Pr		oiabto	
Date Performed	3/2/2015					2040 'No		eignis	
Analysis Time Period	AM Peak	Hour				2040 110-	·Dulla		
Project Description Wa	allings Road Sa	fety & Corridor St	udy						
East/West Street: Walling	ngs Road		North/S	South Stree	et: Joyce R	Road/Fireho	use		
Intersection Orientation:	East-West		Study F	Period (hrs): 0.25				
Vehicle Volumes ar	nd Adjustme	nts							
Major Street		Eastbound				Westbound			
Movement	1	2	3		4	5		6	
	L	Т	R		L	Т		R	
Volume (veh/h)	10	1330	30		10	400		10	
Peak-Hour Factor, PHF	0.92	0.92	0.92		0.92	0.92		0.92	
Hourly Flow Rate, HFR (veh/h)	10	1445	32	32 10				10	
Percent Heavy Vehicles	2				1				
Median Type		•		Undivide	d				
RT Channelized			0					0	
Lanes	0	1	0		0	1		0	
Configuration	LTR				LTR				
Upstream Signal		0				0			
Minor Street		Northbound				Southbou	ind .		
Movement	7	8	9		10	11		12	
	L	Т	R		L	Т		R	
Volume (veh/h)	10	10	10		10	10		10	
Peak-Hour Factor, PHF	0.92	0.92	0.92		0.92	0.92		0.92	
Hourly Flow Rate, HFR (veb/b)	10	10	10		10	10		10	
Percent Heavy Vehicles	0	0	0		0	0		0	
Percent Grade (%)		0	Ť		•	0		•	
Flared Approach		N				N			
Storage		0				0			
PT Channelized			0					0	
	0	1			0	1		0	
Configuration	0	ITR			U			0	
Dolay Quous Longth									
Approach	Eastbound	Westbound	•	Jorthhound	4		outhbour	4	
Approach Movement		vvestbouriu	7			10	11	1 12	
		4	1		9	10		12	
		LIR							
v (ven/n)	10	10		30			30		
C (m) (veh/h)	1116	459		62			66		
v/c	0.01	0.02		0.48			0.45		
95% queue length	0.03	0.07		1.91					
Control Delay (s/veh)	8.3	13.0		108.6			98.7		
LOS	A	В		F			F		
Approach Delay (s/veh)				108.6			98.7		
Approach LOS				F		F			

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	TWO-WAY STOP CONTROL SUMMARY									
General Informatio		Site Ir	nform	atic	on					
Analyst		Interse	ction			Wallings	Rd/Ma	ariann	a Blvd	
Agency/Co.	GPD Grou	ıр	Jurisdi	ction			City of Br	oadvie	w He	eights
Date Performed	3/2/2015		Analys	is Yeaı	r		2040 'No-	·Build'		
Analysis Time Period	AM Peak	Hour								
Project Description Wa	allings Road Saf	ety & Corridor St	udy							
East/West Street: Walli	ngs Road		North/S	South S	street	: Marianr	na Boulevar	ď		
Intersection Orientation:	East-West		Study F	Period ((hrs)	0.25				
Vehicle Volumes ar	nd Adjustme	nts								
Major Street		Eastbound					Westbound			
Movement	1	2	3			4	5			6
	L L	1010	R			L				R
Volume (ven/n)	0.80	1340	10	, 		10	410			76
Hourly Flow Pate HEP	0.80	0.92	0.92			0.92	0.92	-+	ι.	.70
(veh/h)	0	0 1456				10	445			0
Percent Heavy Vehicles	2					3				
Median Type		_		Undivi						
RT Channelized										0
Lanes	0	1	0			0	1			0
Configuration			TR			LT				
Upstream Signal		0					0			
Minor Street		Northbound					Southbou	Ind		
Movement	7	8	9	9		10	0 11			12
	L	Т	R	R		L	Т			R
Volume (veh/h)	10		10							
Peak-Hour Factor, PHF	0.92	1.00	0.92		0.70		1.00		0	0.70
Hourly Flow Rate, HFR (veh/h)	10	0	10		0		0			0
Percent Heavy Vehicles	0	0	0			0	0			0
Percent Grade (%)		0					0			
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0							0
Lanes	0	0	0			0	0			0
Configuration		LR								
Delay, Queue Length, a	nd Level of Sei	rvice								
Approach	Eastbound	Westbound	1	Vorthbo	ound		S	outhb	ound	
Movement	1	4	7	8		9	10	1	1	12
Lane Configuration		LT		LR						
v (veh/h)		10		20						
C (m) (veh/h)		457		99						
v/c	437			0.20)		1			
95% queue length		0.07		0.71	1					
Control Delay (s/veh)		13.1		50	3					
		, <u>, , ,</u> B		50.C	,					
Approach Dolou (aluch)				<i>F</i>						
Approach Delay (S/Ven)			50.3				<u> </u>			
Approach LOS			F							

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	TW	O-WAY STOP	CONTR	OL SI	JMN	IARY				
General Information	า		Site I	nform	atic	on				
Analyst	BMF	BMF GPD Group					Wallings	Rd/Cr	aia Li	1
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadvie	ew He	eights
Date Performed	3/2/2015	•	Analys	sis Year	r		2040 'No	-Build	'	-
Analysis Time Period	AM Peak	Hour								
Project Description Wa	allings Road Sa	fety & Corridor Si	tudy							
East/West Street: Walli	ngs Road	-	North/S	South S	treet	t: Craig L	ane			
Intersection Orientation:	East-West		Study I	Period ((hrs)	: 0.25				
Vehicle Volumes ar	nd Adjustme	ents								
Major Street		Eastbound					Westbound			
Movement	1	2	3			4	5			6
	L	Т	R			L	Т			R
Volume (veh/h)		1380	10			10	400			
Peak-Hour Factor, PHF	0.80	0.92	0.92			0.92	0.92		(0.76
Hourly Flow Rate, HFR (veh/h)	0	1499	10			10	434			0
Percent Heavy Vehicles	2	2		3						
Median Type				Undivided						
RT Channelized										0
Lanes	0	1	0	0		0	1			0
Configuration			TR			LT				
Upstream Signal		0					0			
Minor Street		Northbound	-				Southbound			
Movement	7	8	9	9		10	11			12
	L	Т	R			L	Т			R
Volume (veh/h)	10		50							
Peak-Hour Factor, PHF	0.92	1.00	0.92	· ·	0.70		1.00		(0.70
Hourly Flow Rate, HFR (veh/h)	10	0	54		0		0			0
Percent Heavy Vehicles	7	0	7			0	0			0
Percent Grade (%)		0					0			
Flared Approach		N					N	Г		
Storage		0					0			
RT Channelized			0							0
	0	0	0			0	0			0
Configuration		I R				0	Ŭ			0
Delay Queue Length	I and Level of Se									
Approach	Fastbound	Westbound	l 1	Northbo	ound		s	outhb	ound	
Movement	1	4	7	8		9	10	1	1	12
Lane Configuration		LT		LR						
v (veh/h)		10		64						
C (m) (veh/h)		440		122	,					
v/c		0.02		0.52	2					
95% queue length		0.07		2.47	7					
Control Delay (s/veh)		13.4		63.2	2					
LOS		В		F						
Approach Delay (s/veh)				6.3 2	2					
Approach LOS				55.2 F	-		<u> </u>			
		==		1			I			

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	TW	O-WAY STOP	CONTR		IMARY				
General Informatio	n		Site I	nformat	tion				
Analvst	BMF		Interse	ection		Wallings	Rd/Skvline	Dr	
Agency/Co.	GPD Gro	ир	Jurisdi	ction		City of Br	oadview He	eights	
Date Performed	3/2/2015	•	Analys	is Year		2040 'No	-Build'	-	
Analysis Time Period	AM Peak	Hour							
Project Description W	allings Road Sa	fety & Corridor Si	tudy						
East/West Street: Walli	ngs Road		North/S	South Stre	eet: Skyline	Drive			
Intersection Orientation:	East-West		Study I	Period (hi	rs): 0.25				
Vehicle Volumes ar	nd Adjustme	ents							
Major Street		Eastbound				Westbou			
Movement	1	2	3		4	5		6	
	L	T	R		L	Т		R	
Volume (veh/h)	20	1410				400		10	
Peak-Hour Factor, PHF	0.92	0.92	0.81		0.78	0.92	(0.92	
Hourly Flow Rate, HFR (veh/h)	21	1532	0		0	434		10	
Percent Heavy Vehicles	1				3				
Median Type				Undivid	ed				
RT Channelized			0					0	
Lanes	0	1	0		0	1		0	
Configuration	LT							TR	
Upstream Signal		0				0			
Minor Street		Northbound				Southbou	Ind		
Movement	7	8	9		10	11		12	
	L	Т	R		L	Т		R	
Volume (veh/h)					10			10	
Peak-Hour Factor, PHF	0.63	1.00	0.63		0.92	1.00	(.92	
Hourly Flow Rate, HFR (veh/h)	0	0	0		10	0		10	
Percent Heavy Vehicles	7	0	7		4	0		4	
Percent Grade (%)		0				0			
Flared Approach		N				N			
Storage		0				0			
RT Channelized			0					0	
Lanes	0	0	0		0	0		0	
Configuration						LR			
Delay, Queue Length, a	and Level of Se	ervice	•						
Approach	Eastbound	Westbound	1	Northbou	nd	S	outhbound		
Movement	1	4	7	8	9	10	11	12	
Lane Configuration	LT						LR		
v (veh/h)	21						20		
C (m) (veh/h)	1121						114		
v/c	0.02						0.18		
95% queue length	0.06						0.61		
Control Delay (s/veh)	8.3						43.2		
LOS	A						E		
Approach Delay (s/veh)							43.2		
Approach LOS						E			

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	TW	O-WAY STOP	CONTR		UMN	MARY				
General Information	n		Site I	nform	natio	on				
Analyst	BMF	BMF GPD Group					Wallings	Rd/Sk	vline	Dr
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadvie	ew He	eights
Date Performed	3/2/2015		Analys	sis Yea	r		2040 'No	-Build'	,	
Analysis Time Period	AM Peak	Hour								
Project Description W	allings Road Sa	fety & Corridor Si	tudy							
East/West Street: Walli	ngs Road		North/S	South S	Stree	t: Skyline	Drive			
Intersection Orientation:	East-West		Study I	Period	(hrs)	: 0.25				
Vehicle Volumes ar	nd Adjustme	ents								
Major Street		Eastbound					Westbound			
Movement	1	2	3			4	5			6
	L	Т	R			L	Т			R
Volume (veh/h)		1240	180			10	400			
Peak-Hour Factor, PHF	0.92	0.92	0.92	·		0.92	0.92		().92
Hourly Flow Rate, HFR (veh/h)	0	1347	195			10	434			0
Percent Heavy Vehicles	1	1		3						
Median Type					Undivided					
RT Channelized										0
Lanes	0	0 1		0		0	1			0
Configuration				TR		LT				
Upstream Signal		0					0			
Minor Street		Northbound					Southbou	ind		
Movement	7	8	9			10	11			12
	L	Т	R	ĺ		L	Т			R
Volume (veh/h)	10		60	60						
Peak-Hour Factor, PHF	0.92	0.92	0.92			0.92	0.92		().92
Hourly Flow Rate, HFR (veh/h)	10	0	65		0		0			0
Percent Heavy Vehicles	2	0	2			4	0			4
Percent Grade (%)		0					0			
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0							0
lanes	0	0	0			0	0			0
Configuration		LR				-	-			-
Delay, Queue Length, a	nd Level of Se									
Approach	Eastbound	Westbound		Northbo	ound		s	outhb	ound	
Movement	1	4	7	8		9	10	1	1	12
Lane Configuration	•			IR						
v (veh/h)		10		75						
$\nabla (ven/n)$		10		1.40	`					
		420		140	/					
V/C		0.02		0.54	4					
95% queue length		0.07		2.62	2					
Control Delay (s/veh)		13.6		57.1	1					
LOS		В		F						
Approach Delay (s/veh)				57.1	1					
Approach LOS			F							

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General Inform	nation								Intersec	tion Inf	ormatic	n		▲ \}\+ ↓	× L <u>.</u>
Agency	lation	GPD Group							Duration	h	0.25			417	
Analyst		BME		Analys	is Date	Mar 2	2015			,)e	Other		- <u>-</u> -		<u>ل</u> 4
Jurisdiction		City of Broadview H	oiahte	Time F	Pariod		ak Hou	ır			0 92		- <mark>→</mark> *	w∔e	×_ ⊱ ↓ ∲
Intersection		Wallings Boad/Broa	dview F	Analys	is Vear	· 2040			Analysis	Period	1 > 7.0	0			→ *
File Name		1 Wallings Rd Broa		Rd Des	ian Ve	ar 2040	'No-Bui	Id' PM	1 110	T CHOU					<u></u>
Project Descript	tion	Design Year 2040 'N	Jo-Build	I PM Pe	ak Ho				1.705				- 5	" 	* 1
r reject Besch		Dobigit Total 2010 1	to Balle												
Demand Inform	nation				EB			W	В		NB			SB	
Approach Move	ment					R	L	Т	R	L	Т	R	L	Т	R
Demand (v), ve	h/h			150	260	110	390	81	0 180	150	480	160	230	680	290
				in-											
Signal Informa	tion			-	5	215					R			_	ð-
Cycle, s	154.4	Reference Phase	2		5	l Str	7 °	7	۳Ŕ.	£		<u>┣</u> ╷ҝィ	2	_ 3	4
Offset, s	0	Reference Point	End	Green	22.0	35.0	22.0	12	.4 35.0	0.0		•			
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	3.6	3.6	3.6	3.6	3.6	0.0	_		*		
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	2.0	2.0	2.0) 2.0	0.0		5	6	7	Y 8
			_		1			1			1				
Timer Results				EBL	-	EBT	WB	L	WBT	NBI	-	NBT	SBL		SBT
Assigned Phase	9			3		8	7		4	1		6	5		2
Case Number				1.1		4.0	1.1		3.0	1.1		4.0	1.1		4.0
Phase Duration	, S			27.6		40.6	45.6	5	58.6	27.6	<u>}</u>	40.6	27.6	; .	40.6
Change Period,	(Y+Rc)	, S		5.6		5.6	5.6		5.6	5.6		5.6	5.6		5.6
Max Allow Head	dway (N	1AH), s		4.1		4.1	4.1		4.1	4.3		4.3	4.3		4.3
Queue Clearan	ce Time	(<i>gs</i>), s		11.8		36.7	32.8	3	55.0	11.9)	31.1) ;	37.0
Green Extensio	n Time	(<i>g</i> ∉), s		0.3	0.3 0.0		1.0		0.0	0.4		2.7	0.3		0.0
Phase Call Prot	bability			1.00	1.00 1.0		1.00		1.00	1.00	1.00		1.00)	1.00
Max Out Probal	bility			0.01 1.0		1.00	0.26	3	1.00	0.01		1.00	1.00)	1.00
Movement Gro	up Res	ults			FB			WF	3		NB			SB	_
Approach Move	ement				 T	B	1	T	, B	1	Т	R		Т	B
Assigned Move	ment			3	8	18	7	4	14	1	6	16	5	2	12
Adjusted Flow F	Rate (v)	. veh/h	_	163	402		424	880	196	163	362	333	250	555	499
Adjusted Satura	ation Flo	w Rate (<i>s</i>), veh/h/ln		1792	1786		1757	184	5 1563	1774	1863	1703	1774	1900	1706
Queue Service	Time (a	s). S		9.8	34.7		30.8	53.0) 14.5	9.9	28.8	29.1	16.0	35.0	35.0
Cvcle Queue C	learance	e Time (<i>a</i> c). s		9.8	34.7		30.8	53.0) 14.5	9.9	28.8	29.1	16.0	35.0	35.0
Green Ratio (<i>q</i> /	(C)			0.37	0.23		0.50	0.34	1 0.34	0.37	0.23	0.23	0.37	0.23	0.23
Capacity (c), ve	h/h			302	405		504	633	537	299	422	386	318	431	387
Volume-to-Capa	acity Ra	tio (<i>X</i>)		0.540	0.994		0.842	1.39	0 0.365	0.545	0.858	0.864	0.785	1.289	1.290
Available Capa	city (<i>Ca</i>),	veh/h		302	405		504	633	537	299	422	386	318	431	387
Back of Queue	(<i>Q</i>), veł	n/In (50th percentile)		4.5	20.4		12.4	56.8	3 5.7	4.5	15.6	14.6	8.2	34.5	31.2
Queue Storage	Ratio (RQ) (50th percentile))	1.12	0.00		2.53	0.00	0.45	0.38	0.00	0.00	0.69	0.00	0.00
Uniform Delay ((d1), s/ve	əh		37.8	59.6		43.2	50.7	7 38.1	37.8	57.3	57.4	39.6	59.7	59.7
Incremental De	lay (<i>d</i> 2),	s/veh		1.9	42.9		12.2	185.	3 0.4	2.0	16.0	18.0	12.2	146.8	148.8
Initial Queue De	elay (d3)	, s/veh		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (ntrol Delay (d), s/veh			39.7	102.5		55.4	236.	0 38.5	39.8	73.3	75.4	51.8	206.5	208.5
Level of Service	Level of Service (LOS)			D	F		E	F	D	D	E	E	D	F	F
Approach Delay	Approach Delay, s/veh / LOS			84.4		F	159.	2	F	67.8	3	E	177.	6	F
Intersection Del	lay, s/ve	h / LOS				13	6.3				H		F		
Multimodal Re	sults				EB			WE	3		NB			SB	
Pedestrian LOS	Score	/ LOS													
Bicycle LOS Sc	ore / LC	DS													

	TW	O-WAY STOP	CONTR	OL SI	ЈММ	ARY				
General Informatio	า		Site I	nform	atio	n				
Analyst	BMF		Interse	ection			Wallings I	Road/Elm	hurst	
Agency/Co.	GPD Gro	ир	lurisdi	ction			City of Br	oodview H	leichts	
Date Performed	3/2/2015			is Vea	r		2040 'No	Build'	leiginis	
Analysis Time Period	PM Peak	Hour					2040 110	Dulla		
Project Description Wa	allings Road Sa	fety & Corridor St	udy							
East/West Street: Walling	ngs Road		North/S	South S	street:	Elmhurs	st Drive			
Intersection Orientation:	East-West		Study I	Period	(hrs):	0.25				
Vehicle Volumes ar	nd Adjustme	nts								
Major Street		Eastbound					Westbound			
Movement	1	2	3			4	5		6	
	L	Т	R			L	<u> </u>		R	
Volume (veh/h)	10	640					1360		10	
Peak-Hour Factor, PHF	0.92	0.92 0.92			1.00 1.00				0.92	
Hourly Flow Rate, HFR (veh/h)	10	695	0	0 0			1478		10	
Percent Heavy Vehicles	1					0				
Median Type					vided					
RT Channelized			0						0	
Lanes	0	0 1				0	1		0	
Configuration	LT	LT							TR	
Upstream Signal		0					0			
Minor Street		Northbound					Southbou	ind		
Movement	7	8	9			10	11		12	
	L	Т	R	R		L	Т		R	
Volume (veh/h)						10			20	
Peak-Hour Factor, PHF	1.00	1.00	1.00		0.92		1.00		0.92	
Hourly Flow Rate, HFR (veh/h)	0	0	0			10	0		21	
Percent Heavy Vehicles	0	0	0			0	0		0	
Percent Grade (%)		0					0			
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0						0	
lanes	0	0	0			0	0		0	
Configuration			Ť			•	LR		<u> </u>	
Delay Queue Length a	nd Level of Se	rvice		I			_, ,			
Approach	Fastbound	Westbound		Northbo	ound		s	outhboun	d	
Movement	1	4	7	8		9	10	11	12	
Lane Configuration			•	Ť		•		IR		
v (veh/h)	10							31		
C (m) (veh/h)	455							01		
	0.02							0.24		
V/C	0.02							1 22		
	0.07							1.32		
Control Delay (s/ven)	13.1			<u> </u>	\rightarrow			63.8		
LOS	В							F		
Approach Delay (s/veh)								63.8		
Approach LOS							F			

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	тw	O-WAY STOP	CONTR	OL SU	MMARY				
General Informatio	Seneral Information								
Analyst	BMF		Interse	ection		Wallings I Road	Road/Long	view	
Agency/Co.	GPD Gro	ир	Jurisdi	ction		City of Br	oadview H	eiahts	
Date Performed	3/2/2015		Analys	sis Year		2040 'No	Build'	cigino	
Analysis Time Period	PM Peak	Hour				2040 110	Dulla		
Project Description Wa	allings Road Sa	fety & Corridor St	udy						
East/West Street: Walling	ngs Road		North/S	South St	reet: Longv	iew Road			
Intersection Orientation:	East-West		Study I	Period (h	nrs): <i>0.25</i>				
Vehicle Volumes ar	nd Adjustme	nts							
Major Street		Eastbound				Westbou			
Movement	1	2	3		4	5		6	
	L	T	R		L	T		R	
Volume (veh/h)	10	640			1.00	1360		10	
Peak-Hour Factor, PHF	0.92	0.92	1.00	<u> </u>	1.00	0.92		0.92	
(veh/h)	10	695	0	0 0				10	
Percent Heavy Vehicles	1				0				
Median Type		•		Undivi	ded				
RT Channelized			0					0	
Lanes	0	0 1			0	1		0	
Configuration	LT							TR	
Upstream Signal		0				0			
Minor Street		Northbound				Southbou	ind		
Movement	7	8	9		10	11		12	
	L	Т	R		L	Т		R	
Volume (veh/h)					10			10	
Peak-Hour Factor, PHF	1.00	1.00	1.00	,	0.92	1.00		0.92	
Hourly Flow Rate, HFR (veh/h)	0	0	0		10	0		10	
Percent Heavy Vehicles	0	0	0		0	0		0	
Percent Grade (%)		0				0			
Flared Approach		N				N			
Storage		0				0			
RT Channelized			0					0	
Lanes	0	0	0		0	0		0	
Configuration						LR			
Delay, Queue Length, a	nd Level of Se	rvice							
Approach	Eastbound	Westbound		Northbo	und	S	outhbound		
Movement	1	4	7	8	9	10	11	12	
Lane Configuration	LT						LR		
v (veh/h)	10						20		
C (m) (veh/h)	455	455					74		
v/c	0.02	2					0.27		
95% queue length	0.07						0.97		
Control Delay (s/veh)	13 1						70.8		
	R					1	F		
Approach Delay (s/yoh)								70.8	
Approach LOS			- <u>+</u>				F		
						F			

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	TW	O-WAY STOP	CONTR	OL SU	JMM	ARY				
General Information	General Information Analyst BMF				atio	n				
Analyst	BMF	BMF GPD Group					Wallings	Rd/Ch	estnı	ıt Blvd
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadvie	w He	eights
Date Performed	3/2/2015	•	Analys	is Year			2040 'No-	Build'		
Analysis Time Period	PM Peak	Hour								
Project Description Wa	allings Road Sa	fety & Corridor St	tudy							
East/West Street: Walli	ngs Road		North/S	South S	treet:	Chestn	ut Boulevar	d		
Intersection Orientation:	East-West		Study I	Period (hrs):	0.25				
Vehicle Volumes ar	nd Adjustme	ents								
Major Street		Eastbound					Westbound			
Movement	1	2	3			4	5			6
	L L	Т	R			L	Т			R
Volume (veh/h)		620		50		50	1360			
Peak-Hour Factor, PHF	0.88	0.92	0.92		0	0.92	0.92		0	0.86
Hourly Flow Rate, HFR (veh/h)	0	673	32			54	1478			0
Percent Heavy Vehicles	2	2		1						
Median Type					Undivided					
RT Channelized										0
Lanes	0	1	0			0	1			0
Configuration				TR LT		LT				
Upstream Signal		0					0			
Minor Street		Northbound					Southbound			
Movement	7	8	9			10	11			12
	L	Т	R			L	Т			R
Volume (veh/h)	10		10	10						
Peak-Hour Factor, PHF	0.92	1.00	0.92	0.92		.67	1.00		0	.67
Hourly Flow Rate, HFR	10	0	10		0		0			0
Percent Heavy Vehicles	0	0	0			0	0			0
Percent Grade (%)		0	-			-	0			-
Flared Approach		N					N			
Storage		0					0			
PT Channelized			0				Ŭ			0
						0	0			0
Configuration						0	0			0
Delay, Queue Length, a	Ind Level of Se			1						
Approacn Movement		vvestbound 4	7	oannov 8	ouna	9	10		ouna	12
	1	+ / T	'			5	10			12
		L1								
v (ven/n)		54		20	_					
C (m) (veh/h)		898		- //						
v/c		0.06		0.26						
95% queue length		0.19		0.93						
Control Delay (s/veh)		9.3		67.4						
LOS		A		F	Т					
Approach Delav (s/veh)				67.4				-		
Approach LOS				F			1			
				<u> </u>						

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	TW	O-WAY STOP	CONTR	OL SU	MMARY	,				
General Informatio		Site I	nforma	ation						
Analyst	BMF	BMF I GPD Group				И	/allings	Rd/Ov	erloo	k Ave
Agency/Co.	GPD Gro	ир	Jurisdi	ction		С	ity of Br	oadvie	w He	eights
Date Performed	3/2/2015	•	Analys	sis Year		2	040 'No	-Build'		-
Analysis Time Period	PM Peak	Hour								
Project Description Wa	allings Road Sa	fety & Corridor Si	tudy							
East/West Street: Walli	ngs Road		North/S	South St	reet: Ove	erlook A	venue			
Intersection Orientation:	East-West		Study I	Period (I	nrs): 0.25	5				
Vehicle Volumes ar	nd Adjustme	ents								
Major Street		Eastbound				V	Vestbou	nd		
Movement	1	2	3		4		5			6
	L	Т	R		L		Т			R
Volume (veh/h)		620	10		30		1400			
Peak-Hour Factor, PHF	0.88	0.92	0.92		0.92		0.92			0.86
Hourly Flow Rate, HFR (veh/h)	0	673	10		32		1521			0
Percent Heavy Vehicles	2	2		1						
Median Type					Undivided					
RT Channelized										0
Lanes	0	1	0		0		1			0
Configuration				TR						
Upstream Signal		0					0			
Minor Street		Northbound	-			S	Southbound			
Movement	7	8	9		10		11			12
	L	Т	R		L		Т			R
Volume (veh/h)	10		20	20						
Peak-Hour Factor, PHF	0.92	1.00	0.92		0.67		1.00		C).67
Hourly Flow Rate, HFR (veh/h)	10	0	21		0		0			0
Percent Heavy Vehicles	0	0	0		0		0			0
Percent Grade (%)		0			-		0			-
Flared Approach		N					N	T		
Storage		0	+							
	-						0			0
			0							0
Lanes	0	0	0		0		0			0
Configuration		LR								
Delay, Queue Length, a	ind Level of Se	ervice								
Approach	Eastbound	Westbound		Northbou	und		S	outhbo	ound	
Movement	1	4	7	8	9		10	1'	1	12
Lane Configuration		LT		LR						
v (veh/h)		32		31						
C (m) (veh/h)		915		113						
v/c		0.03		0.27						
95% queue length		0.11		1.03						
Control Delay (s/veh)		9.1		48.5						
108		Δ		F						
Approach Delay (aluch)		7								
Approach LCC				40.0						
Approach LOS				E						

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	TW	O-WAY STOP	CONTR	OL SI	JMN	MARY			
General Information	n		Site I	nform	natio	on			
Analvst	BMF		Interse	ection			Wallings	Rd/McCr	earv Rd
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadview	Heights
Date Performed	3/2/2015	1	Analys	is Yea	r		2040 'No-	·Build'	<u> </u>
Analysis Time Period	PM Peak	Hour							
Project Description W	allings Road Sa	fetv & Corridor Si	tudv				-		
East/West Street: Walli	ngs Road		North/S	South S	Stree	t: McCrea	ry Road		
Intersection Orientation:	East-West		Study I	Period	(hrs)	: 0.25			
Vehicle Volumes ar	nd Adjustme	ents							
Major Street		Eastbound					Westbou	nd	
Movement	1	2	3			4	5		6
	L	Т	R			L	Т		R
Volume (veh/h)	10	630					1380		80
Peak-Hour Factor, PHF	0.92	0.92	0.89			0.82	0.92		0.92
Hourly Flow Rate, HFR (veh/h)	10	684	0			0	1499		86
Percent Heavy Vehicles	1					2			
Median Type				Undiv	/idea	1			
RT Channelized			0						0
Lanes	0	1	0			0	1		0
Configuration	LT								TR
Upstream Signal		0					0		
Minor Street	Northbound Southbound					ind			
Movement	7	8	9			10	11		12
	L	Т	R			L	Т		R
Volume (veh/h)						30			50
Peak-Hour Factor, PHF	0.57	1.00	0.57			0.92	1.00		0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0			32	0		54
Percent Heavy Vehicles	4	0	4			0	0		0
Percent Grade (%)		0					0		
Flared Approach		N	1				N		
Storage	-	0					0		
PT Channelized	_		0				<u> </u>		0
			0			0			0
Configuration	0	0	0			0			0
Delay, Queue Length, a	and Level of Se								
Approach Movement	Lastbound	Vvestbound		Northbo	ound	0	10		
	1	4	1	0		9	10		12
									_
v (veh/h)	10							86	_
C (m) (veh/h)	417							80	
v/c	0.02							1.08	
95% queue length	0.07							6.07	
Control Delay (s/veh)	13.8							215.4	
LOS	В							F	
Approach Delay (s/veh)				-			ĺ	215.4	-
Approach LOS								F	

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General Inform	nation								Inte	rsect	ion Inf	ormatio	on	2	424	la la
Agency		GPD Group							Dura	ation,	h	0.25				
Analyst		BMF		Analys	is Da	te Mar 2	2, 2015		Area	a Type	;	Other		4		
Jurisdiction		City of Broadview H	leights	Time P	eriod	PM P	eak Hou	Jr	PHF	:		0.92		* *	w∳E	
Intersection		Wallings Road/Wya	tt Road	Analys	is Yea	ar 2040			Ana	lysis F	Period	1> 7:0	00			*
File Name		7. Wallings Rd_Wya	att Rd_D	Design Y	'ear 2	040 'No-	Build' Pl	M.xus				A			*	
Project Descrip	tion	Design Year 2040 1	No-Build	' PM Pe	ak H	our									4 1 4 1	14
							1				1					
Demand Inform	nation				EE	3		W	В			NB			SB	
Approach Move	ement			L	Т	R				R	L	Т	R	L	Т	R
Demand (v), ve	⊧h/h				590) 70	200	14	00		60	0	60			
Signal Informa	tion			1												
Signal Informa		Deference Dhees	0	÷		£ . 8										sta
Cycle, s	121.8	Reference Phase	Z			[•] ایک '	1 S1	7					1	S 2	3	4
Unset, s	U Vaa	Reference Point	Ena	Green	15.0	60.0	30.0	0.0)	0.0	0.0					
Uncoordinated	res Fixed	Simult. Gap E/W	On	Yellow	3.6	3.6	3.6	0.0)	0.0	0.0	_	-	Y	_	
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	2.0	2.0	10.0)	0.0	0.0		5	6	1	8
Timer Deculto			_			ГРТ		1		т	NDI		NDT	CDI		ODT
Accigned Phase	0			EDL		2	1		6		INDI	-		361	-	301
Coso Number	e			<u> </u>		2	1.0		0	2			4	<u> </u>		
Phase Duration	ase Duration, s					0.3 65.6	20.0	2	86	2			12.0 35.6	<u> </u>	-	
Change Duration	hange Period, ($Y+R_c$), s					5.6	20.		5.6	2			55.0	<u> </u>		
Max Allow Hear	hange Period, (Y+Rc), s					1.0	1 1	,	1.0	5 1			1.0			
		(α) s				/1.0	8.5		82	6			0.8			
Green Extensio	n Time	$(g_s), s$				0.0	0.0		02.	.0 1			0.0			
Phase Call Pro	hability	(ge), 3		<u> </u>		1.00	1.0	,	1.0				1.00			
Max Out Proba	bility		_			0.00	0.0	2 7	1.0				0.00	<u> </u>		
Max Out 1100a	onity					0.00	0.0	5	1.0				0.00			
Movement Gro	oup Res	ults			EB			WE	3			NB			SB	
Approach Move	ement			L	Т	R	L	Т		R	L	Т	R	L	Т	R
Assigned Move	ment				2	12	1	6			7	4	14			
Adjusted Flow F	Rate (<i>v</i>)	, veh/h			717		217	152	2			130				
Adjusted Satura	ation Flo	ow Rate (s), veh/h/ln			1828	3	1723	181	0			1671				
Queue Service	Time (g	/s), S			39.9)	6.5	80.6	3			7.8				
Cycle Queue C	learance	e Time (<i>g</i> c), s			39.9)	6.5	80.6	3			7.8				
Green Ratio (g/	/C)				0.49)	0.63	0.66	3			0.25				
Capacity (c), ve	eh/h				900		388	119	7			411				
Volume-to-Capa	acity Ra	tio (<i>X</i>)			0.79	7	0.560	1.27	1			0.317				
Available Capa	city (<i>c</i> a),	, veh/h			900		388	119	7			411				
Back of Queue	(Q), veł	n/In (50th percentile)			17.8	3	2.8	72.3	3			3.2				
Queue Storage	Ratio (RQ) (50th percentile)		0.00)	0.73	0.00)			0.00				
Uniform Delay	(<i>d</i> 1), s/ve	eh			25.8	3	19.8	20.6	3			37.5				
Incremental De	lay (<i>d</i> 2),	s/veh			4.7		1.1	128.	6			0.2				
Initial Queue De	elay (<i>d</i> ₃)	, s/veh			0.0		0.0	0.0				0.0				
Control Delay (d), s/veł	ו			30.5	5	20.9	149.	2			37.7				
Level of Service	e (LOS)				С		С	F				D				
Approach Delay	Approach Delay, s/veh / LOS			30.5		С	133.	.1	F		37.7	7	D	0.0		
Intersection De	ntersection Delay, s/veh / LOS					9	9.9							F		
Multimodal Re	sults	(1.00			EB			WE	3			NB			SB	
Pedestrian LOS	Score	/ LOS														
Bicycle LOS Sc	core / LC	05														

	тw	O-WAY STOP	CONTR	OL SL	JMM	ARY				
General Information	า		Site I	nform	ation	1				
Analyst	BMF		Interse	ection			Wallings I	Rd/Maje	stic O	aks
Agency/Co.	GPD Gro	ир	luriodi	otion			ll City of Pr	adviou	Hojak	to
Date Performed	3/2/2015				r		2040 100	Build'	neigi	115
Analysis Time Period	PM Peak	Hour		515 1 Cal			2040 110-	Dulla		
Project Description Wa	allings Road Sa	fety & Corridor St	udy							
East/West Street: Walli	ngs Road	-	North/S	South S	treet:	Majestic	: Oaks Trail			
Intersection Orientation:	East-West		Study I	Period ((hrs):	0.25				
Vehicle Volumes ar	nd Adjustme	nts								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5		6	
	L	Т	R			L	Т		R	
Volume (veh/h)	10	640					1590		10	
Peak-Hour Factor, PHF	0.92	0.92	0.89	<u> </u>	0.	.82	0.92		0.92	2
Hourly Flow Rate, HFR (veh/h)	10	695	0			0	1728		10	
Percent Heavy Vehicles	1					2				
Median Type				Undiv	vided					
RT Channelized			0						0	
Lanes	0	1	0			0	1		0	
Configuration	LT								TR	·
Upstream Signal		0					0			
Minor Street		Northbound					Southbou	ind		
Movement	7	8	9			10	11		12	2
	L	Т	R			L	Т		R	
Volume (veh/h)					-	10			10	
Peak-Hour Factor, PHF	0.57	1.00	0.57	· 1	0.	.92	1.00		0.92	2
Hourly Flow Rate, HFR (veh/h)	0	0	0		-	10	0		10	
Percent Heavy Vehicles	4	0	4			0	0		0	
Percent Grade (%)		0				-	0		-	
Flared Approach		N					N			
Storage		0					0			
PT Channelized			0				<u> </u>		0	
	0	0	0			0	0		0	
Configuration	0	0	- ·			0	IR		0	
Dolay Quous Longth										
Approach	Eastbound	Westbound		Northbo	hund			outhhou	nd	
Approach Movement			7			0	10	11		12
Novement		4	1	0		9	10			12
									_	
v (ven/n)	10			 				20		
C (m) (veh/h)	364			<u> </u>				52		
v/c	0.03							0.38		
95% queue length	0.08							1.39		
Control Delay (s/veh)	15.2							112.3		
LOS	С							F		
Approach Delay (s/veh)								112.3		
Approach LOS							F			
							-			

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	TW	O-WAY STOP	CONTR		JMN	IARY				
General Informatio	า		Site Ir	nform	atio	on				
Analyst	BMF		Interse	ection			Wallings	Rd/Cre	eksi	de Trce
Agency/Co.	GPD Grou	ıp	Jurisdi	ction			City of Br	oadvie	w He	ights
Date Performed	3/2/2015		Analys	is Year	-		2040 'No-	-Build'		
Analysis Time Period	PM Peak	Hour								
Project Description Wa	allings Road Saf	ety & Corridor St	udy							
East/West Street: Walling	ngs Road		North/S	South S	tree	t: Creeksi	de Terrace			
Intersection Orientation:	East-West		Study F	Period ((hrs)	: 0.25				
Vehicle Volumes ar	nd Adjustmei	nts								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5			6
	L	T	R			L	T (500			R
Volume (ven/n)	0.90	640	10			10	1580			76
Peak-Hour Factor, PHF	0.80	0.92	0.92			0.92	0.92		0	.70
(veh/h)	0	695	10			10	1717			0
Percent Heavy Vehicles	2					1				
Median Type		-		Undiv	ridea					
RT Channelized		0							0	
Lanes	0	1	0			0	1			0
Configuration			TR			LT				
Upstream Signal		0					0			
Minor Street		Northbound					Southbound			
Movement	7	8	9			10	11			12
	L	Т	R			L	Т			R
Volume (veh/h)	20		10							
Peak-Hour Factor, PHF	0.92	1.00	0.92			0.70	1.00		0	0.70
Hourly Flow Rate, HFR (veh/h)	21	0	10			0	0			0
Percent Heavy Vehicles	5	0	5			0	0			0
Percent Grade (%)		0	•				0			
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0							0
Lanes	0	0	0			0	0			0
Configuration		LR								
Delay, Queue Length, a	nd Level of Sei	vice	•				•			
Approach	Eastbound	Westbound	1	Northbo	ound		S	outhbo	ound	
Movement	1	4	7	8		9	10	1'	1	12
Lane Configuration		LT		LR						
v (veh/h)		10		31						
C (m) (veh/h)		898		48						
v/c		0.01		0.65	5					
95% queue length		0.03		2.51	1					
Control Delay (s/veh)		9.1		168	1					
		<u> </u>		F	•					
Approach Delay (s/ych)				162	1					
Approach LOC				- 100. -	I					
Approach LOS				-						

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	тw	O-WAY STOP	CONTR	OL SUM	MARY			
General Informatio	า		Site I	nformati	ion			
Analyst	BMF		Interse	ection		Wallings I Rd/Firebo	Rd/Joyce	
Agency/Co.	GPD Gro	ир	Jurisdi	ction		City of Br	oadview l	leiahts
Date Performed	3/2/2015		Analys	is Year		2040 'No-	Build'	loiginto
Analysis Time Period	PM Peak	Hour						
Project Description Wa	allings Road Sa	fety & Corridor St	udy					
East/West Street: Walling	ngs Road		North/S	South Stre	et: Joyce F	Road/Fireho	use	
Intersection Orientation:	East-West		Study F	Period (hrs	s): 0.25			
Vehicle Volumes ar	nd Adjustme	nts						
Major Street		Eastbound				Westbou	nd	
Movement	1	2	3		4	5		6
	L	Т	R		L	Т		R
Volume (veh/h)	10	630	10		10	1570		10
Peak-Hour Factor, PHF	0.92	0.92	0.92		0.92	0.92		0.92
(veh/h)	10	684	10		10	1706		10
Percent Heavy Vehicles	1				1			
Median Type				Undivide	d			
RT Channelized			0					0
Lanes	0	1	0		0	1		0
Configuration	LTR				LTR			
Upstream Signal		0				0		
Minor Street		Northbound	<u>.</u>			Southbou	Ind	
Movement	7	8	9		10	11		12
	L	Т	R		L	Т		R
Volume (veh/h)	10	10	10		10	10		10
Peak-Hour Factor, PHF	0.92	0.92	0.92		0.92	0.92		0.92
Hourly Flow Rate, HFR (veh/h)	10	10	10		10	10		10
Percent Heavy Vehicles	0	0	0		0	0		0
Percent Grade (%)		0				0	-	
Flared Approach		N				N		
Storage		0				0		
RT Channelized			0					0
Lanes	0	1	0		0	1		0
Configuration		LTR				LTR		
Delay, Queue Length, a	nd Level of Se	rvice						
Approach	Eastbound	Westbound	I	Northboun	d	S	outhbour	d
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (veh/h)	10	10		30			30	
C (m) (veh/h)	372	906						
v/c	0.03	0.01						
95% queue lenath	0.08	0.03						
Control Delay (s/veh)	14 9	90						
	R	<u></u>				+		
LOU Approach Doloy (a/yah)	U	~						1
Approach LOS								
Approach LOS								

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	тw	O-WAY STOP	CONTRO	DL SI	JMN	IARY				
General Information			Site Ir	nform	atio	on				
Analyst	BMF		Interse	ction			Wallings	Rd/Ma	riann	a Blvd
Agency/Co.	GPD Grou	ıp	Jurisdi	ction			City of Br	oadvie	w He	ights
Date Performed	3/2/2015		Analys	is Year	r		2040 'No-	·Build'		
Analysis Time Period	PM Peak I	Hour								
Project Description Wal	llings Road Saf	ety & Corridor Stu	ıdy							
East/West Street: Walling	gs Road		North/S	South S	Stree	t: <i>Mariann</i>	a Boulevar	d		
Intersection Orientation:	East-West		Study F	Period ((hrs)	: 0.25				
Vehicle Volumes and	d Adjustmer	าts								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5			6
	L	T	R			L	T (500			R
Volume (ven/n)	0.00	640	10			10	1580			70
Peak-Hour Factor, PHF	0.80	0.92	0.92			0.92	0.92		0	0.70
(veh/h)	0	695	10			10	1717			0
Percent Heavy Vehicles	2					1				
Median Type		-		Undiv	videa	1				
RT Channelized			0							0
Lanes	0	1	0			0	1			0
Configuration			TR			LT				
Upstream Signal		0					0			
Minor Street		Northbound					Southbound			
Movement	7	8	9			10	11			12
	L	Т	R			L	Т			R
Volume (veh/h)	10		10							
Peak-Hour Factor, PHF	0.92	1.00	0.92			0.70	1.00		C	0.70
Hourly Flow Rate, HFR (veh/h)	10	0	10			0	0			0
Percent Heavy Vehicles	0	0	0			0	0			0
Percent Grade (%)		0	•				0			
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0							0
Lanes	0	0	0			0	0			0
Configuration		LR								
Delay, Queue Length, an	nd Level of Ser	vice								
Approach	Eastbound	Westbound	1	Vorthbo	ound		S	outhbo	ound	
Movement	1	4	7	8		9	10	11	1	12
Lane Configuration		LT		LR						
v (veh/h)		10		20						
C (m) (veh/h)		898		65						
v/c		0.01		0.31	1					
95% queue length		0.03		1.11	1					
Control Delay (s/veh)		9.1		83.3	3					
LOS		А		F						
Approach Delay (s/veh)				83.3	3					
Approach LOS				F						

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			Ū								,					
General Inform	nation								Int	tersect	ion Inf	ormati	on		4241	bi lu
Agency		GPD Group							Du	uration,	h	0.25			*	
Analyst		BMF		Analys	is Date	Mar 2	2015		Are	ea Typ	e	Othe		4		۲. ۲.
Jurisdiction		City of Broadview H	leights	Time F	eriod	PM Pe	eak Hou	ır	P⊢	HF		0.92			w ‡ e	, <u>≻</u> ∕_
Intersection		Wallings Road/Wrig	ht Roac	Analys	is Yea	· 2040			An	alysis	Period	1>7:	00			*
File Name		12. Wallings Rd Wr	right Rd	Design	Year	2040 'No	-Build'	PM.x	us	•					-	4
Project Descrip	tion	Design Year 2040 'N	No-Build	l' PM Pe	ak Ho	ur									4 1 4 9 1	
							1				14					
Demand Inform	nation				EB			W	/B	1		NB			SB	1
Approach Move	ement			L	Т	R	L		Г	R	L	Т	R	L	Т	R
Demand (v), ve	h/h			10	630	10	20	15	50	30	20	10	10	20	10	20
Signal Informa	tion			1	1	5										
	08.4	Reference Phase	2	-			3642	8						X	-	<u>ሉ</u>
Offset s	0	Reference Point	End					7					1	Y 2	3	4
Uncoordinated	Ves	Simult Gan E/W	On	Green	15.0	47.0	20.0	0.0	0	0.0	0.0	_	_	ð-		
Force Mode	Fixed	Simult Gap N/S	On	Red	3.0	2.0	3.2	0.0) า	0.0	0.0		5	6	7	Y
	Плоа		On	Indu	2.0	2.0	2.0	0.0	5	0.0	0.0					•
Timer Results				EBL		EBT	WB	L	W	VBT	NBI	_	NBT	SBI	_	SBT
Assigned Phase	Э			5		2	1			6			8			4
Case Number	ase Number			1.1		4.0	1.1	\rightarrow	4	4.0			8.0			8.0
Phase Duration	hase Duration, s			20.6		52.6	20.6	3	5	2.6			25.2			25.2
Change Period	hange Period, $(Y+R_c)$, s			5.6		5.6	5.6		5	5.6			5.2			5.2
Max Allow Head	fax Allow Headway (MAH), s			3.1		6.0	3.1		6	6.0			4.3			4.3
Queue Clearan	Queue Clearance Time (g_s), s			2.2		32.8	2.5		49	9.0			4.0			4.6
Green Extensio	n Time	(<i>g</i> _e), s		0.0		14.1	0.0	·	0	0.0			0.2			0.2
Phase Call Pro	oability			1.00		1.00	1.00)	1.	.00			1.00			1.00
Max Out Proba	bility			0.00		0.99	0.00)	1.	.00			0.00			0.00
No.					50			14/5	`						00	
Movement Gro	oup Res	ults			EB	D			3	Р	1		D		5B T	B
Approach Move	mont			L 5	1 0	10	L - 4		+	п 16	L 2	0	10		1	<u>п</u>
Adjusted Flow		voh/h		- 5	2	12	1	171	7	10	3	0	10		4 54	14
Adjusted Flow I	tion Ele	, ven/n w Rate (c) veh/h/ln		1774	1858		1740	182	1			15/0			1530	
	Time (a			02	30.8		0.5	47 (_		0.0			0.0	
	learance	Time (a_2) s		0.2	30.8		0.5	47 (2.0			2.6	
Green Batio (a)	$\langle C \rangle$			0.2	0.48		0.63	0.4	8	_		0.20			0.20	
Capacity (c), ve	h/h			344	887		444	870	2			370			364	
Volume-to-Cap	acitv Ra	tio (<i>X</i>)	_	0.032	0.784		0.049	1.97	'5	_		0.118			0.149	
Available Capa	city (<i>C</i> a).	veh/h		344	887		444	870)			370			364	
Back of Queue	(<i>Q</i>), veł	n/In (50th percentile)	_	0.1	13.7		0.2	125.	.5			0.9			1.1	
Queue Storage	Ratio (I	RQ) (50th percentile)	0.03	0.00		0.05	0.0	0			0.00			0.00	
Uniform Delay ((d1), s/ve	eh		18.0	21.5		12.4	25.	7			32.0	1		32.3	
Incremental De	lay (<i>d</i> 2),	s/veh		0.0	5.4		0.0	442.	.8			0.1			0.2	
Initial Queue De	elay (d3)	, s/veh		0.0	0.0		0.0	0.0)			0.0			0.0	
Control Delay (d), s/veł	ו ו		18.0	26.8		12.5	468.	.5			32.2			32.4	
Level of Service	e (LOS)			В	С		В	F				С			С	
Approach Delay	/, s/veh	/ LOS		26.7		С	462.	8		F	32.2	2	С	32.4		С
Intersection De	lay, s/ve	h / LOS				32	5.1							F		
Multimodal Re	sults				EB			WE	3			NB			SB	
Pedestrian LOS	Score	/ LOS														
Bicycle LOS Sc	ore / LC	DS														

	TW	O-WAY STOP	CONTR	OL SI	JMN	MARY				
General Information	n		Site I	nform	atio	on				
Analyst	BMF		Interse	ection			Wallings	Rd/Cra	aia Li	1
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadvie	w He	eights
Date Performed	3/2/2015		Analys	is Yea	r		2040 'No-	Build'		
Analysis Time Period	PM Peak	Hour								
Project Description W	allings Road Sa	fetv & Corridor Si	tudv							
East/West Street: Walli	ngs Road		North/S	South S	Stree	t: Craig L	ane			
Intersection Orientation:	East-West		Study I	Period	(hrs)	: 0.25				
Vehicle Volumes ar	nd Adjustme	ents								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5			6
	L	Т	R			L	Т			R
Volume (veh/h)		650	10			10	1590			
Peak-Hour Factor, PHF	0.80	0.92	0.92			0.92	0.92		0	0.76
Hourly Flow Rate, HFR (veh/h)	0	706	10			10	1728			0
Percent Heavy Vehicles	2					3				
Median Type				Undiv	videa	1				
RT Channelized			0							0
Lanes	0	1	0			0	1			0
Configuration			TR			LT				
Upstream Signal		0					0			
Minor Street		Northbound	-				Southbou	ind		
Movement	7	8	9			10	11			12
	L	Т	R			L	Т			R
Volume (veh/h)	10		10							
Peak-Hour Factor, PHF	0.92	1.00	0.92			0.70	1.00		0	.70
Hourly Flow Rate, HFR (veh/h)	10	0	10			0	0			0
Percent Heavy Vehicles	7	0	7			0	0			0
Percent Grade (%)		0				-	0			-
Flared Approach		N					N			
Storage		0					0			
DT Channelized	-		0							0
			0			0	0			0
Lanes	0		0			0	0			0
Delay, Queue Length, a	ind Level of Se									
Approach	Eastbound	VVestbound		Northbo	ound		S 40	outhbo	ound	40
	1	4	/	8		9	10	1	I	12
		LI								
v (veh/h)		10		20						
C (m) (veh/h)		880		60						
v/c		0.01		0.33	3					
95% queue length		0.03		1.21	1					
Control Delay (s/veh)		9.1		92.5	5					
LOS		A		F						
Approach Delay (s/veh)				92.5	5					
Approach LOS				F						

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	TW	O-WAY STOP	CONTR	OL SU	MMARY			
General Informatio	n		Site I	nforma	tion			
Analyst	BMF		Interse	ection		Wallings	Rd/Skyline	Dr
Agency/Co.	GPD Gro	ир	Jurisdi	iction		City of Br	oadview He	eights
Date Performed	3/2/2015	•	Analys	sis Year		2040 'No	-Build'	-
Analysis Time Period	PM Peak	Hour						
Project Description W	allings Road Sa	fety & Corridor St	tudy					
East/West Street: Walli	ngs Road		North/S	South St	reet: Skylin	e Drive		
Intersection Orientation:	East-West		Study I	Period (h	nrs): 0.25			
Vehicle Volumes aı	nd Adjustme	ents						
Major Street		Eastbound				Westbou	nd	
Movement	1	2	3		4	5		6
	L	Т	R		L	Т		R
Volume (veh/h)	10	650				1590		10
Peak-Hour Factor, PHF	0.92	0.92	0.81		0.78	0.92	0	.92
Hourly Flow Rate, HFR (veh/h)	10	706	0		0	1728		10
Percent Heavy Vehicles	1				3			
Median Type		•		Undivid	ded	-		
RT Channelized			0					0
Lanes	0	1	0		0	1		0
Configuration	LT		-		-			TR
Upstream Signal		0				0		
Minor Street	Northbound Southbound						Ind	
Movement	7	8	9		10	11		12
		Т	R		1	т		R
Volume (veh/h)		- <u> </u>			10	· · ·		10
Peak-Hour Factor, PHF	0.63	1.00	0.63	2	0.92	1.00	(.92
Hourly Flow Rate, HFR	0	0	0		10	0		10
(Ven/n) Percent Heavy Vehicles	7	0	7		1	0		1
Percent Crade (0()	/		1		4			4
			1					
Flared Approach	_	N				N		
Storage		0				0		
RT Channelized			0					0
Lanes	0	0	0		0	0		0
Configuration						LR		
Delay, Queue Length, a	and Level of Se	ervice						
Approach	Eastbound	Westbound	l	Northbou	und	S	outhbound	
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	10						20	
C (m) (veh/h)	364						49	
v/c	0.03						0.41	
95% queue length	0.08						1.47	
Control Doloy (alyah)	15 2					+	100.0	
	13.2				_		122.0	
	C	ļ					<i>F</i>	
Approach Delay (s/veh)						4	122.0	
Approach LOS							F	

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	TW	O-WAY STOP	CONTR	OL SI	UMI	MARY				
General Information	n		Site I	nform	natio	on				
Analyst	BMF		Interse	ection			Wallings	Rd/Skv	line	Dr
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadvie	w He	ights
Date Performed	3/2/2015	•	Analys	sis Yea	r		2040 'No-	Build'		-
Analysis Time Period	PM Peak	Hour								
Project Description W	allings Road Sa	fety & Corridor St	tudy							
East/West Street: Walli	ngs Road		North/S	South S	Stree	t: West M	lill Road			
Intersection Orientation:	East-West		Study I	Period	(hrs)	: 0.25				
Vehicle Volumes ar	nd Adjustme	nts								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5			6
	L	Т	R			L	Т			R
Volume (veh/h)		650	10			10	1590			
Peak-Hour Factor, PHF	0.80	0.92	0.92	·		0.92	0.92		0	.63
Hourly Flow Rate, HFR (veh/h)	0	706	10			10	1728			0
Percent Heavy Vehicles	1					3				
Median Type				Undiv	/idec	1				
RT Channelized			0							0
Lanes	0	1	0			0	1			0
Configuration			TR			LT				
Upstream Signal	0						0			
Minor Street						Southbou	Ind			
Movement	7	8	9			10	11			12
	L	Т	R			L	Т			R
Volume (veh/h)	10		10							
Peak-Hour Factor, PHF	0.92	1.00	0.92			0.79	1.00		0	.79
Hourly Flow Rate, HFR (veh/h)	10	0	10			0	о			0
Percent Heavy Vehicles	2	0	2			4	0			4
Percent Grade (%)		0					0			
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0							0
Lanes	0	0	0			0	0			0
Configuration		LR				-				-
Delay, Queue Length, a	nd Level of Se	ervice								
Approach	Eastbound	Westbound	1	Northb	ound		S	outhbo	und	
Movement	1	4	7	8		9	10	11		12
Lane Configuration		IT		IR		-				
v (veh/h)		10		20					-	
(vch/h)		800		62					-	
		0.01		03	<u>,</u>				\dashv	
V/C		0.01		0.3	2				\rightarrow	
95% queue length		0.03		1.1	5				\rightarrow	
Control Delay (s/veh)		9.1		86.1	7		ļ		$ \longrightarrow $	
LOS		A		F						
Approach Delay (s/veh)				86.	7					
Approach LOS				F						

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General Inform	nation	0.5.5.0							Inters	secti	on Info	ormatic	on			PA 14
Agency		GPD Group							Durati	ion,	h	0.25				×
Analyst		BMF		Analys	is Date	Mar 2,	2015		Area ⁻	Туре)	Other		_ <u>→</u>		*
Jurisdiction		City of Broadview H	leights	Time F	eriod	PM Pe	eak Hou	r	PHF			0.92		* *	w‡e s	∳ →
Intersection		Wallings Road / I-77	7 SB	Analys	is Year	2040			Analy	'sis F	Period	1> 7:0	00			ም ም
File Name		16. Wallings Rd_I-7	7 SB_D	esign Y	ear 204	10 'No-B	uild' PM	.xus								
Project Descrip	tion	Design Year 2040 'N	No-Build	' PM Pe	ak Ho	Jr								1	41471	1
P					50		1				1			1	0.0	
Demand Inform	nation				EB		<u> </u>	VV	. Г	_	<u> </u>	NB		<u> </u>	SB	
Approach Move	ement			<u> </u>	1	R	L 70			ĸ			R	L		R
Demand (v), ve	n/n				530	130	70	59	0					300	10	1010
Signal Informa	tion					T JIL										
	90.0	Reference Phase	2	e	Lé									_		
Offset s	0	Reference Point	End		Fi i								1	Y 2	3	4
Uncoordinated	Voc	Simult Gap E/W	On	Green	54.5	24.5	0.0	0.0) 0).0	0.0	_		~~		\mathbf{L}
Earce Mode	Fixed	Simult Gap N/S	On	Pellow	3.6	3.0	0.0	0.0).0	0.0	_	5	× 6	7	< ↓ ⁸
	Tixed	Simult. Cap N/S	OII	Tieu	1.5	2.5	0.0	0.0		.0	0.0		3	0		0
Timer Results			_	FBI		FBT	WRI		WRT	r I	NRI		NBT	SBI		SBT
Assigned Phase	<u>ــــــ</u>				-	2		-	6							8
Case Number	0					8.0			80							10.0
Phase Duration	hase Duration, s					60.0			60.0							30.0
Change Boried	hase Duration, s hange Period, $(Y+R_c)$, s					5.5			5.5							55.0
	hange Period, (Y+Rc), s					2.2			0.0	+						1.2
	Max Allow Headway (<i>MAH</i>), s			<u> </u>		2.2			2.2					<u> </u>	\rightarrow	4.5
Green Extensio	n Time	$(g_s), s$		<u> </u>		1.0			40.0					<u> </u>		20.5
Bhase Cell Bro	hobility	(<i>ge</i>), S		<u> </u>		1.2			1.0						\rightarrow	1.00
Max Out Droke						1.00			0.15							1.00
Max Out Proba	Dility					0.00			0.15							1.00
Movement Gro	oup Res	ults			EB			WE	}			NB			SB	
Approach Move	ement			L	Т	R	L	Т	R	{	L	Т	R	L	Т	R
Assigned Move	ment				2	12	1	6						3	8	18
Adjusted Flow I	Rate (v).	, veh/h			717			717						326	1109	
Adjusted Satura	ation Flo	w Rate (<i>s</i>), veh/h/ln			1817			1314	1					1740	1551	
Queue Service	Time (a	s). S			23.2			22.8	3					15.1	24.5	
Cvcle Queue C	learance	e Time (<i>a</i> c). s			23.2			46.0)					15.1	24.5	
Green Ratio (a/	(C)				0.61			0.61						0.27	0.27	
Capacity (c), ve	eh/h				1100			840						474	422	
Volume-to-Cap	acitv Ra	tio (<i>X</i>)			0.652			0.85	4					0.688	2.627	
Available Capa	city (<i>Ca</i>).	veh/h			1100			840						474	422	
Back of Queue	(<i>Q</i>), veh	n/In (50th percentile)			8.3			13.9)					6.6	95.4	
Queue Storage	Ratio (RQ) (50th percentile)		0.00			0.00)					0.00	0.00	
Uniform Delay	(d1), s/ve	əh			11.6			16.4	1					29.3	32.8	
Incremental De	lay (d2).	s/veh			1.1			8.2						4.2	738.8	
Initial Queue De	elav (d3)	, s/veh			0.0			0.0						0.0	0.0	
Control Delay (d), s/veł	1			12.7			24.6	3					33.5	771.5	
Level of Service	e (LOS)				B			С	1					С	F	
Approach Delay	v, s/veh	/ LOS		12.7	_	В	24.6		С		0.0		1	603.	8	F
Intersection De	lay, s/ve	h / LOS				31	1.2							F		
	,			1												
Multimodal Re	sults				EB			WE	3			NB			SB	
Pedestrian LOS	Score	/ LOS														
Bicycle LOS Sc	ore / LC	DS														

		100 20		gnan	2001			me	ounto c	Jamm	ary				
General Inform	nation								Intersec	tion Inf	ormatio	on	4	4 J 40 1	Ja La
Agency		GPD Group							Duration	. h	0.25				
Analyst		BMF		Analys	is Date	e Mar 2.	2015		Area Tvi	., 	Other		4		₹
Jurisdiction		City of Broadview H	eiahts	Time F	Period	PM Pe	ak Hou	r	PHF		0.92		⇒ - \$	wļe	
Intersection		Wallings Road/I-77	NB/Mill	Analys	is Yea	r 2040	annieu		Analysis	Period	1>7:	00			→ 7
File Name		17. Wallings Rd I-7	7 NB N	1ill Rd [Desian	Year 204	40 'No-E	Build'	PM.xus					.	
Project Descrip	tion	Design Year 2040 'N	No-Build	' PM Pe	ak Ho	ur								<u>ነ</u> 1141	1 M
-,	-					-							-1		
Demand Inform	nation				EB			W	'B		NB			SB	
Approach Move	ement			L	Т	R	L	Т	R	L	Т	R	L	Т	R
Demand (v), ve	h/h			270	410	150	10	20	0 140	460	80	70			
				1	1		-								
Signal Informa	tion	r1			a	a 🗧							_		-+-
Cycle, s	90.0	Reference Phase	2		R	R	517	7				1		3	
Offset, s	0	Reference Point	End	Green	0.0	59.7	19.7	0.0	0.0	0.0			ĸ		•
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	4.0	3.6	3.0	0.0	0.0	0.0		~			
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.9	1.7	2.3	0.0	0.0	0.0		5	6	7	8
Timer Results				EBL	-	EBT	WBI	-	WBT	NB		NBT	SBL	-	SBT
Assigned Phase	Э			5		2			6	<u> </u>		4			
Case Number				0.0		14.0			8.3			12.0			
Phase Duration	ase Duration, s ange Period, (<i>Y+Rc</i>), s			0.0		65.0			65.0	<u> </u>		25.0			
Change Period,	ange Period, (Y+Rc), s			6.9		5.3			5.3			5.3			
Max Allow Head	ax Allow Headway (<i>MAH</i>), s			0.0		2.4		_	2.4	<u> </u>		5.3			
Queue Clearan	Queue Clearance Time (g_s) , s					46.9			10.4	<u> </u>		21.7			
Green Extensio	n lime	(<i>g</i> e), s		0.0		1.4			1.3	<u> </u>		0.0			
Phase Call Prot	bability					1.00			1.00	<u> </u>		1.00			
Max Out Probal	bility					0.01			0.06			1.00			
Movement Gro	oup Res	ults			EB			WE	3		NB			SB	
Approach Move	ement			L	Т	R	L	Т	R	L	Т	R	L	Т	R
Assigned Move	ment			5	2	12	1	6	16	7	4	14			
Adjusted Flow F	Rate (v).	, veh/h	_		902			380)		663				
Adjusted Satura	ation Flo	w Rate (s), veh/h/ln			1461			174	6		1743				
Queue Service	Time (g	/s), S			6.0			0.0	-		19.7				
Cycle Queue C	learance	e Time (<i>g</i> c), s			44.9			8.4			19.7				
Green Ratio (g/	(C)				0.66			0.66	3		0.22				
Capacity (c), ve	h/h				1024			119	9		382				
Volume-to-Capa	acity Ra	tio (X)			0.881			0.31	7		1.738	1			
Available Capa	city (<i>c</i> a),	veh/h			1024			119	9		382				
Back of Queue	(<i>Q</i>), veł	n/In (50th percentile)			14.6			2.6	-		44.6				
Queue Storage	Ratio (RQ) (50th percentile))		0.00			0.00)		0.00				
Uniform Delay ((d1), s/ve	əh			12.9			6.5			35.2				
Incremental De	lay (<i>d2</i>),	s/veh			8.7			0.1			342.8				
Initial Queue De	elay (<i>d</i> 3)	, s/veh			0.0			0.0			0.0				
Control Delay (d), s/veł	1			21.6			6.6			378.0				
Level of Service	e (LOS)				С			Α			F				
Approach Delay	, s/veh	/ LOS		21.6		С	6.6		А	378.	0	F	0.0		
Intersection Del	lay, s/ve	h / LOS				14	0.1						F		
Multimodal Re	sults				EB			WE	3		NB			SB	
Pedestrian LOS	Score	/ LOS													
Bicycle LOS Sc	ore / LC	DS													

DESIGN YEAR 2040 'BUILD' CONDITIONS

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General Inform	nation									Inte	ersect	ion Infe	ormati	on	4	4441	s L
Agency		GPD Group								Dur	ration,	h	0.25		┨_┛┛	444	
Analyst		BMF		Analys	is Da	ate	Mar 2,	2015		Are	а Тур	e	Othe	r	4		
Jurisdiction		City of Broadview H	leights	Time F	erio	k	AM Pe	ak Hou	r	PH	F		0.92			w ↓ E	
Intersection	ral Information GPD Group St BMF City of Broadview Hei ection Vallings Road/Broadviane Interview Wallings Road/Broadview Hei Interview Wallings Road/Broadview Hei Interview Wallings Road/Broadview Hei Interview Wallings Road/Broadview Hei Interview Hei Interview Wallings Road/Broadview Hei Interview Wallings Road/Broadview Hei Interview Wali		dview F	Analys	is Ye	ar	2040			Ana	alysis	Period	1>7:	00			
File Name		1. Wallings Rd_Broa	adview	Rd_Des	ign Y	′ear	2040 '	Build' A	M.xu	s	-					ካተቱ	
Project Descrip	tion	Design Year 2040 'E	Build' Al	/ Peak	Hour											* 1 4 1 1	* (*
				-				1				v					
Demand Inform	nation				E	3			W	'B			NB			SB	
Approach Move	ement			L	Т		R	L			R	L	Т	R	L	Т	R
Demand (v), ve	h/h			350	62	0	80	90	22	20	90	60	620	420	80	210	90
0				li -	1			1	l		3	Ĩ					
Signal Informa	tion		-	e	1 5	N I	215		43	÷						~	\rightarrow
Cycle, s	140.0	Reference Phase	2		5		_≌1?		B	E					2	3	4
Offset, s	0	Reference Point	End	Green	5.0		49.1	5.0	58	.5	0.0	0.0					
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	3.6		3.6	3.6	3.6	3	0.0	0.0	_ `		$\mathbf{\Psi}$	<u> </u>	\mathbf{A}
Force Mode	Fixed	Simult. Gap N/S	On	Red 2.0 2.0 2.0 2.0 0.0 0.0			5	6	7	¥ 8							
Timer Deculto			_				DT			14/	DT			NDT			ODT
Assigned Deser	-			EBL	-	-	BI	7		VV	BI			NB1	SBL	-	<u>0000000000000000000000000000000000000</u>
Assigned Phase	8			3		4	0	/		4	+			0			2
Case Number				1.1		4	.U 4 1	1.1		3.	.0	1.1		4.0	1.1		4.0
Change Duration	ange Period, $(Y+R_c)$, s			56 5		5	+. 1	10.6		5	F. I	5.6)	54.7	10.0		56
Max Allow Hoor	nge Period, (<i>Y+Rc</i>), s Allow Headway (<i>MAH</i>), s			5.0		0	1	0.0 4 1		<u>ن</u>	.0	3.0		0.0	5.0	_	0.0 4.2
	ax Allow Headway (<i>MAH</i>), s leue Clearance Time (<i>gs</i>), s			4.1		4	 	6.5		4.	. 1	4.3		4.3	4.3		4.3
Groop Extensio	Leve Clearance Time (g_s) , s een Extension Time (a_e) s			7.0		0	9.3	0.0		5	F. I -1	0.0		40.0	0.4		77
Phase Call Pro	hability	(<i>ge</i>), s		1.00		1	00	1.00		1 (. 1	1.00		1.00	1.00		1.00
Max Out Proba	bility			1.00		1.	.00	1.00	,	0.0	00	1.00	, ,	1.00	1.00		1.00
	onity			1.00			.00	1.00	,	0.0	00	1.00	,	1.00	1.00		0.00
Movement Gro	oup Res	ults			EE	3			WE	3			NB			SB	
Approach Move	ement			L	Т		R	L	Т		R	L	Т	R	L	Т	R
Assigned Move	ment			3	8		18	7	4		14	1	6	16	5	2	12
Adjusted Flow F	Rate (v)	, veh/h		380	761	1		98	239)	98	65	605	525	87	168	158
Adjusted Satura	ation Flo	w Rate (s), veh/h/ln		1792	184	3		1757	184	5 1	1563	1774	1863	1611	1774	1900	1710
Queue Service	Time (g	/s), S		5.0	57.3	3		4.5	12.	1	5.4	3.3	43.7	44.0	4.4	8.8	9.3
Cycle Queue C	learance	e Time (<i>g</i> c), s		5.0	57.3	3		4.5	12.	1	5.4	3.3	43.7	44.0	4.4	8.8	9.3
Green Ratio (g/	(C)			0.45	0.42	2		0.45	0.42	2 (0.42	0.39	0.35	0.35	0.39	0.35	0.35
Capacity (c), ve	eh/h			479	770)		114	771		653	398	653	565	126	666	600
Volume-to-Capa	acity Ra	tio (<i>X</i>)		0.794	0.98	88		0.857	0.31	0 0).150	0.164	0.926	0.930	0.691	0.252	0.264
Available Capa	city (<i>c</i> a),	veh/h		479	770)		114	771		653	398	653	565	126	666	600
Back of Queue	(<i>Q</i>), veł	n/In (50th percentile)		10.8	31.0	6		3.3	5.4		2.1	1.5	23.8	21.1	3.7	4.2	4.0
Queue Storage	Ratio (RQ) (50th percentile)	0.73	0.0	0		0.21	0.0) (0.16	0.16	0.00	0.00	0.37	0.00	0.00
Uniform Delay ((<i>d</i> 1), s/ve	əh		39.1	40.4	4		34.4	27.3	3 2	25.3	27.8	43.7	43.8	36.1	32.4	32.5
Incremental De	lay (<i>d2</i>),	s/veh		9.0	29.3	3		43.6	0.2		0.1	0.2	19.4	22.1	14.9	0.2	0.2
Initial Queue De	elay (<i>d</i> 3)	, s/veh		0.0	0.0)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veł	1		48.0	69.	7		78.0	27.	5 2	25.4	28.0	63.1	65.9	51.0	32.6	32.8
Level of Service	e (LOS)			D	Е			Е	С		С	С	E	E	D	С	С
Approach Delay	, s/veh	/ LOS		62.5			E	38.4		C	2	62.4		Е	36.5		D
Intersection De	lay, s/ve	h / LOS					55	.8							E		
Multimodal Re	sults	// 00			EE	3			WE	3			NB			SB	
Pedestrian LOS	Score	/ LOS															
Bicycle LOS Sc	ore / LC	DS															

				5							,				
General Inform	eneral Information gency GPD Group nalyst BMF								Interse	ction In	formati	on		***	la l⊾
Agency		GPD Group							Duratio	ייי ו. h	0.25				
Analvst		BMF		Analvs	is Date	e Mar 2	. 2015	_	Area Tv	pe	Othe	r	-7 -5		۲. ۲.
Jurisdiction		City of Broadview H	leights	Time P	eriod	AM Pe	eak Hou	ır	PHF	•	0.92			w ‡ e	↓ ↓ ↓
Intersection		Wallings Road/Wya	tt Road	Analys	is Yea	r 2040			Analysi	s Period	1>7	:00	4		+ *
File Name		7. Wallings Rd Wya	att Rd D	Design Y	ear 20	40 'Build	d' AM.xu	JS						str.	
Project Descrip	tion	Design Year 2040 'E		V Peak I	Hour									1 1 1 1 1 1 1 1 1	1 1 1
Demand Inform	nation				EB			W	'B		NB			SB	
Approach Move	ement			L	Т	R	L	T	R	L	Т	R	L	Т	R
Demand (v), ve	h/h				1070) 10	60	36	60	50	0	260			
Signal Informa	tion			1					1					_	
	120.0	Poforonoo Phono	2	e	5	= . :		Е							sta
Offect c	120.0	Reference Priase	Z End				L Sî	7				1	Y 2	3	4
Unseed, S	Voc	Simult Con E/M	On	Green	5.0	70.8	27.4	0.0	0.0	0.0	_		←		
Earco Modo	Fixed	Simult Gap N/S	On	Ped	3.6	3.6	3.6	0.0	$\frac{0.0}{0.0}$	0.0	_	5	Y	7	0
Force wode	Fixeu	Simult. Gap N/S	On	neu	2.0	2.0	2.0	10.0	0.0	0.0		5	0	/	0
Timer Besults				EBI		EBT	WB	1	WBT	NE	1	NBT	SBI		SBT
Assigned Phase	<u></u>				·	2	1		6		<u>, </u>	4		-	001
Case Number	5					83	1.0		4.0	-		12.0			
Phase Duration						76.4	10.6	3	87.0	-		33.0	<u> </u>		
Change Period	ange Period, $(Y+R_c)$, s					5.6	5.6		5.6	-		5.6			
Max Allow Heat	, (<i>1 111</i>) dwav (<i>N</i>	, . 1AH) s				1.0	11		1.0	-		1.5			
Queue Clearan	lax Allow Headway (<i>MAH</i>), s Dueue Clearance Time (<i>a</i> s), s					72.8	3.7		12.7			26.6			
Green Extensio	n Time	(ge), S				0.0	0.0		0.0		0.0				
Phase Call Pro	bability	(90), 0				1.00	1.00)	1.00			1.00			
Max Out Proba	bility					1.00	0.51	1	0.00	-		1.00			
	,														
Movement Gro	oup Res	ults			EB			WE	3		NB			SB	
Approach Move	ement			L	Т	R	L	Т	R	L	Т	R	L	Т	R
Assigned Move	ment				2	12	1	6		7	4	14			
Adjusted Flow I	Rate (v)	, veh/h			1174		65	391			337				
Adjusted Satura	ation Flo	w Rate (s), veh/h/ln			1860		1723	181	0		1607				
Queue Service	Time (g	s), S			70.8		1.7	10.7	7		24.6				
Cycle Queue C	learance	e Time (<i>g</i> c), s			70.8		1.7	10.7	7		24.6				
Green Ratio (g/	(C)				0.59		0.65	0.68	3		0.23				
Capacity (c), ve	eh/h				1097		132	122	7		367				
Volume-to-Cap	acity Ra	tio (<i>X</i>)			1.070		0.495	0.31	9		0.918				
Available Capa	city (<i>Ca</i>),	veh/h			1097		132	122	7	\vdash	367				
Back of Queue	(<i>Q</i>), veł	n/In (50th percentile)			42.8		1.2	3.8			12.6				
Queue Storage	Ratio (RQ) (50th percentile)		0.00		0.13	0.00)	\vdash	0.00				
Uniform Delay	(<i>d</i> 1), s/ve	eh			24.6		29.8	7.9			45.2				
Incremental De	lay (<i>d</i> ₂),	s/veh			47.9		1.1	0.1	_		27.0				
Initial Queue De	elay (<i>d</i> ₃)	, s/veh			0.0		0.0	0.0			0.0				
Control Delay (d), s/veł	1			72.5		30.9	8.0			72.2				
Level of Service	e (LOS)	(1.00			F		C	A			E	<u> </u>			
Approach Delay	/, s/veh	LOS		/2.5		E _	11.2	2	В	72.	2	E	0.0		
Intersection De	iay, s/ve	n / LOS 				58	3.3						E		
Multimodal Ba	eulte				ED			\٨/٢	2					QD	
Pedestrian LOS	Score	/105						VVE	,	-					
Bicycle LOS So)S													
210,010 200 00	5107 LC														

				.g												
General Inform	nation								Inters	ectio	on Info	rmatic	n		42440↓↓	s L
Agency		GPD Group							Durati	on k	טוו וווס ו	0.25			17 F	
Analyst		BME		Analys	is Date	Mar 2	2015		Area 1	īvne		Other		-7 -5		۲. ۲.
Jurisdiction		City of Broadview He	eiahts	Time F	Period		ak Hou	ır	PHF	700		0.92		→ 	w‡e	
Intersection		Wallings Boad / I-77	SB	Analys	is Yea	r 2040			Analys	sis P	eriod	1> 7·(00			+ * *
File Name	Index Low state of the second state of th		7 SB D	esian Y	ear 20	40 'Build	' AM.xu	s	7							
Project Descrip	tion	Design Year 2040 'B	uild' Al	M Peak	Hour		7 1111.70								4 1 4 1 1	* (*
				in roan												
Demand Inform	nation				EB			W	В			NB			SB	
Approach Move	ement			L	Т	R	L	Т	- F	۲	L	Т	R	L	Т	R
Demand (v), ve	h/h				1050	250	70	24	-0					160	10	170
Signal Informa	tion	1		÷		_216										
Cycle, s	90.0	Reference Phase	2		₿"								1	₹ 2	3	4
Offset, s	0	Reference Point	End	Green	46.2	31.8	0.0	0.0) 0.	0	0.0					
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	4.0	4.0	0.0	0.0) 0.	0	0.0				M	Φ
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	2.0	0.0	0.0) 0.	.0	0.0		5	6	7	8
								. 1		_						
Timer Results				EBL	-	EBT	WB		WBT	_	NBL		NBT	SBL		SBT
Assigned Phase	Э					2			6	_						8
Case Number						8.0			6.0	_						11.0
Phase Duration	, S					52.2			52.2	_						37.8
Change Period,	(Y+Rc)	, S				6.0			6.0	+						6.0
Max Allow Head	dway (<i>N</i>	1AH), s				2.4		_	2.4	-						4.2
Queue Clearan		e (<i>g</i> ₅), s		<u> </u>		30.1			48.2	+		_				8.9
Green Extensio	ance Time (g_s) , s sion Time (g_e) , s robability			<u> </u>		1.8		_	0.0	+				<u> </u>		1.5
Phase Call Proi				<u> </u>		1.00			1.00	+		_				1.00
Max Out Proba	oility					0.02			1.00							0.00
Movement Gro	up Res	sults	_		EB			WE	}			NB	_		SB	
Approach Move	ement			L	Т	R	L	Т	R		L	Т	R	L	T	R
Assigned Move	ment				2	12	1	6		╈	_	-		3	8	18
Adjusted Flow F	Rate (v)	, veh/h			726	687	76	261		T					185	185
Adjusted Satura	ation Flo	w Rate (s), veh/h/ln			1881	1756	372	179	2						1745	1370
Queue Service	Time (g	(s), S			27.4	28.1	18.1	7.5							6.9	4.2
Cycle Queue C	learanc	e Time (gc), s			27.4	28.1	46.2	7.5		╈					6.9	4.2
Green Ratio (g/	(C)				0.51	0.51	0.51	0.51							0.35	0.35
Capacity (c), ve	h/h				966	902	155	920							617	968
Volume-to-Capa	acity Ra	tio (<i>X</i>)			0.752	0.762	0.492	0.28	4	T					0.300	0.191
Available Capa	city (<i>Ca</i>)	, veh/h			966	902	155	920							617	968
Back of Queue	(<i>Q</i>), veł	n/In (50th percentile)			11.5	11.1	1.7	2.8							2.7	1.3
Queue Storage	Ratio (RQ) (50th percentile)			0.00	0.00	0.43	0.00)						0.09	0.04
Uniform Delay ((d1), s/v	eh			17.4	17.5	36.2	12.5	5						21.0	20.2
Incremental De	lay (<i>d2</i>),	s/veh			3.0	3.5	0.9	0.1		Т					0.3	0.1
Initial Queue De	elay (<i>d</i> 3)	, s/veh			0.0	0.0	0.0	0.0							0.0	0.0
Control Delay (d), s/veł	1			20.3	21.0	37.1	12.5	5						21.3	20.3
Level of Service	e (LOS)				С	С	D	В							С	С
Approach Delay	, s/veh	/ LOS		20.7		С	18.1		В		0.0			20.8	;	С
Intersection De	lay, s/ve	h / LOS				20).3							С		
Multimodal Re	sults				EB			WE	3			NB			SB	
Pedestrian LOS	Score	/ LOS														
Bicycle LOS Sc	ore / LC	DS														

General Inform	eneral Information gency GPD Group nalyst BMF								Intersec	tion Infe	ormatio	n	J.	석 남 학 수	la L
Agency		GPD Group							Duration	, h	0.25				
Analvst		BMF		Analvs	is Date	e Mar 2	2015		Area Tvp	e	Other		4		<u>₹</u>
Jurisdiction		Citv of Broadview H	eiahts	Time P	eriod	AM Pe	eak Hou	ır	PHF		0.92			w↓e	- <u>-</u>
Intersection		Wallings Road/I-77	NB/Mill	Analvs	is Yea	r 2040			Analvsis	Period	1>7:0	00			
File Name		17. Wallings Rd I-7	7 NB M	1ill Rd D	Desian	Year 20	40 'Builo	d' AM	.xus					5.1	
Project Descrip	tion	Design Year 2040 'E	 Build' AN	/ Peak I	Hour			-					1	 	14
-) [-															
Demand Inform	nation				EB			W	'B		NB			SB	
Approach Move	ement			L	Т	R	L	1	R	L	Т	R	L	Т	R
Demand (v), ve	h/h			930	190	90	20	12	20 280	190	250	80			
0				1	1	_				_					
Signal Informa		Deferrer Diseas	0	-		12	i i i	4							кŤа
Cycle, s	90.0	Reference Phase	2 Final			R	R		SA2			1	Z 2	3	4
Oliset, s	0	Reference Point	End	Green	7.0	16.0	21.0	22	.0 0.0	0.0			<u> </u>		
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	4.0	4.0	4.0	4.0	0.0	0.0					
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	2.0	2.0	2.0	0.0	0.0		5	6	1	8
Timer Besults				FBI		FBT	WB		WBT	NRI		NRT	SBI		SBT
Assigned Phase	<u>م</u>		_	5		2	1		6		-	4			
Case Number	<u> </u>			20		4.0	20		3.0		4			+	
Phase Duration	e Duration, s			35.0 49		49.0	13.0)	27.0			28.0	<u> </u>		
Change Period,	ge Period, (<i>Y+Rc</i>), s			6.0		6.0	6.0		6.0	6.0 6.		6.0			
Max Allow Head	nge Period, (<i>Y+Rc</i>), s Allow Headway (<i>MAH</i>), s			4.1		2.2	2.1 2.2		2.2			5.2			
Queue Clearan	ax Allow Headway (<i>MAH</i>), s ueue Clearance Time (<i>g</i> s), s			27.3		11.7	3.1		18.1			19.3			
Green Extensio	n Time	(<i>g</i> _e), s		0.9		0.6	0.0		0.3			0.9		\perp	
Phase Call Prol	oability			1.00		1.00	1.00)	1.00			1.00			
Max Out Proba	bility			1.00		0.00	0.01		0.59			1.00			
Movement Gro	un Res	ults			FB			WF	3		NB			SB	_
Approach Move	ement			1	T	B		Т	B	1	Т	R		T	B
Assigned Move	ment			5	2	12	-	6	16	7	4	14			+
Adjusted Flow F	Rate (v)	, veh/h		1011	304		22	130) 304	207	359				\square
Adjusted Satura	ation Flo	w Rate (s), veh/h/ln		1723	1778		1740	188	1 1610	1810	1768				
Queue Service	Time (g	/s), S		25.3	9.7		1.1	5.1	16.1	8.8	17.3				
Cycle Queue C	learance	e Time (<i>g</i> c), s		25.3	9.7		1.1	5.1	16.1	8.8	17.3				
Green Ratio (g/	(C)			0.32	0.48		0.08	0.23	3 0.23	0.24	0.24				
Capacity (c), ve	⊧h/h			1110	850		135	439	376	442	432				
Volume-to-Capa	acity Ra	tio (<i>X</i>)		0.911	0.358		0.161	0.29	7 0.810	0.467	0.830				
Available Capa	city (<i>c</i> a),	veh/h		1110	850		135	439	376	442	432				
Back of Queue	(<i>Q</i>), veł	n/In (50th percentile)		11.6	3.7		0.4	2.3	7.2	3.9	8.9				\square
Queue Storage	Ratio (I	RQ) (50th percentile)	0.36	0.00		0.04	0.00	0.66	0.22	0.00				
Uniform Delay ((d1), s/ve	eh		29.3	14.8		38.8	28.4	4 32.6	29.0	32.2				\square
Incremental De	lay (<i>d</i> 2),	s/veh		11.1	0.1		0.2	0.1	11.7	1.1	13.3				$ \longrightarrow $
Initial Queue De	elay (d3)	, s/veh		0.0	0.0		0.0	0.0	0.0	0.0	0.0				<u> </u>
Control Delay (d), s/veł	1		40.4	14.9		39.0	28.6	5 44.3	30.1	45.5				
Level of Service	e (LOS)	/1.00			В		D	C		C					<u> </u>
Approach Delay	, s/veh	/ LUS		34.5		U	39.6		D	39.9)	U	0.0		
Intersection De	ay, s/ve	en / LUS 				36	ο.Ծ						U		
Multimodal Re	sults				EB			WF	3		NB			SB	
Pedestrian LOS	Score	/ LOS													
Bicycle LOS Sc	ore / LC)S													

	TW	O-WAY STOP	CONTR	OL SI	JMN	IARY				
General Informatio		Site I	nform	atio	n					
Analyst	BMF	Interse	ection			Wallings I Drive	Road/Eln	nhurst		
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	nadview	Heiahts	
Date Performed	3/2/2015		Analys	is Year	r		2040 'Bui	ld'	loiginto	
Analysis Time Period	AM Peak	Hour					2040 Dull	G		
Project Description Wa	allings Road Sa	fety & Corridor St	udy							
East/West Street: Wallin	ngs Road		North/S	South S	Street	: Elmhurs	st Drive			
Intersection Orientation:	East-West		Study I	Period ((hrs):	0.25				
Vehicle Volumes ar	nd Adjustme	nts								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5		6	
	L	T	R			L	Т		R	
Volume (veh/h)	60	1060				(390		10	
Peak-Hour Factor, PHF	0.92	0.92	1.00			1.00	0.92		0.92	
Hourly Flow Rate, HFR (veh/h)	65	1152	0			0	423		10	
Percent Heavy Vehicles	1					0				
Median Type				Undivided						
RT Channelized			0						0	
Lanes	1	1	0		0		1		0	
Configuration	L	L T							TR	
Upstream Signal		0					0			
Minor Street		Northbound					Southbou	ind		
Movement	7	8	9			10	11		12	
	L	Т	R			L	Т		R	
Volume (veh/h)				10		10			10	
Peak-Hour Factor, PHF	1.00	1.00	1.00			0.92	1.00		0.92	
Hourly Flow Rate, HFR (veh/h)	0	0	0		10		0		10	
Percent Heavy Vehicles	0	0	0		0		0		0	
Percent Grade (%)		0	•				0	•		
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0						0	
Lanes	0	0	0			0	0		0	
Configuration							LR			
 Delay, Queue Length, a	nd Level of Se	rvice								
Approach	Eastbound	Westbound		Northbo	ound		S	outhbour	nd	
Movement	1	4	7	8		9	10	11	12	
Lane Configuration	L							LR		
v (veh/h)	65							20		
C (m) (veh/h)	1132							165		
v/c	0.06							0.12		
95% queue length	0.18							0.40		
Control Dolay (alyoh)	Q /							20.90	_	
	0.4			<u> </u>				29.0		
	А									
Approach Delay (s/veh)							29.8			
Approach LOS							D			

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	тw	O-WAY STOP	CONTR	OL SI	JMMA	RY			
General Information		Site I	nform	ation					
Analyst	BMF	Interse	ection			Wallings I	Road/Lor	ngview	
Agency/Co.	GPD Gro	ир	luriod	otion			Ruau City of Pr	odviow	Hoighto
Date Performed	3/2/2015				r		2040 'Bui		neignis
Analysis Time Period	AM Peak	Hour					2040 Dui	iu –	
Project Description Wa	allings Road Sa	fety & Corridor St	udy						
East/West Street: Walli	ngs Road		North/S	South S	Street:	Longvie	w Road		
Intersection Orientation:	East-West		Study	Period ((hrs):	0.25			
Vehicle Volumes ar	nd Adjustme	nts							
Major Street		Eastbound					Westbou	nd	
Movement	1	2	3			4	5		6
	L	Т	R				<u> </u>		R
Volume (veh/h)	30	1040					390		10
Peak-Hour Factor, PHF	0.92	0.92	1.00	<u> </u>	1.0	00	0.92		0.92
Hourly Flow Rate, HFR (veh/h)	32	1130	0		()	423		10
Percent Heavy Vehicles	1				()			
Median Type				Undiv	vided				
RT Channelized			0	0					0
Lanes	1 1		0	0)	1		0
Configuration	L	Т							TR
Upstream Signal		0					0		
Minor Street		Northbound					Southbou	Ind	
Movement	7	8	9		1	0	11		12
	L	Т	R		L		Т		R
Volume (veh/h)					10				10
Peak-Hour Factor, PHF	1.00	1.00	1.00	, I	0.9	92	1.00		0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0		10		0		10
Percent Heavy Vehicles	0	0	0		()	0		0
Percent Grade (%)		0					0		
Flared Approach		N					N		
Storage		0					0		
RT Channelized			0						0
Lanes	0	0	0		()	0		0
Configuration		-					LR		-
Delav, Queue Length, a	nd Level of Se	rvice	-						
Approach	Eastbound	Westbound		Northbo	ound		s	outhbour	nd
Movement	1	4	7	8		9	10	11	12
Lane Configuration	L					-		LR	
v (veh/h)	32							20	
C (m) (veh/h)	1132							180	
	0.02			l				0 11	
V/C	0.03							0.11	
	0.09							0.35	_
Control Delay (s/ven)	ð.3						 	26.3	
LOS	A							D	
Approach Delay (s/veh)							26.3		
Approach LOS			D						

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	TW	O-WAY STOP	CONTR	OL SI	JMN	IARY				
General Informatio		Site I	nform	natio	on					
Analyst	BMF	Interse	ection			Wallings	Rd/Ch	nestni	ıt Blvd	
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadvie	ew He	eights
Date Performed	3/2/2015		Analys	is Yea	r		2040 'Bui	ld'		
Analysis Time Period	AM Peak	Hour								
Project Description W	allings Road Sa	fety & Corridor Si	tudy							
East/West Street: Walli	ngs Road		North/S	South S	Stree	t: Chestn	ut Boulevar	ď		
Intersection Orientation:	East-West		Study I	Period	(hrs)	: 0.25				
Vehicle Volumes ar	nd Adjustme	ents								
Major Street		Eastbound					Westbound			
Movement	1	2	3			4	5			6
	L	Т	R			L	Т			R
Volume (veh/h)		1040	10			10	380			
Peak-Hour Factor, PHF	0.88	0.92	0.92			0.92	0.92		(0.86
Hourly Flow Rate, HFR (veh/h)	0	1130	10			10	413			0
Percent Heavy Vehicles	2					1				
Median Type				Undiv	/idea					
RT Channelized			0							0
Lanes	0	1	0	0		1	1			0
Configuration			TR			L	Т	Т		
Upstream Signal		0					0			
Minor Street		Northbound					Southbou	ind		
Movement	7	8	9			10	11			12
	L	Т	R			L	Т			R
Volume (veh/h)	20		30	30						
Peak-Hour Factor, PHF	0.92	1.00	0.92	2		0.67	1.00		().67
Hourly Flow Rate, HFR (veh/h)	21	0	32		0		0			0
Percent Heavy Vehicles	0	0	0			0	0			0
Percent Grade (%)		0					0			
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0				-			0
lanes	0	0	0			0	0			0
Configuration		LR				·				•
Delay Queue Length a	nd Level of Se									
Approach	Eastbound	Westbound	l 1	Northbo	ound		s	outhb	ound	
Movement	1	4	7	8		9	10	1	1	12
Lane Configuration		L		LR						
v (veh/h)		10		53						
C (m) (veh/h)		617		175	5					
v/c		0.02		0.30)					
95% queue length		0.05		1.21	1					
Control Delay (s/veh)		10.9		34.3	3					
LOS		В		D						
Approach Delav (s/veh)				34.3	3					
Approach LOS				D						

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	TW	O-WAY STOP	CONTR	OL SU	ЛММ	ARY				
General Information		Site I	nform	atio	n					
Analyst	BMF	Interse	ection			Wallings	Rd/Ov	/erloo	k Ave	
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadvie	ew He	eights
Date Performed	3/2/2015		Analys	sis Year	•		2040 'Bui	ld'		
Analysis Time Period	AM Peak	Hour								
Project Description W	allings Road Sa	fety & Corridor Si	tudy							
East/West Street: Walli	ngs Road		North/S	South S	treet:	Overloc	ok Avenue			
Intersection Orientation:	East-West		Study I	Period ((hrs):	0.25				
Vehicle Volumes ar	nd Adjustme	ents								
Major Street		Eastbound					Westbound			
Movement	1	2	3			4	5			6
	L	Т	R			L	Т			R
Volume (veh/h)		1060	10			10	380			
Peak-Hour Factor, PHF	0.88	0.92	0.92	· · · · ·	().92	0.92		0	0.86
Hourly Flow Rate, HFR (veh/h)	0	1152	10			10	413			0
Percent Heavy Vehicles	2					1				
Median Type				Undivi	ided					
RT Channelized			0							0
Lanes	0	1	0		1		1			0
Configuration			TR			L	Т			
Upstream Signal		0					0			
Minor Street		Northbound					Southbou	ind		
Movement	7	8	9			10	11			12
	L	Т	R			L	Т			R
Volume (veh/h)	10		30							
Peak-Hour Factor, PHF	0.92	1.00	0.92		C).67	1.00		C).67
Hourly Flow Rate, HFR (veh/h)	10	0	32			0	0			0
Percent Heavy Vehicles	0	0	0			0	0			0
Percent Grade (%)		0					0			
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0							0
Lanes	0	0	0			0	0			0
Configuration		LR								
Delay, Queue Length, a	nd Level of Se	ervice								
Approach	Eastbound	Westbound		Northbo	ound		S	outhb	ound	
Movement	1	4	7	8	Т	9	10	1	1	12
Lane Configuration		L		LR						
v (veh/h)		10		42						
C (m) (veh/h)		605		193						
v/c		0.02		0.22	2					
95% queue lenath		0.05		0.80	,					
Control Delay (s/veh)		11.1		28.8			1			
LOS		В		D	\neg		1			
Approach Delav (s/veh)				28.8	}					
Approach I OS				0						
				-			I			

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	TW	O-WAY STOP	CONTR		MMARY			
General Informatio	n		Site I	nforma	tion			
Analvst	BMF		Interse	ection		Wallings	Rd/McCrea	rv Rd
Agency/Co.	GPD Gro	ир	Jurisdi	ction		City of Br	oadview He	eights
Date Performed	3/2/2015	•	Analys	is Year		2040 'Bui	ld'	
Analysis Time Period	AM Peak	Hour						
Project Description W	allings Road Sa	fety & Corridor St	tudy					
East/West Street: Walli	ngs Road		North/S	South Str	eet: McCre	ary Road		
Intersection Orientation:	East-West		Study I	Period (h	rs): 0.25			
Vehicle Volumes ar	nd Adjustme	ents						
Major Street		Eastbound				Westbou	nd	
Movement	1	2	3		4	5		6
	L	Т	R		L	Т		R
Volume (veh/h)	30	1060				380		30
Peak-Hour Factor, PHF	0.92	0.92	0.89		0.82	0.92	().92
Hourly Flow Rate, HFR (veh/h)	32	1152	0		0	413		32
Percent Heavy Vehicles	1				2			
Median Type				Undivia	led			
RT Channelized			0					0
Lanes	1	1	0		0	1		1
Configuration	L	Т				Т		R
Upstream Signal		0				0		
Minor Street		Northbound				Southbou	Ind	
Movement	7	8	9		10	11		12
	L	Т	R		L	Т		R
Volume (veh/h)					20			10
Peak-Hour Factor, PHF	0.57	1.00	0.57		0.92	1.00	().92
Hourly Flow Rate, HFR (veh/h)	0	0	0		21	0		10
Percent Heavy Vehicles	4	0	4		0	0		0
Percent Grade (%)		0				0		
Flared Approach		N				N		
Storage		0				0		
RT Channelized			0					0
Lanes	0	0	0		0	0		0
Configuration						LR		
Delay, Queue Length, a	and Level of Se	ervice	•			-		
Approach	Eastbound	Westbound	1	Northbou	nd	S	outhbound	
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L						LR	
v (veh/h)	32						31	
C (m) (veh/h)	1121						150	
v/c	0.03						0.21	
95% queue lenath	0.09		0.74		0.74			
Control Delay (s/yoh)	8 2					0.74		
	0.3						- 55.1 -	
	A					┨────		
Approach Delay (s/veh)								
Approach LOS				E				

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	тw	O-WAY STOP	CONTR	OL S	UMN	IARY					
General Informatio	General Information Analyst BMF					on					
Analyst	BMF	Interse	ection			Wallings I	Rd/Majes	tic Oak	S		
Agency/Co.	GPD Gro	ир	lurisd	iction			City of Br	oadview	Heights		
Date Performed	3/2/2015		Analys	sis Yea	n		2040 'Bui	Id'	riciginto	,	
Analysis Time Period	AM Peak	Hour					2040 Dull				
Project Description Wa	allings Road Sa	fety & Corridor St	udy								
East/West Street: Wallin	ngs Road		North/S	South S	Stree	t: <i>Majestic</i>	: Oaks Trail				
Intersection Orientation:	East-West		Study	Period	(hrs)	: 0.25					
Vehicle Volumes ar	nd Adjustme	nts									
Major Street		Eastbound					Westbou	nd	d		
Movement	1	2	3			4	5		6		
	L	T	R			L	Т		R		
Volume (veh/h)	10	1320					410		10		
Peak-Hour Factor, PHF	0.92	0.92	0.89)		0.82	0.92		0.92		
Hourly Flow Rate, HFR (veh/h)	10	1434	0			0	445	10			
Percent Heavy Vehicles	1					2					
Median Type				Undivided							
RT Channelized			0	0					0		
Lanes	1	1	0	0		0	1		0		
Configuration	L	Т							TR		
Upstream Signal		0					0				
Minor Street		Northbound					Southbou	Ind			
Movement	7	8	9			10	11		12		
	L	Т	R	R		L	Т		R		
Volume (veh/h)						10			10		
Peak-Hour Factor, PHF	0.57	1.00	0.57	,	0.92		1.00		0.92		
Hourly Flow Rate, HFR (veh/h)	0	0	0		10		0		10		
Percent Heavy Vehicles	4	0	4			0	0		0		
Percent Grade (%)		0					0				
Flared Approach		N					N				
Storage		0					0				
RT Channelized			0						0		
Lanes	0	0	0			0	0		0		
Configuration						-	LR		-		
Delav, Queue Length, a	nd Level of Se	rvice	•								
Approach	Eastbound	Westbound		Northb	ound		S	outhbou	nd		
Movement	1	4	7	8		9	10	11	1	2	
Lane Configuration	L							LR	1-		
v (veh/h)	10							20			
C (m) (veh/h)	1111							135			
v/c	0.01							0 15			
V/C	0.07							0.10	_		
	0.03			<u> </u>				0.50			
Control Delay (s/ven)	<u> </u>							36.2	_		
LOS	A							E			
Approach Delay (s/veh)								36.2			
Approach LOS			E				E				

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	TW	O-WAY STOP	CONTR	OL SI	JMN	IARY				
General Information	า		Site Ir	nform	natio	on				
Analyst	BMF		Interse	ction			Wallings	Rd/Cre	eeksi	de Trce
Agency/Co.	GPD Grou	ир	Jurisdi	ction			City of Br	oadvie	w He	eights
Date Performed	3/2/2015		Analys	is Yea	r		2040 'Bui	ld'		
Analysis Time Period	AM Peak	Hour								
Project Description Wa	allings Road Saf	fety & Corridor St	udy							
East/West Street: Wallin	ngs Road		North/S	South S	Stree	t: Creeksi	ide Terrace			
Intersection Orientation:	East-West		Study F	Period	(hrs)	: 0.25				
Vehicle Volumes ar	nd Adjustme	nts								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5			6
	L	T	R			L	T			R
Volume (veh/h)		1320	10			10	410			. = .
Peak-Hour Factor, PHF	0.80	0.92	0.92			0.92	0.92		().76
Hourly Flow Rate, HFR (veh/h)	0	1434	10			10	445			0
Percent Heavy Vehicles	2					1				
Median Type				Undivided						
RT Channelized			0							0
Lanes	0	1	0			1	1			0
Configuration			TR		L		Т			
Upstream Signal		0					0			
Minor Street		•				Southbou	ind .			
Movement	7	8	9			10	11			12
	L	Т	R			L	Т			R
Volume (veh/h)	10		50							
Peak-Hour Factor, PHF	0.92	1.00	0.92			0.70	1.00		(0.70
Hourly Flow Rate, HFR (veb/b)	10	0	54			0	0			0
Percent Heavy Vehicles	5	0	5			0	0			0
Percent Grade (%)		0	÷			•	0	I		•
Flared Approach		N	1				N			
Storage		0					0			
RT Channelized			0							0
Lanes	0	0	0			0	0			0
Configuration		LR				-	-			
Delay, Queue Length, a	nd Level of Se	rvice		•						
Approach	Eastbound	Westbound	1	Vorthbo	ound		S	outhb	ound	
Movement	1	4	7	8		9	10	1	1	12
Lane Configuration		L		LR)					
v (veh/h)		10		64						
C (m) (veh/h)		473		134	1					
v/c		0.02		0.48	8					
95% queue length		0.06		2 19	9					
Control Delay (c/yoh)		12.8		51	- २					
		12.0 P		- <u>04.</u> -	,					
		Б								
Approach Delay (s/veh)	elay (s/veh)				54.3					
Approach LOS				F						

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TWO-WAY STOP CONTROL SUMMARY											
General Information	າ		Site Ir	nformatio	on						
Analyst	BMF		Interse	ection		Wallings I Rd/Eirebo	Rd/Joyce				
Agency/Co.	GPD Gro	ир	Jurisdi	ction		City of Br	nadview H	eiahts			
Date Performed	3/2/2015		Analys	Analysis Year		2040 'Bui	ld'	cigints			
Analysis Time Period	AM Peak	Hour				2010 201					
Proiect Description Wa	allinas Road Sa	fetv & Corridor St	udv								
East/West Street: Wallin	ngs Road		North/S	South Stree	et: Joyce R	Road/Fireho	use				
Intersection Orientation:	East-West		Study F	Period (hrs)): 0.25						
Vehicle Volumes ar	nd Adiustme	nts									
Major Street	1	Eastbound				Westbound					
Movement	1	2	3		4	5		6			
	L	Т	R		L	Т		R			
Volume (veh/h)	10	1330	30		10	400		10			
Peak-Hour Factor, PHF	0.92	0.92	0.92		0.92	0.92		0.92			
Hourly Flow Rate, HFR (veh/h)	10	1445	32		10	434		10			
Percent Heavy Vehicles	1				1						
Median Type		Undivided									
RT Channelized			0					0			
Lanes	1	1	1		1	1		0			
Configuration	L	Т	R		L			TR			
Upstream Signal		0				0					
Minor Street		Northbound				Southbou					
Movement	7	8	9		10	11	12				
	L	Т	R		L	Т		R			
Volume (veh/h)	10	10	10		10	10		10			
Peak-Hour Factor, PHF	0.92	0.92	0.92		0.92	0.92		0.92			
Hourly Flow Rate, HFR (veh/h)	10	10	10		10	10		10			
Percent Heavy Vehicles	0	0	0	0 0		0 0		0 0		0	
Percent Grade (%)		0				0	•				
Flared Approach		N				N					
Storage		0				0					
RT Channelized			0					0			
Lanes	0	1	0		0	1		0			
Configuration		LTR				LTR					
Delav. Queue Length. a	nd Level of Se	rvice	•			•					
Approach	Eastbound	Westbound	1	Northbound	d	s	outhbound	1			
Movement	1	4	7	8	9	10	11	12			
Lane Configuration	L	L		LTR			LTR				
v (veh/h)	10	10		30			30				
C (m) (veh/h)	1121	459		66			71				
v/c	0.01	0.02		0.45	0.42		0.42				
95% queue length	0.03	0.02		1 70			1.66				
Control Doloy (chich)	0.00	12.07		007			7.00 20 E				
	0.2	13.0		90./			00.0				
	A	В					<u> </u>				
Approach Delay (s/veh)				98.7			88.6				
Approach LOS			F			F					

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	TWO-WAY STOP CONTROL SUMMARY											
General Informatio	า		Site II	nform	atio	on						
Analyst	BMF		Interse	ection			Wallings	Rd/Ma	riann	a Blvd		
Agency/Co.	GPD Grou	ир	Jurisdi	ction			City of Br	oadvie	w He	ights		
Date Performed	3/2/2015		Analys	is Year	ſ		2040 'Bui	ld'				
Analysis Time Period	AM Peak	Hour										
Project Description Wa	allings Road Saf	fety & Corridor St	udy									
East/West Street: Wallin	ngs Road		North/S	South S	tree	t: <i>Marianr</i>	na Boulevar	ď				
Intersection Orientation:	East-West		Study F	Period ((hrs)	: 0.25						
Vehicle Volumes ar	nd Adjustme	nts										
Major Street		Eastbound	_				Westbou	nd				
Movement	1	2	3			4	5			6		
	L	T	R			L	T			R		
Volume (veh/h)		1340	10			10	410					
Peak-Hour Factor, PHF	0.80	0.92	0.92			0.92	0.92		0	.76		
Hourly Flow Rate, HFR (veh/h)	0	1456	10			10	445			0		
Percent Heavy Vehicles	2					1						
Median Type				Undiv	videa	1						
RT Channelized			0							0		
Lanes	0	1	0			1	1			0		
Configuration			TR			L	Т					
Upstream Signal		0					0					
Minor Street		Northbound					Southbound					
Movement	7	8	9			10	11			12		
	L	Т	R		L		Т Г			R		
Volume (veh/h)	10		10									
Peak-Hour Factor, PHF	0.92	1.00	0.92		0.70		1.00		0	.70		
Hourly Flow Rate, HFR (veh/h)	10	0	10			0	0			0		
Percent Heavy Vehicles	0	0	0			0	0			0		
Percent Grade (%)		0	-			-	0	I		-		
Flared Approach		N	1				N					
Storage		0					0					
RT Channelized			0							0		
Lanes	0	0	0			0	0			0		
Configuration		LR										
Delay, Queue Length, a	nd Level of Se	rvice					-					
Approach	Eastbound	Westbound	1	Northbo	ound		S	outhbo	ound			
Movement	1	4	7	8		9	10	11	1	12		
Lane Configuration		L		LR								
v (veh/h)		10		20								
C (m) (veh/h)		463		99								
v/c		0.02		0.20)							
95% aueue lenath		0.07		0.71	1							
Control Delay (s/veh)		12.9		50 3	2							
		, 2.3 B		50.0	,							
LUU Approach Delay (alush)		<u>ь</u>			,							
Approach Delay (s/ven)				50.3)							
Approach LOS			F									

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	TW	O-WAY STOP	CONTR		MARY															
General Information	n		Site I	nforma	tion															
Analyst	BMF		Interse	ection		Wallings	Rd/Wriaht I	Rd												
Agency/Co.	GPD Gro	ир	Jurisdi	ction		City of Br	oadview He	eights												
Date Performed	3/2/2015	1	Analys	is Year		2040 'Bui	ld'	<u> </u>												
Analysis Time Period	AM Peak	Hour																		
Project Description W	allings Road Sa	fetv & Corridor Si	tudv																	
East/West Street: Walli	ngs Road		North/S	South Str	eet: Wright	Road														
Intersection Orientation:	East-West		Study I	Period (h	rs): 0.25															
Vehicle Volumes ar	nd Adjustme	ents																		
Major Street		Eastbound				Westbou	nd													
Movement	1	2	3		4	5		6												
	L	Т	R		L	Т		R												
Volume (veh/h)	20	1320	10		10	390		10												
Peak-Hour Factor, PHF	0.92	0.92	0.92		0.92	0.92	().92												
Hourly Flow Rate, HFR (veh/h)	21	1434	10		10	423		10												
Percent Heavy Vehicles	1				3															
Median Type			Undivided																	
RT Channelized			0					0												
Lanes	1	1	0		1	1		1												
Configuration	L		TR		L	Т		R												
Upstream Signal		0				0														
Minor Street		Northbound				Southbound														
Movement	7	8	9		10	11	11 1													
	L	Т	R		L	Т		R												
Volume (veh/h)	20	20	10		60	10		10												
Peak-Hour Factor, PHF	0.92	0.92	0.92		0.92	0.92	().92												
Hourly Flow Rate, HFR (veh/h)	21	21	10		65	10		10												
Percent Heavy Vehicles	2	0	2	2 4		2 4		2 4		2 4		4		2 4		2 4		0		4
Percent Grade (%)		0				0														
Flared Approach	_	N				N														
Storage		0				0														
RT Channelized			0					0												
Lanes	0	1	0		0	1		0												
Configuration		LTR				LTR														
Delay, Queue Length, a	and Level of Se	ervice																		
Approach	Eastbound	Westbound	1	Northbou	nd	S	outhbound													
Movement	1	4	7	8	9	10	11	12												
Lane Configuration	L	L		LTR			LTR													
v (veh/h)	21	10		52			85													
C (m) (veh/h)	1132	466		58			40													
v/c	0.02	0.02		0.90		2.13														
95% queue length	0.06	0.07		4.06			9.12													
Control Delay (s/veh)	8.2	12.9		203.7			735.6													
LOS	A	В		F			F													
Approach Delay (s/veh)				203.7			735.6													
Approach LOS				F																

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General Information Site Information Analyst BMF Agency/Co. GPD Group Date Performed 3/2/2015 Analysis Time Period AM Peak Hour Project Description Wallings Road Safety & Corridor Study Eat/West Street: Wallings Road Safety & Corridor Study Eat/West Street: Wallings Road Safety & Corridor Study Bast/West Street: Wallings Road Adjustments Major Street Eastbound Worement 1 2 3 4 5 6 Volume (veh/h) 1330 10 10 400 Peak-Hour Factor, PHF 0.80 0.92 0.92 0.92 0.76 Houry Flow Rate, HFR 0 1499 10 10 434 0 Percent Heavy Vehicles 2 3 Median Type 0 1499 10 10 434 0 Upstream Signal 0 1 0 1 1 0 <t< th=""></t<>
Analyst BMF Intersection Wallings Rd/Craig Ln Agency/Co. GPD Group Uurisdiction City of Broadview Heights Date Performed 3/2/2015 Analysis Time Period AM Peak Hour Analysis Time Period AM Peak Hour Analysis Year 2040 'Build' Project Description Wallings Road Safety & Corridor Study EastWest Street: Study Period (hrs): 0.25 Vehicle Volumes and Adjustments Study Period (hrs): 0.25 Major Street L T R L T R Volume (veh/h) 1380 10 10 400 Peak-Hour Factor, PHF 0.80 0.92 0.92 0.92 0.76 Houry Flow Rate, HFR 0 1499 10 10 434 0 0 Percent Heavy Vehicles 2 3 - <td< th=""></td<>
Agency/Co. CPD Group Uurisdiction City of Broadview Heights Date Performed 3/2/2015 Analysis Time Period 2040 'Build' Analysis Time Period AM Peak Hour 2040 'Build' Project Description Wallings Road Safety & Corridor Study 2040 'Build' East/West Street: Wallings Road North/South Street: Craig Lane Intersection Orientation: East-West Study Period (hrs): 0.25 Vehicle Volumes and Adjustments Major Street Eastbound Westbound Movement 1 2 3 4 5 6 Volume (veh/h) 1380 10 10 400 Percent Heavy Vehicles 2 3 -
Date Performed 3/2/2015 Analysis Time Period AM Peak Hour Project Description Velocitings Road Safety & Corridor Study EastWest Street: Wallings Road Safety & Corridor Study 0 0 0 EastWest Street: Wallings Road Safety & Corridor Study 0.25 0.25 Vehicle Volumes and Adjustments Major Street Westbound 0 Movement 1 2 3 4 5 6 Volume (veh/h) 1380 10 10 400 0 Peak-Hour Factor, PHF 0.80 0.92 0.92 0.92 0.76 Hourly Flow Rate, HFR (veh/h) 0 1499 10 10 434 0 Percent Heavy Vehicles 2 - 3 Median Type 0 1499 10 10 434 0 Percent Heavy Vehicles 2 - - - - - - - - - - - - - </td
Analysis Time Period Wa Peak Hour Image: Construction of the second sec
Project Description Wallings Road North/South Street: Craig Lane Intersection Orientation: East/West Study Period (hrs): 0.25 Vehicle Volumes and Adjustments Study Period (hrs): 0.25 Major Street East-West Westbound Movement 1 2 3 4 5 6 Volume (veh/h) 1380 10 10 400 10 20.92 0.92 0.92 0.76 Hourly Flow Rate, HFR 0 1499 10 10 434 0 0 10 434 0 0 10 434 0 0 10 434 0 0 10 11 0 0 10 10 10 11 10 0 10 11 10 0 10 11 10 0 11 11 0 10 11 10 0 10 10 10 10 10 10 10 10 10 10
East/West Street: Wallings Road North/South Street: Craig Lane Intersection Orientation: East-West Study Period (hrs): 0.25 Vehicle Volumes and Adjustments Major Street Eastbound Westbound Movement 1 2 3 4 5 6 Volume (veh/h) L T R L T R Peak-Hour Factor, PHF 0.80 0.92 0.92 0.92 0.76 Hourly Flow Rate, HFR 0 1499 10 10 434 0 Percent Heavy Vehicles 2 3 Median Type 0 1 0 1 1 0 Configuration 1 7 8 9 10 11 12 Morth Street Northbound Southbound Southbound 0 0 0 More Street 10 0 50 - - - Volume (veh/h)
Intersection Orientation: East-West Study Period (hrs): 0.25 Vehicle Volumes and Adjustments Eastbound Westbound Movement 1 2 3 4 5 6 Movement 1 2 3 4 5 6 Volume (veh/h) 1380 10 10 400 Percent Petcor, PHF 0.80 0.92 0.92 0.92 0.92 0.76 Hourly Flow Rate, HFR 0 1499 10 10 434 0 Percent Heavy Vehicles 2 3 Median Type Undivided 0 1 1 0 0 Lanes 0 1 0 1 1 0 Upstream Signal 0 1 1 1 1 1 Volume (veh/h) 10 50 1 1 1 Volume (veh/h) 10 0 54 0
Vehicle Volumes and Adjustments Major Street Eastbound Westbound Movement 1 2 3 4 5 6 Movement 1 2 3 4 5 6 Volume (veh/h) 1380 10 10 400 7 R Volume (veh/h) 1380 10 10 400 7 R Peak-Hour Factor, PHF 0.80 0.92 0.92 0.92 0.76 Hourly Flow Rate, HFR 0 1499 10 10 434 0 Veh/n) 0 1499 10 10 434 0 Percent Heavy Vehicles 2 3 - Motionation 0 1 0 0 0 0 0 Lanes 0 1 0 1 1 0 0 Movement 7 8 9 10 1 12 <
Major Street Eastbound Westbound Movement 1 2 3 4 5 6 Movement L T R L T R Volume (veh/h) 1380 10 10 400 10 20.92 0.92 0.92 0.92 0.76 Hourly Flow Rate, HFR 0 1499 10 10 434 0 Percent Heavy Vehicles 2 3 Median Type Undivided 0 10 434 0 0 10 Percent Heavy Vehicles 2 3 Median Type Undivided 0 1 0 0 10 10 0 10 10 0 10 10 10 0 10 10 10 10 10 10 10 11 12 12 12 11 12 12 10
Movement 1 2 3 4 5 6 L T R L T R Volume (veh/h) 1380 10 10 400 Peak-Hour Factor, PHF 0.80 0.92 0.92 0.92 0.92 0.76 Hourly Flow Rate, HFR 0 1499 10 10 434 0 Percent Heavy Vehicles 2 - 3 - Median Type Undivided 0 1 0 0 Lanes 0 1 0 1 1 0 Lanes 0 1 0 1 1 0 Upstream Signal 0 0 0 0 0 11 12 Mior Street Northbound Southbound Southbound 10 50 - Peceut-Heavy Vehicles 7 0 0 0 0 0 0 0 0 0 </td
L T R L T R Volume (veh/h) 1380 10 10 400 Percent Hour Factor, PHF 0.80 0.92 0.92 0.92 0.92 0.92 0.76 Hourly Flow Rate, HFR (veh/h) 0 1499 10 10 434 0 Percent Heavy Vehicles 2 3 Median Type Undivided 0 10 1344 0 RT Channelized 0 1 1 0 0 Lanes 0 1 0 1 1 0 Configuration 7 8 9 10 11 12 Minor Street Northbound Southbound Southbound No 12 Percent Reavy Vehicles 7 0 0 0 7 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 <t< td=""></t<>
Volume (veh/h) 1380 10 10 400 Peak-Hour Factor, PHF 0.80 0.92 0.92 0.92 0.92 0.92 0.76 Hourly Flow Rate, HFR 0 1499 10 10 434 0 Percent Heavy Vehicles 2 3 Median Type Undivided 0 10 434 0 RT Channelized 0 0 10 0 0 Lanes 0 1 0 1 0 Configuration 7 7 8 9 10 11 12 Upstream Signal 0 50 R 12 R 11 12
Peak-Hour Factor, PHF 0.80 0.92 0.92 0.92 0.92 0.92 0.92 0.76 Hourly Flow Rate, HFR (veh/h) 0 1499 10 10 434 0 Percent Heavy Vehicles 2 3 Median Type Undivided 0 0 0 0 RT Channelized 0 1 0 1 1 0 Lanes 0 1 0 1 1 0 0 Lanes 0 1 0 1 1 0 0 Upstream Signal 0 0 0 0 0 0 0 Minor Street Northbound Southbound Movement 7 8 9 10 11 12 L T R L T R 0 0 0 Volume (veh/h) 10 0 54 0 0 0
Houry Flow Rate, HFR (veh/h) 0 1499 10 10 434 0 Percent Heavy Vehicles 2 3 Median Type Undivided 0 0 0 0 RT Channelized 0 1 0 1 1 0 Lanes 0 1 0 1 1 0 Configuration 7 7 1 0 0 0 Minor Street Northbound Southbound Movement 7 8 9 10 11 12 L T R L T R L T R Volume (veh/h) 10 50
Percent Heavy Vehicles 2 3 Median Type Undivided 0
Median Type Undivided RT Channelized 0 0 0 Lanes 0 1 1 0 Lanes 0 1 1 0 Configuration 7 7 1 0 1 Upstream Signal 0 7 0 0 0 Minor Street Northbound Southbound Southbound Movement 7 8 9 10 11 12 Volume (veh/h) 10 50 7 R C 7 Volume (veh/h) 10 50 7 R C 7 R Volume (veh/h) 10 0 54 0 0 0 0 Peak-Hour Factor, PHF 0.92 1.00 0.92 0.70 1.00 0.70 Hourly Flow Rate, HFR (veh/h) 0 0 54 0 0 0 Percent Heavy Vehicles 7 0 7 0 0 0 Flared Approach N N 0 0
RT Channelized 0 0 0 Lanes 0 1 0 1 1 0 Configuration 7 7 1 0 7 0 Upstream Signal 0 7 7 0 0 0 Minor Street Northbound Southbound Southbound Movement 7 8 9 10 11 12 L T R L T R Value 7 8 9 10 11 12 L T R L T R Value Yalue
Lanes 0 1 0 1 1 0 Configuration 7R L 7 1 0 Upstream Signal 0 0 0 0 0 Minor Street Northbound Southbound 0 11 12 Movement 7 8 9 10 11 12 L T R L T R 10 11 12 Volume (veh/h) 10 50 70
Configuration TR L T Upstream Signal 0 0 0 Minor Street Northbound Southbound Movement 7 8 9 10 11 12 L T R L T R Volume (veh/h) 10 50 Peak-Hour Factor, PHF 0.92 1.00 0.92 0.70 1.00 0.70 Hourly Flow Rate, HFR (veh/h) 10 0 54 0 0 0 Percent Heavy Vehicles 7 0 7 0 0 0 Percent Grade (%) 0 0 0 0 0 0 Flared Approach N 0 0 0 0 0 0 RT Channelized 0 0 0 0 0 0 0 Lanes 0 0 0 0 0 0 0 0 0 0 </td
Upstream Signal 0 0 Minor Street Northbound Southbound Movement 7 8 9 10 11 12 Movement 7 8 9 10 11 12 L T R L T R Volume (veh/h) 10 50 Peak-Hour Factor, PHF 0.92 1.00 0.92 0.70 1.00 0.70 Hourly Flow Rate, HFR (veh/h) 10 0 54 0 0 0 Percent Heavy Vehicles 7 0 7 0 0 0 Percent Grade (%) 0 0 7 0 0 0 Flared Approach N 0 0 0 0 0 RT Channelized 0 0 0 0 0 0 0 Lanes 0 0 0 0 0 0 0 <
Minor Street Northbound Southbound Movement 7 8 9 10 11 12 Movement L T R L T R Volume (veh/h) 10 50 Peak-Hour Factor, PHF 0.92 1.00 0.92 0.70 1.00 0.70 Hourly Flow Rate, HFR (veh/h) 10 0 54 0 0 0 Percent Heavy Vehicles 7 0 7 0 0 0 Percent Grade (%) 0 0 7 0 0 0 Flared Approach N 0 0 0 0 Storage 0 0 0 0 0 0 0 RT Channelized 0 0 0 0 0 0 0 Lanes 0 0 0 0 0 0 0 0 0 0
Movement 7 8 9 10 11 12 L T R L T R Volume (veh/h) 10 50 Peak-Hour Factor, PHF 0.92 1.00 0.92 0.70 1.00 0.70 Hourly Flow Rate, HFR (veh/h) 10 0 54 0 0 0 Percent Heavy Vehicles 7 0 7 0 0 0 Percent Grade (%) 0 0 7 0 0 0 Flared Approach N 0 0 0 0 0 Storage 0 0 0 0 0 0 0 RT Channelized 0 0 0 0 0 0 0 0 Lanes 0 0 0 0 0 0 0 Delay, Queue Length, and Level of Service Vesthound Northbound Southbound Southbound
L T R L T R Volume (veh/h) 10 50
Volume (veh/h) 10 50 Image: style
Peak-Hour Factor, PHF 0.92 1.00 0.92 0.70 1.00 0.70 Hourly Flow Rate, HFR (veh/h) 10 0 54 0 0 0 Percent Heavy Vehicles 7 0 7 0 0 0 Percent Grade (%) 0 0 0 0 0 0 Flared Approach N 0 0 0 0 0 0 Storage 0 <t< td=""></t<>
Hourly Flow Rate, HFR (veh/h) 10 0 54 0 0 0 Percent Heavy Vehicles 7 0 7 0 0 0 0 Percent Grade (%) 0 0 7 0 0 0 0 Flared Approach N 0
Percent Heavy Vehicles 7 0 7 0 0 0 Percent Grade (%) 0
Percent Grade (%) 0 0 Flared Approach N N Storage 0 0 RT Channelized 0 0 Lanes 0 0 0 Configuration LR 0 0 Delay, Queue Length, and Level of Service Nesthound Nesthound Southbound
Flared Approach N N Storage 0 0 RT Channelized 0 0 Lanes 0 0 0 Configuration LR 0 0 Delay, Queue Length, and Level of Service
Storage 0 0 RT Channelized 0 0 Lanes 0 0 0 Configuration LR 0
RT Channelized 0 0 Lanes 0 0 0 Configuration LR 0 0 Delay, Queue Length, and Level of Service Approach Easthound Westhound Northhound
Lanes 0 0 0 0 Configuration LR 0 0 Delay, Queue Length, and Level of Service Approach Fastbound Westbound Northbound
Configuration LR Delay, Queue Length, and Level of Service Approach Eastbound Westbound Southbound
Delay, Queue Length, and Level of Service Approach Eastbound Westbound Northbound Southbound
Approach Eastbound Westbound Northbound Southbound
Movement 1 4 7 8 9 10 11 12
Lane Configuration L LR
v (veh/h) 10 64
C (m) (veh/h) 440 122
v/c 0.02 0.52
95% gueue length 0.07 2.47
Control Delay (s/veh) 13.4 63.2
LOS B F
Approach Delay (s/veh) 63.2
Approach LOS F

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TWO-WAY STOP CONTROL SUMMARY										
General Informatio	n		Site I	nform	atic	on				
Analyst	BMF		Interse	ection			Wallings I	Rd/Skyline	Dr	
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadview H	eights	
Date Performed	3/2/2015	•	Analys	is Year			2040 'Bui	ld'		
Analysis Time Period	AM Peak	Hour								
Project Description W	allings Road Sa	fetv & Corridor St	udv							
East/West Street: Walli	ngs Road		North/S	South S	tree	t: Skyline	Drive			
Intersection Orientation:	East-West		Study I	Period ((hrs)	: 0.25				
Vehicle Volumes ar	nd Adjustme	ents								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5		6	
	L	Т	R			L	Т		R	
Volume (veh/h)	20	1410					400		10	
Peak-Hour Factor, PHF	0.92	0.92	0.81			0.78	0.92	(0.92	
Hourly Flow Rate, HFR (veh/h)	21	1532	0			0	434		10	
Percent Heavy Vehicles	1					3				
Median Type				Undiv	ided					
RT Channelized			0						0	
Lanes	1	1	0			0	1		0	
Configuration	L	Т				-			TR	
Upstream Signal		0					0			
Minor Street		Northbound					Southbou	ind		
Movement	7	8	9			10	11		12	
		Т	R			1	т	т		
Volume (veh/h)		· ·				10	1		10	
Peak-Hour Factor, PHF	0.63	1.00	0.63			0.92	1.00	().92	
Hourly Flow Rate, HFR	0	0	0			10	0		10	
(Ven/II) Percent Heavy Vehicles	7	0	7			1	0		1	
Percent Crade (%)	,		1			7	0		7	
Fercent Grade (70)	_		1				0			
	_	/\					N			
Storage	_	0					0			
RT Channelized			0						0	
Lanes	0	0	0			0	0		0	
Configuration							LR			
Delay, Queue Length, a	and Level of Se	ervice								
Approach	Eastbound	Westbound	1	Northbo	ound		S	outhbound		
Movement	1	4	7	8		9	10	11	12	
Lane Configuration	L							LR		
v (veh/h)	21							20		
C (m) (veh/h)	1121							114		
	0.02							0.18		
0.50/ augus longth	0.02				_			0.10		
	0.00						0.61			
Control Delay (s/veh)	8.3			ļ				43.2		
LOS	A							Ē		
Approach Delay (s/veh)								43.2		
Approach LOS			E			Е				

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	TW	O-WAY STOP	CONTR	OL SI	JWN	IARY				
General Informatio	n		Site I	nform	atio	on				
Analyst	BMF		Interse	ection			Wallings	Rd/We	st Mi	ll Rd
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadvie	w He	ights
Date Performed	3/2/2015	·	Analys	sis Year	r		2040 'Bui	ld'		
Analysis Time Period	AM Peak	Hour								
Project Description Wa	allings Road Sa	fety & Corridor Si	tudy							
East/West Street: Walling	ngs Road		North/S	South S	stree	t: West M	lill Road			
Intersection Orientation:	East-West		Study I	Period	(hrs)	: 0.25				
Vehicle Volumes ar	nd Adjustme	nts								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5			6
	L	Т	R			L	Т			R
Volume (veh/h)		1240	180			10	400			
Peak-Hour Factor, PHF	0.80	0.92	0.92			0.92	0.92		0	.63
Hourly Flow Rate, HFR (veh/h)	0	1347	195			10	434			0
Percent Heavy Vehicles	1					3				
Median Type				Undivided						
RT Channelized			0							0
Lanes	0	1	1			1	1			0
Configuration		Т	R			L	Т			
Upstream Signal		0					0			
Minor Street		Northbound					Southbou	Ind		
Movement	7	7 8				10	11			12
-	L	Т	RL		Т			R		
Volume (veh/h)	10		60							
Peak-Hour Factor, PHF	0.92	1.00	0.92	,		0.79	1.00		0	.79
Hourly Flow Rate, HFR (veh/h)	10	0	65			0	о			0
Percent Heavy Vehicles	2	0	2			4	0			4
Percent Grade (%)		0					0			
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0							0
Lanes	0	0	0			0	0			0
Configuration		LR				-				-
Delav. Queue Length. a	nd Level of Se	rvice								
Approach	Eastbound	Westbound		Northbo	ound		S	outhbo	ound	
Movement	1	4	7	8		9	10	11		12
Lane Configuration		L		LR						
v (veh/h)		10		75						
C (m) (veh/h)		428		160)					
		0.02		0.47	7					
05% quous longth		0.02		2.10	,					
		0.07		2.19	<u>,</u>					
Control Delay (s/ven)		13.0		45.9	1					
LUS		В		E						
Approach Delay (s/veh)				45.9)					
Approach LOS				E						

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HCS 2010 Signalized Intersection Results Summary

									•	j				
General Information								Intersec	tion Info	ormatio	n	2	4 24 the t	a l <u>a</u>
Agency	GPD Group							Duration	h	0.25			୶∔⊾	
Analyst	BMF		Analys	is Da	te Mar 2	2015		Area Tyr)e	Other				۲. ۲
Jurisdiction	City of Broadview H	eiahts	Time F	Period	PM P	eak Hou	ır	PHF		0.92			w∔e	× ↓ ↓
Intersection	Wallings Road/Broa	dview F	Analys	is Yea	ar 2040	ourried		Analysis	Period	1>7:	00			→ ~ *
File Name	1 Wallings Rd Broa	adview	Rd Des	ian Y	ar 2040	'Build' F	РМ хн	s	1 onou			╡╩┻┓╢	5.4.12	
Project Description	Design Year 2040 'F	Ruild' Pl	M Peak	Hour	541 2010	Baild I	WII.XG					-	111 11471	* (*
r reject becomption			in our	rioar										
Demand Information				EB	;		W	/B		NB		SB		
Approach Movement			LT		R	L		Г R	L T		RL		Т	R
Demand (v), veh/h			150	260) 110	390	81	10 180	150	480	160	230	680	290
Signal Information				Γ	215	215				⊆			_	A
Cycle, s 120.0	Reference Phase	2		8	8	1 54	2 ^	6	řŧ	è" i	רא¦ ∫	–		×.
Offset, s 0	Reference Point	End	Green	5.0	19	28.2	5(0 87	37.6	3	1	2	3	4
Uncoordinated Yes	Simult. Gap E/W	On	Yellow	3.6	3.6	3.6	3.6	6 3.6	3.6	- L		512		~
Force Mode Fixed	Simult. Gap N/S	On	Red	2.0	2.0	2.0	2.0	0 2.0	2.0		5	6	7	8
Timer Results			EBL	-	EBT	WB	L	WBT	NBL	_	NBT	SBL	-	SBT
Assigned Phase			3		8	7		4	1		6	5		2
Case Number			1.1		4.0	1.1		3.0	1.1		4.0	1.1		4.0
Phase Duration, s			10.6	;	43.2	24.9	9	57.5	10.6	6	33.8	18.1		41.3
Change Period, (Y+Rc), s		5.6		5.6	5.6		5.6	5.6		5.6	5.6		5.6
Max Allow Headway (I	MAH), s		4.1 4.1		4.1	4.1 4.1		4.3	4.3 4.		4.3		4.3	
Queue Clearance Time	e (<i>gs</i>), s		7.0	7.0 26.0		21.3	3	53.9	7.0		24.4	14.5		36.9
Green Extension Time	Green Extension Time (g_e) , s		0.0		4.7	0.0		0.0	0.0		2.6	0.0		0.0
Phase Call Probability			1.00		1.00	1.00)	1.00	1.00)	1.00	1.00		1.00
Max Out Probability			1.00	0 0.57		1.00)	1.00	1.00)	1.00	1.00		1.00
Manager and One of Da		_					14/5	`			_		00	
Movement Group Res	suits			EB				3					5B 	D
Approach Movement				1	10 10			14		I C	R 1C	E	1	н 10
Adjusted Flow Pate (v)	voh/h		3 162	0	10	/	4	14	162	262	222	250	2	12
Adjusted Flow hate (V	$r_{\rm r}$, veri/ii		1702	402		424	101	5 1562	1774	1062	1702	1774	1000	499
Aujusteu Saturation I I			50	24.0		10.2	51 (0 07	50	2000	22.4	12.5	24.9	24.0
	g_{s} , s		5.0	24.0		10.3	51.	0 0.7	5.0	22.2	22.4	12.5	34.8	34.9
Cycle Queue Clearant			0.25	24.0	<u> </u>	0.40	0.4	9 9.7	0.29	0.22	0.22	0.26	0.20	0.20
Capacity (c) yeb/b			135	560		453	798	3 676	134	/38	400	281	565	508
Volume-to-Capacity B:	atio (X)		1 211	0.71	2	0.936	1 10	1 0 289	1 217	0.827	0.833	0.889	0.982	0.983
Available Canacity (Ca)	veh/h		135	560	<u> </u>	453	798	3 676	1.217	438	400	281	565	508
Back of Queue (Q) ve	h/ln (50th percentile)		7.0	11 0		11 1	36	5 36	7 1	11.8	11.0	7.6	21.5	19.6
Queue Storage Batio ((50th percentile)		0.47	0.00		0.71	0.00	0 0 28	0.81	0.00	0.00	0.77	0.00	0.00
Liniform Delay (d1) s/v	reh		37.8	36.5		25.4	34	1 22 1	43.1	43.6	43.7	32.6	41.8	41.9
Incremental Delay (da)	s/veh		145.1	44		27.1	64	1 02	147.7	12.4	14.0	27.4	33.3	35.5
Initial Queue Delay (da) s/veh		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d) s/ve	h		182.9	41 0		52.5	98	1 22 3	190.8	56.0	57.7	60.0	75.1	77.3
Level of Service (LOS)			F			D	- 50. F	. <u>22.</u> 3	F	F	57.7 F	F	75.1 F	F
Approach Delay s/yeh	/105		81 0		F	75 0	3	F	1 82.2		F	73.1		F
Intersection Delay, s/ven	eh / LOS		01.3		. 7/	3.9	-	-	02.2			F		
					70							_		
Multimodal Results				EB			WE	3		NB			SB	
Pedestrian LOS Score	/ LOS													
Bicycle LOS Score / Lo	OS													

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	TW	O-WAY STOP	CONTR	OL SI	JMN	IARY			
General Informatio	า		Site I	nform	atic	n			
Analyst	BMF		Interse	ection			Wallings I Drive	Road/Elm	nhurst
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadview	Heiahts
Date Performed	3/2/2015		Analys	is Year	r		2040 'Bui	ld'	loiginto
Analysis Time Period	PM Peak	Hour					2010 20	6	
Project Description Wa	allings Road Sa	fety & Corridor St	udy						
East/West Street: Wallin	ngs Road		North/S	South S	Street	:: Elmhurs	t Drive		
Intersection Orientation:	East-West		Study I	Period ((hrs)	0.25			
Vehicle Volumes ar	nd Adjustme	nts							
Major Street		Eastbound					Westbou		
Movement	1	2	3			4	5		6
	L	T	R			L	Т		R
Volume (veh/h)	10	640	1.00			4.00	1360		10
Peak-Hour Factor, PHF	0.92	0.92	1.00			1.00	0.92		0.92
(veh/h)	10	695	0			0	1478		10
Percent Heavy Vehicles	1					0			
Median Type					Undivided				
RT Channelized			0						0
Lanes	1	1	0			0	1		0
Configuration	L	Т							TR
Upstream Signal		0					0		
Minor Street		Northbound	5	Southb		Southbou	ind		
Movement	7	8	9			10	11		12
	L	Т	R			L	Т		R
Volume (veh/h)						10			20
Peak-Hour Factor, PHF	1.00	1.00	1.00			0.92 1.00			0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0		10		0		21
Percent Heavy Vehicles	0	0	0			0	0		0
Percent Grade (%)		0					0		
Flared Approach		N					N		
Storage		0					0		
RT Channelized			0						0
Lanes	0	0	0			0	0		0
Configuration		-				-	LR		-
Delav, Queue Length, a	nd Level of Se	rvice	•					•	
Approach	Eastbound	Westbound		Northbo	ound		S	outhbour	nd
Movement	1	4	7	8		9	10	11	12
Lane Configuration	L							LR	
v (veh/h)	10							31	
C (m) (veh/h)	455								
v/c	0.02							0.34	
95% queue length	0.02							1 32	
Control Doloy (chuch)	10.07							1.32	
	13.1 B			<u> </u>				- 03.0	
	В							<i>F</i>	
Approach Delay (s/veh)								63.8	
Approach LOS					F				

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	тw	O-WAY STOP	CONTR	OL SU	MMARY					
General Informatio	າ		Site I	nforma	ation					
Analyst	BMF		Interse	ection		Wallings I Road	Road/Long	view		
Agency/Co.	GPD Gro	ир	lurisdi	ction		City of Br	oadview H	eiahts		
Date Performed	3/2/2015		Analys	is Year		2040 'Bui	ld'	cigino		
Analysis Time Period	PM Peak	Hour				2040 Bui				
Project Description Wa	allings Road Sa	fety & Corridor St	udy							
East/West Street: Walling	ngs Road		North/S	South St	reet: <i>Longv</i>	iew Road				
Intersection Orientation:	East-West		Study I	Period (h	nrs): 0.25					
Vehicle Volumes ar	nd Adjustme	nts								
Major Street		Eastbound				Westbou	nd			
Movement	1	2	3		4	5		6		
	L	T	R		L	Т		R		
Volume (veh/h)	10	640	1.00		1.00	1360		10		
Peak-Hour Factor, PHF	0.92	0.92	1.00	<u> </u>	1.00	0.92		0.92		
(veh/h)	10	695	0		0	1478		10		
Percent Heavy Vehicles	1				0					
Median Type				Undivided						
RT Channelized			0					0		
Lanes	1	1	0		0	1		0		
Configuration	L	Т						TR		
Upstream Signal		0				0				
Minor Street		Northbound				Southbou	ind			
Movement	7	8	9		10	11		12		
	L	Т	R		L	Т		R		
Volume (veh/h)					10			10		
Peak-Hour Factor, PHF	1.00	1.00	1.00		0.92	1.00		0.92		
Hourly Flow Rate, HFR (veh/h)	0	0	0		10	0		10		
Percent Heavy Vehicles	0	0	0	0 0		0		0		
Percent Grade (%)		0				0	•			
Flared Approach		N				N				
Storage		0				0				
RT Channelized			0					0		
Lanes	0	0	0		0	0		0		
Configuration						LR				
Delay, Queue Length, a	nd Level of Se	rvice								
Approach	Eastbound	Westbound		Northbo	und	S	outhbound			
Movement	1	4	7	8	9	10	11	12		
Lane Configuration	L						LR			
v (veh/h)	10						20			
C (m) (veh/h)	455						74			
v/c	0.02						0.27			
95% queue length	0.07						0.97			
Control Delav (s/veh)	13.1			1		1	70.8			
108	B			1		1	F			
Approach Delay (s/yeh)						+	70.8			
Approach LOS							F			
				F			1			

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	TW	O-WAY STOP	CONTR	OL SI	JMN	MARY				
General Information	า		Site I	nform	atio	on				
Analvst	BMF		Interse	ection			Wallings	Rd/Ch	estni	ıt Blvd
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadvie	w He	eights
Date Performed	3/2/2015		Analys	sis Yea	r		2040 'Bui	'ld'		Ŭ
Analysis Time Period	PM Peak	Hour								
Project Description Wa	allings Road Sa	fety & Corridor Si	tudy							
East/West Street: Wallin	ngs Road		North/S	South S	Stree	t: Chestn	ut Boulevar	ď		
Intersection Orientation:	East-West		Study I	Period	(hrs)	: 0.25				
Vehicle Volumes ar	nd Adjustme	ents								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5			6
	L	Т	R			L	Т			R
Volume (veh/h)		620	30			50	1360			
Peak-Hour Factor, PHF	0.88	0.92	0.92			0.92	0.92		().86
Hourly Flow Rate, HFR (veh/h)	0	673	32			54	1478			0
Percent Heavy Vehicles	2					1				
Median Type				Undiv	videa	I				
RT Channelized			0							0
Lanes	0	1	0			1	1			0
Configuration			TR			L	Т			-
Upstream Signal		0					0			
Minor Street		Northbound			Southbou	Ind				
Movement	7	8	9			10	11			12
		Т	R			1	т			R
Volume (veh/h)	10		10	10		-				
Peak-Hour Factor, PHF	0.92	1.00	0.92			0.67	1.00	0.0		.67
Hourly Flow Rate, HFR	10	0	10			0	0			0
(Ven/n) Dereent Heevy Vehicles		0				0	0			0
	0		0			0	0			0
Percent Grade (%)		0	-				0	<u> </u>		
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0							0
Lanes	0	0	0			0	0			0
Configuration		LR								
Delay, Queue Length, a	nd Level of Se	ervice								
Approach	Eastbound	Westbound	1	Northbo	ound		S	outhb	ound	
Movement	1	4	7	8		9	10	1 [.]	1	12
Lane Configuration		L		LR						
v (veh/h)		54		20						
C(m)(yeh/h)		808		77						
		0.90		0.00	2					
		0.00		0.20) 					
95% queue length		0.19		0.93	5					
Control Delay (s/veh)		9.3		67.4	1					
LOS		A		F						
Approach Delay (s/veh)				67.4	4					
Approach LOS				F						

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	TW	O-WAY STOP	CONTR	OL SI	JMN	MARY				
General Information	n		Site I	nform	atio	on				
Analyst	BMF		Interse	ection			Wallings	Rd/Ov	erloo	k Ave
Agency/Co.	GPD Gro	ир	Jurisdi	iction			City of Br	oadvie	w He	eights
Date Performed	3/2/2015		Analys	sis Year	r		2040 'Bui	ld'		
Analysis Time Period	PM Peak	Hour								
Project Description W	allings Road Sa	fety & Corridor Si	tudy							
East/West Street: Walli	ngs Road		North/S	South S	Stree	t: Overloo	ok Avenue			
Intersection Orientation:	East-West		Study I	Period	(hrs)	: 0.25				
Vehicle Volumes ar	nd Adjustme	ents								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5			6
	L	Т	R			L	Т			R
Volume (veh/h)		620	10			30	1400			
Peak-Hour Factor, PHF	0.88	0.92	0.92	2		0.92	0.92		0	0.86
Hourly Flow Rate, HFR (veh/h)	0	673	10			32	1521			0
Percent Heavy Vehicles	2					1				
Median Type		Undivided			1					
RT Channelized			0							0
Lanes	0	1	0			1	1			0
Configuration			TR			L	Т			
Upstream Signal		0					0			
Minor Street		Northbound			Southbou	ind				
Movement	7	8	9			10	11			12
	L	Т	R			L	Т			R
Volume (veh/h)	10		20							
Peak-Hour Factor, PHF	0.92	1.00	0.92	2		0.67	1.00		C).67
Hourly Flow Rate, HFR (veh/h)	10	0	21			0	0			0
Percent Heavy Vehicles	0	0	0			0	0			0
Percent Grade (%)		0					0			
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0							0
Lanes	0	0	0			0	0			0
Configuration		LR				-	-			-
Delav. Queue Length. a	nd Level of Se	ervice								
Approach	Eastbound	Westbound		Northbo	ound		s	outhbo	ound	
Movement	1	4	7	8		9	10	11	1	12
Lane Configuration		L		LR						
v (veh/h)		32		31						
C (m) (veh/h)		915		113	}					
v/c		0.03		0.27	7					
95% queue lenath		0.11		1.03	3					
Control Delay (s/veh)		9.1		48.5	5		1			
LOS		А		E			1			
Approach Delav (s/veh)				48.5	5		1			
Approach I OS				F						
				-						

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	TW	O-WAY STOP	CONTR		UMN	MARY			
General Information	n		Site I	nform	natio	on			
Analyst	BMF		Interse	ection			Wallings	Rd/McCrea	arv Rd
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadview H	eights
Date Performed	3/2/2015	1	Analys	sis Yea	r		2040 'Bui	ld'	- Č
Analysis Time Period	PM Peak	Hour							
Project Description W	allings Road Sa	fety & Corridor St	tudy						
East/West Street: Walli	ngs Road		North/S	South S	Stree	t: McCrea	ry Road		
Intersection Orientation:	East-West		Study I	Period	(hrs)	: 0.25			
Vehicle Volumes ar	nd Adjustme	ents							
Major Street		Eastbound					Westbou	nd	
Movement	1	2	3			4	5		6
	L	T	R			L	Т		R
Volume (veh/h)	10	630					1380		80
Peak-Hour Factor, PHF	0.92	0.92	0.89			0.82	0.92	(0.92
Hourly Flow Rate, HFR (veh/h)	10	684	0			0	1499		86
Percent Heavy Vehicles	1					2			
Median Type				Undiv	/idea	1			
RT Channelized			0						0
Lanes	1	1	0			0	1		1
Configuration	L	Т					Т		R
Upstream Signal		0					0		
Minor Street		Northbound					Southbound		
Movement	7	8	9			10	11		12
	L	Т	R			L	Т		R
Volume (veh/h)						30			50
Peak-Hour Factor, PHF	0.57	1.00	0.57			0.92	1.00	(0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0			32	0		54
Percent Heavy Vehicles	4	0	4			0	0		0
Percent Grade (%)		0					0		
Flared Approach		N					N		
Storage		0					0		
RT Channelized			0						0
Lanes	0	0	0			0	0		0
Configuration							LR		
Delay, Queue Length, a	nd Level of Se	ervice	•						
Approach	Eastbound	Westbound	l	Northb	ound		S	outhbound	
Movement	1	4	7	8		9	10	11	12
Lane Configuration	L							LR	
v (veh/h)	10							86	
C (m) (veh/h)	417							85	
v/c	0.02							1.01	
95% aueue lenath	0.07							5.74	
Control Delay (s/veh)	13.8							188.9	
				<u> </u>				F	
Approach Dolou (aluch)	D							100 0	L
Approach LOC								100.9 F	
Approach LOS							F		

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HCS 2010 Signalized Intersection Results Summary

								-				· ,				
General Inform	eneral Information gency GPD Group								Inters	ecti	on Inf	ormatio	n		444	
Agency		GPD Group							Durati	on, ł	n	0.25				
Analvst		BMF		Analvs	is Dat	e Mar 2	. 2015	_	Area 1	, Fvpe		Other		-7 -5		۲. ۲.
Jurisdiction		Citv of Broadview H	leiahts	Time P	eriod	PM Pe	eak Hou	ır	PHF	71		0.92			w↓e	+ _ _
Intersection		Wallings Road/Wya	tt Road	Analys	is Yea	r 2040			Analys	sis P	Period	1> 7:0)0	4		+ *
File Name		7. Wallings Rd Wya	att Rd D	Design Y	'ear 20		d' PM.xu	IS	,			I			.	
Project Descrip	tion	Design Year 2040 'E	 Build' Pl	V Peak	Hour										1 4 4	7 17 17
		-		-			1				1					
Demand Inform	nation				EB			W	В			NB			SB	
Approach Move	ement			L	Т	R	L	Т	· I	R	L	Т	R	L	Т	R
Demand (<i>v</i>), ve	h/h				590	70	200	14	00		60	0	60			
0:				1				1								
Signal Informa	tion		•		6	<u>⊨</u> 5							<u> </u>			sta
Cycle, s	110.0	Reference Phase	2		L *	í 🖪 "	51	7					1	Z 2	3	
Offset, s	0	Reference Point	End	Green	5.0	75.3	12.9	0.0) 0	.0	0.0	0.0				
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	3.6	3.6	3.6	0.0) 0	.0	0.0	_				
Force Mode	Fixed	Simult. Gap N/S	On	Red 2.0		2.0	2.0	0.0) [0	.0	0.0		5	6	7	8
T . D			_	EDI		EDT			MOT		NIDI		NDT	0.01		ODT
Timer Results	-			EBL		EBI	WB		WBI	+	NBI		NBI	SBI	-+-	SBI
Assigned Phase	9					2	1	_	6	+			4			
Case Number						8.3	1.0		4.0	+			12.0	<u> </u>		
Phase Duration	hange Period, $(Y+R_c)$, s					80.9	10.6	>	91.5	+			18.5	<u> </u>	\rightarrow	
Change Period,	hange Period, (Y+Rc), s lax Allow Headway (MAH), s					0.0	5.6		0.0	+			0.0			
	Aax Allow Headway (<i>MAH</i>), s			<u> </u>	-	24.4	6.0		07.0	+			1.4	<u> </u>	-	
Green Extensio	Queue Clearance Time (g_s) , s			<u> </u>	-	24.4	0.0		07.9	+			0.0	<u> </u>	-	
Bhase Cell Brok		(<i>ge</i>), s			-	1.00	1.00	<u> </u>	1.00	+		_	1.00	<u> </u>	-	
Max Out Broba	bility			<u> </u>		0.00	1.00	,	1.00	+			0.04			
Max Out Floba	onity					0.00	1.00)	1.00				0.04			
Movement Gro	oup Res	ults			EB			WE	}	Т		NB			SB	
Approach Move	ement			L	Т	R	L	Т	R		L	Т	R	L	Т	R
Assigned Move	ment				2	12	1	6			7	4	14			
Adjusted Flow F	Rate (v)	, veh/h			717		217	152	2			130				
Adjusted Satura	ation Flo	w Rate (s), veh/h/ln			1828		1723	181	0			1671				
Queue Service	Time (g	/s), S			22.4		4.0	85.9)			8.2				
Cycle Queue C	learance	e Time (<i>g</i> c), s			22.4		4.0	85.9)			8.2				
Green Ratio (g/	(C)				0.68		0.75	0.78	3			0.12				
Capacity (c), ve	h/h				1251		485	141	3			196				
Volume-to-Capa	acity Ra	tio (<i>X</i>)			0.573		0.448	1.07	7			0.666				
Available Capa	city (<i>Ca</i>),	veh/h			1251		485	141	3			196				
Back of Queue	(<i>Q</i>), veł	n/In (50th percentile)			7.8		1.2	41.8	3			3.8				
Queue Storage	Ratio (RQ) (50th percentile)		0.00		0.14	0.00)			0.00				
Uniform Delay ((d1), s/ve	əh			9.0		7.9	12.1				46.5				
Incremental De	ncremental Delay (<i>d</i> ₂), s/veh				0.4		0.2	47.6	6			6.7				
Initial Queue De	nitial Queue Delay (d3), s/veh				0.0		0.0	0.0				0.0				
Control Delay (Control Delay (d), s/veh				9.4		8.1	59.6	6			53.2				
Level of Service (LOS)				А		A	F				D					
Approach Delay	Approach Delay, s/veh / LOS			9.4		Α	53.2	2	D		53.2	2	D	0.0		
Intersection De	lay, s/ve	h / LOS				41	.1							D		
	, i															
Multimodal Re	sults				EB			WE	3			NB			SB	
Pedestrian LOS	Score	/ LOS														
Bicycle LOS Sc	ore / LC	DS														

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	TW	O-WAY STOP	CONTR	OL SI	JMM	ARY			
General Informatio	า		Site I	nform	atior	n			
Analyst	BMF		Interse	ection			Wallings I	Rd/Majes	tic Oaks
Agency/Co.	GPD Gro	ир	lurisdi	ction			City of Br	oodview l	leights
Date Performed	3/2/2015				r		2040 'Bui	Id'	leigints
Analysis Time Period	PM Peak	Hour					2040 Dui	u –	
Project Description Wa	allings Road Sa	fety & Corridor St	udy				•		
East/West Street: Walling	ngs Road	•	North/S	South S	treet:	Majestic	: Oaks Trail		
Intersection Orientation:	East-West		Study I	Period ((hrs):	0.25			
Vehicle Volumes ar	nd Adjustme	nts							
Major Street		Eastbound					Westbou	nd	
Movement	1	2	3			4	5		6
	L	T	R			L	Т		R
Volume (veh/h)	10	640					1590		10
Peak-Hour Factor, PHF	0.92	0.92	0.89		0	0.82	0.92		0.92
Hourly Flow Rate, HFR (veh/h)	10	695	0			0	1728		10
Percent Heavy Vehicles	1					2			
Median Type				Undivided					
RT Channelized			0	0					0
Lanes	1	1	0			0	1		0
Configuration	L								TR
Upstream Signal		0					0		
Minor Street		Northbound					Southbou	ind	
Movement	7	8	9			10	11		12
	L	Т	R			L	Т		R
Volume (veh/h)						10			10
Peak-Hour Factor, PHF	0.57	1.00	0.57		0).92	1.00		0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0			10	0		10
Percent Heavy Vehicles	4	0	4			0	0		0
Percent Grade (%)		0					0	N	
Flared Approach		N	1				N		
Storage		0					0		
RT Channelized			0						0
Lanes	0	0	0			0	0		0
Configuration						-	LR		
Delav, Queue Length, a	nd Level of Se	rvice	•					•	
Approach	Eastbound	Westbound		Northbo	ound		S	outhbour	d
Movement	1	4	7	8		9	10	11	12
Lane Configuration	L							LR	
v (veh/h)	10							20	
C (m) (veh/h)	364							52	
v/c	0.03							0.38	_
95% queue length	0.08						1 30		
Control Dolay (alyoh)	15.00							110.0	
					F 112.3				
LOS C								F	
Approach Delay (s/veh)								112.3	
Approach LOS		F							

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	TW	O-WAY STOP	CONTR	DL SU	JMN	IARY				
General Informatio	า		Site Ir	nform	atic	on				
Analyst	Energi Information nalyst BMF gency/Co. GPD Group						Wallings	Rd/Cre	eksi	de Trce
Agency/Co.	GPD Grou	ıp	Jurisdi	ction			City of Br	oadvie	w He	eights
Date Performed	3/2/2015		Analys	is Year	-		2040 'Bui	ld'		
Analysis Time Period	PM Peak	Hour								
Project Description Wa	allings Road Saf	ety & Corridor St	udy							
East/West Street: Walling	ngs Road		North/S	South S	treet	t: Creeksi	de Terrace			
Intersection Orientation:	East-West		Study F	Period ((hrs)	: 0.25				
Vehicle Volumes ar	nd Adjustmei	nts								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5			6
	L	T	R			L	T			R
Volume (veh/h)	0.00	640	10			10	1580			70
Peak-Hour Factor, PHF	0.80	0.92	0.92			0.92	0.92		l	0.76
(veh/h)	0	695	10			10	1717			0
Percent Heavy Vehicles	2					1				
Median Type		-		Undiv	ided	1				
RT Channelized			0							0
Lanes	0	1	0			1	1			0
Configuration			TR			L	Т			
Upstream Signal	ream Signal						0			
Minor Street		Northbound					Southbou	ind		
Movement	7	7 8 9 10 1					11			12
	L	Т	R			L	Т			R
Volume (veh/h)	20		10							
Peak-Hour Factor, PHF	0.92	1.00	0.92	.92 0.70		0.70	1.00		C	0.70
Hourly Flow Rate, HFR (veh/h)	21	0	10			0	0			0
Percent Heavy Vehicles	5	0	5			0	0			0
Percent Grade (%)		0	•				0			
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0							0
Lanes	0	0	0			0	0			0
Configuration		LR								
Delay, Queue Length, a	nd Level of Sei	rvice								
Approach	Eastbound	Westbound	1	Northbo	ound		S	outhb	ound	
Movement	1	4	7	8		9	10	1'	1	12
Lane Configuration		L		LR						
v (veh/h)		10		31						
C (m) (veh/h)	n) (veh/h) 898			48						
v/c	0.01			0.65	5					
95% queue lenath	gueue length 0.03			2.51	1					
Control Delav (s/veh)		9.1		168	1					
			F							
Approach Delay (s/yeh)										
Annroach I OS	-	_								
Approach LOS			F							

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	тw	O-WAY STOP	CONTR	OL SUM	MARY			
General Informatio	า		Site II	nformati	ion			
Analyst	BMF		Interse	ection		Wallings I Rd/Eirebo	Rd/Joyce	
Agency/Co.	GPD Gro	ир	Jurisdi	ction		City of Br	nadview H	eiahts
Date Performed	3/2/2015		Analys	is Year		2040 'Bui	ld'	cigino
Analysis Time Period	PM Peak	Hour				2010 Dail	G	
Project Description Wa	allings Road Sa	fety & Corridor St	udy					
East/West Street: Wallin	ngs Road		North/S	South Stre	et: Joyce R	?oad/Fireho	use	
Intersection Orientation:	East-West		Study F	Period (hrs	s): 0.25			
Vehicle Volumes ar	nd Adjustme	nts						
Major Street		Eastbound				Westbou	nd	
Movement	1	2	3		4	5		6
	L	Т	R		L	Т		R
Volume (veh/h)	10	630	10		10	1570		10
Peak-Hour Factor, PHF	0.92	0.92	0.92		0.92	0.92		0.92
Hourly Flow Rate, HFR (veh/h)	10	684	10		10	1706		10
Percent Heavy Vehicles	1				1			
Median Type				Undivided				
RT Channelized			0					0
Lanes	1	1	1		1	1		0
Configuration	L	Т	R		L			TR
Upstream Signal		0				0		
Minor Street		Northbound				Southbou	ind	
Movement	7	8	9		10	11		12
	L	Т	R		L	Т		R
Volume (veh/h)	10	10	10		10	10		10
Peak-Hour Factor, PHF	0.92	0.92	0.92		0.92	0.92		0.92
Hourly Flow Rate, HFR (veh/h)	10	10	10		10	10		10
Percent Heavy Vehicles	0	0	0		0	0		0
Percent Grade (%)		0				0		
Flared Approach		N				N		
Storage		0				0		
RT Channelized	_		0			, v		0
	0	1	0		0	1		0
Configuration		I TR	- v		0	I TR		-
Delay Queue Length a	nd Level of Se							
Approach	Fastbound	Westbound	1	Northhoun	d	<u>م</u>	outhbound	4
Movement	1	4	7	8	a a	10	11	1 12
			'		<u> </u>		ITR	12
	10 10	10		20			20	
$v (v \in I/II)$	270	10		30			30	┨───┤
C (m) (ven/n)	372	906		30	_		29	
V/C	0.03	0.01		1.00			1.03	
95% queue length	0.08	0.03		3.35			3.42	I
Control Delay (s/veh)	14.9	9.0		357.4			377.4	
LOS	B	A		F			F	
Approach Delay (s/veh)				357.4			377.4	
Approach LOS				F		F		

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	TW	O-WAY STOP	CONTR	OL SU	JMMA	RY				
General Informatio	า		Site II	nform	ation					
Analyst	BMF		Interse	ection			Wallings	Rd/Mar	ianna	Blvd
Agency/Co.	GPD Grou	up	Jurisdi	ction			City of Br	oadviev	v Hei	ghts
Date Performed	3/2/2015	•	Analys	is Year			2040 'Bui	ild'		-
Analysis Time Period	PM Peak	Hour								
Project Description Wa	allings Road Sat	fety & Corridor St	udy							
East/West Street: Wallin	ngs Road		North/S	South S	treet:	Mariann	na Boulevar	ď		
Intersection Orientation:	East-West		Study F	Period (hrs):	0.25				
Vehicle Volumes ar	nd Adjustme	nts								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5			6
	L	Т	R				Т			R
Volume (veh/h)		640	10		1	0	1580			
Peak-Hour Factor, PHF	0.80	0.92	0.92		0.9	92	0.92		0.	76
Hourly Flow Rate, HFR (veh/h)	0	695	10		1	0	1717			0
Percent Heavy Vehicles	2				1	1				
Median Type				Undiv	ided					
RT Channelized			0						(0
Lanes	0	1	0		1	1	1			0
Configuration			TR		L		Т			
Upstream Signal		0					0			
Minor Street						Southbou	und			
Movement	7 8 9				1	0	11			12
	L	Т	R			L	Т			R
Volume (veh/h)	10		10							
Peak-Hour Factor, PHF	0.92	1.00	0.92		0.1	70	1.00		0.	70
Hourly Flow Rate, HFR (veh/h)	10	0	10		C)	0			0
Percent Heavy Vehicles	0	0	0		()	0			0
Percent Grade (%)		0	-				0			-
Flared Approach		N	1				N			
Storage		0					0			
RT Channelized			0							0
Lanes	0	0	0		()	0			0
Configuration		LR								-
Delay, Queue Length, a	nd Level of Se	rvice								
Approach	Eastbound	Westbound	1	Northbo	ound		S	Southbo	und	
Movement	1	4	7	8		9	10	11		12
Lane Configuration		L		LR						
v (veh/h)	10			20						
C (m) (veh/h)	veh/h) 898			65						
v/c	0.01			0.31						
95% queue length	eue length 0.03			1.11						
Control Delay (s/veh) 9.1				83.3						
LOS A				F					\neg	
Approach Delay (s/veh)				83.3						
Approach LOS				F			1			
			F							

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	TW	O-WAY STOP	CONTR		IMARY				
General Information	า		Site I	nformat	tion				
Analyst	BMF		Interse	ection		Wallings	Rd/Wriaht I	Rd	
Agency/Co.	GPD Gro	ир	Jurisdi	ction		City of Br	oadview H	eights	
Date Performed	3/2/2015	1	Analys	sis Year		2040 'Bui	ld'	<u> </u>	
Analysis Time Period	PM Peak	Hour							
Project Description Wa	allings Road Sa	fetv & Corridor Si	tudv						
East/West Street: Walli	ngs Road		North/S	South Stre	eet: Wright	Road			
Intersection Orientation:	East-West		Study I	Period (hr	rs): 0.25				
Vehicle Volumes ar	nd Adjustme	ents							
Major Street		Eastbound				Westbou	nd		
Movement	1	2	3		4	5		6	
	L	Т	R		L	Т		R	
Volume (veh/h)	10	630	10		20	1550		30	
Peak-Hour Factor, PHF	0.92	0.92	0.92	·	0.92	0.92	().92	
Hourly Flow Rate, HFR (veh/h)	10	684	10		21	1684		32	
Percent Heavy Vehicles	1				3				
Median Type				Undivide	ed	-			
RT Channelized			0					0	
Lanes	1	1	0		1	1		1	
Configuration	L		TR		L	Т		R	
Upstream Signal		0	-			0			
Minor Street		Northbound			Southbound				
Movement	7	8	9		10				
		Т	R		10	т		R	
Volume (veh/h)	20	10	10		20 10			20	
Peak-Hour Factor, PHF	0.92	0.92	0.92		0.92	0.92	(.92	
Hourly Flow Rate, HFR	21	10	10	21 10			21		
(Venini) Percent Heavy Vehicles	2	0	2		4	0		4	
Porcent Grade (%)			2		7	0		-	
Flored Approach			1						
	_	N				N O			
Storage	_	0				0		-	
RT Channelized			0					0	
Lanes	0	1	0		0	1		0	
Configuration		LTR				LTR			
Delay, Queue Length, a	nd Level of Se	ervice							
Approach	Eastbound	Westbound	1	Northbour	nd	S	outhbound		
Movement	1	4	7	8	9	10	11	12	
Lane Configuration	L	L		LTR			LTR		
v (veh/h)	10	21		41			52		
C. (m) (veh/h)	.372	897		19			26		
v/c	0.03	0.02		216			2.00		
05% quous longth	0.00	0.02		5.52			6.22		
Control Dolor (official)	14.0	0.07		0.00	+		707 4		
Control Delay (s/ven)	14.9	9.7		950.9			/0/.1		
LOS	В	A	A F		F				
Approach Delay (s/veh)				956.9			787.1		
Approach LOS			F F				F		

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	TW	O-WAY STOP	CONTR	OL SU	JMM	ARY				
General Information	า		Site I	nform	atior	<u>ו</u>				
Analyst	BMF	Interse	ection			Wallings	Rd/Cra	aia Li	1	
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadvie	ew He	eights
Date Performed	3/2/2015	,	Analys	is Year			2040 'Bui	'ld'		-
Analysis Time Period	PM Peak	Hour								
Project Description Wa	allings Road Sa	fetv & Corridor Si	tudv							
East/West Street: Walli	ngs Road		North/S	South St	treet:	Craig L	ane			
Intersection Orientation:	East-West		Study I	Period (hrs):	0.25				
Vehicle Volumes ar	nd Adjustme	ents								
Major Street		Eastbound					Westbou	nd		
Movement	1	2	3			4	5			6
	L	Т	R			L	Т			R
Volume (veh/h)		650	10			10	1590			
Peak-Hour Factor, PHF	0.80	0.92	0.92		0	.92	0.92		0	0.76
Hourly Flow Rate, HFR (veh/h)	0	706	10			10	1728			0
Percent Heavy Vehicles	2					3				
Median Type				Undivi	ided					
RT Channelized			0							0
Lanes	0	1	0		1		1			0
Configuration			TR			L	Т			
Upstream Signal		0					0			
Minor Street		•				Southbou	ind			
Movement	7	7 8 9				10	11	T		12
	L	Т	R			L	Т			R
Volume (veh/h)	10		10							
Peak-Hour Factor, PHF	0.92	1.00	0.92		0	.70	1.00	1.00).70
Hourly Flow Rate, HFR (veh/h)	10	0	10	0		0	0			0
Percent Heavy Vehicles	7	0	7			0	0			0
Percent Grade (%)		0				-	0			-
Flared Approach		N N					N	1		
Storage		0					0			
			0				<u> </u>			0
			0			0	0			0
Lanes	0	0	0			0	0			0
Conliguration		LR								
Delay, Queue Length, a	nd Level of Se	ervice	1							
Approach	Eastbound	Westbound	1	Northbo	ound		S	outhbo	ound	
Movement	1	4	7	8		9	10	11	1	12
Lane Configuration		L		LR						
v (veh/h)		10		20						
C (m) (veh/h)		880		60						
v/c		0.01		0.33						
95% queue length		0.03		1 21						
Control Delay (s/yeh)		9.1		02.5						
		3.1 A		92.J F						
<u>.05</u> A										
Approach Delay (s/veh)			92.5							
Approach LOS	zh LOS				F					

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	TW	O-WAY STOP	CONTR	OL SU	MMAR	Y			
General Information	n		Site I	nform	ation				
Analyst	BMF	Interse	ection			Wallings	Rd/Skvline	Dr	
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadview He	eights
Date Performed	3/2/2015	•	Analys	is Year			2040 'Bui	ld'	-
Analysis Time Period	PM Peak	Hour							
Project Description W	allings Road Sa	fety & Corridor St	tudy						
East/West Street: Walli	ngs Road		North/S	South St	treet: S	kyline	Drive		
Intersection Orientation:	East-West		Study I	Period (hrs): 0.2	25			
Vehicle Volumes ar	nd Adjustme	ents							
Major Street		Eastbound					Westbou	nd	
Movement	1	2	3		4		5		6
	L	T	R		L		T		R
Volume (veh/h)	10	650					1590		10
Peak-Hour Factor, PHF	0.92	0.92	0.81		0.78		0.92		0.92
(veh/h)	10	706	0		0		1728		10
Percent Heavy Vehicles	1				3				
Median Type				Undivi	ded				
RT Channelized			0						0
Lanes	1	1	0		0		1		0
Configuration	L	Т							TR
Upstream Signal		0					0		
Minor Street	Northbound Sout				Southbou	ind			
Movement	7	8	9		10		11		
	L	Т	R		L		Т		R
Volume (veh/h)					10				10
Peak-Hour Factor, PHF	0.63	1.00	0.63		0.92		1.00	().92
Hourly Flow Rate, HFR (veh/h)	0	0	0		10		0		10
Percent Heavy Vehicles	7	0	7		4		0		4
Percent Grade (%)		0					0	I	
Flared Approach		N					N		
Storage		0					0		
RT Channelized			0						0
Lanes	0	0	0		0		0		0
Configuration		-	-		-		LR		-
Delav. Queue Length. a	nd Level of Se	ervice							
Approach	Eastbound	Westbound		Northbo	und		S	outhbound	
Movement	1	4	7	8		9	10	11	12
Lane Configuration	L							LR	
v (veh/h)	10							20	
C (m) (veh/h)	364							49	
v/c	0.03							0.41	
95% queue lenath	0.08		1.4				1 47		
Control Delay (s/yeh)	15 2		122			122.0			
Approach Delay (s/veh)							ļ	122.0	
Approach LOS	bach LOS F								

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	TW	O-WAY STOP	CONTR	OL SU	JMN	IARY				
General Information	า		Site I	nform	atic	on				
Analyst	BMF	Interse	ection			Wallings	Rd/W	Mill F	Rd	
Agency/Co.	GPD Gro	ир	Jurisdi	ction			City of Br	oadvie	ew He	eights
Date Performed	3/2/2015	,	Analys	is Year	-		2040 'Bui	ld'		<u> </u>
Analysis Time Period	PM Peak	Hour								
Project Description Wa	allings Road Sa	fetv & Corridor Si	tudv							
East/West Street: Walli	ngs Road		North/S	South S	tree	t: West M	lill Road			
Intersection Orientation:	East-West		Study I	Period ((hrs)	: 0.25				
Vehicle Volumes ar	nd Adjustme	ents								
Major Street		Eastbound					Westbou	nd	nd	
Movement	1	2	3			4	5			6
	L	Т	R			L	Т			R
Volume (veh/h)		650	10			10	1590			
Peak-Hour Factor, PHF	0.80	0.92	0.92			0.92	0.92		().63
Hourly Flow Rate, HFR (veh/h)	0	706	10			10	1728			0
Percent Heavy Vehicles	1					3				
Median Type			-	Undiv	ided					
RT Channelized			0							0
Lanes	0	1	1			1	1			0
Configuration		Т	R			L	Т			-
Upstream Signal		0					0			
Minor Street						Southbou	Ind			
Movement	7	Northbound 7 8 9 10				10	11			12
		Т	R			1	т			R
Volume (veh/h)	10	· · ·	10			-	· ·			
Peak-Hour Factor, PHF	0.92	1.00	0.92			0.79	1.00		(0.79
Hourly Flow Rate, HFR	10	0	10			0	0		-	0
(Ven/n) Percent Heavy Vehicles	2		2			1	0			1
Percent Crade (0()	2		2			4	0			4
		0								
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0							0
Lanes	0	0	0			0	0			0
Configuration		LR								
Delay, Queue Length, a	nd Level of Se	ervice								
Approach	Eastbound	Westbound	1	Northbo	ound		S	outhb	ound	
Movement	1	4	7	8		9	10	1	1	12
Lane Configuration		L		LR						
v (veh/h)		10		20						
C (m) (veh/h)		880		63						
		0.01		0.32	,					
		0.07		0.52						
95% queue length		0.03		1.15	,					
Control Delay (s/veh)		9.1	86.7							
LOS	A			F						
Approach Delay (s/veh)			86.7							
Approach LOS		F								

HCS+TM Version 5.3 Generated: 3/20/2015 1:22 PM

HCS 2010 Signalized Intersection Results Summary

				ignan	2001				ounto		e	y				
General Inform	nation								Inters	ecti	on Info	rmatic	n		*7*	b L
Agency	lation	GPD Group							Durati	ion ł	יייס ו	0.25	·••		신신문	
Analyst		BME		Analys	is Date	Mar 2	2015		Area -	Tvne		Other		-7 -4		۲. ۲.
Jurisdiction		City of Broadview He	iahts	Time F	Period		ak Hou	ır	PHF	Type		0.92			w‡e	↓
Intersection		Wallings Boad / I-77	SB	Analys	is Year	r 2040			Analy	sis P	eriod	1> 7·()()			+ *
File Name		16 Wallings Bd 1-77	SB D	esian Y	ear 20	40 'Build	' PM xu	s	7 that y							
Project Descrip	tion	Design Year 2040 'Bi	uild' Pl	M Peak	Hour	TO Baile	T WI.XO								***	<u>۲</u>
r reject becomp				ni oan	rioui											
Demand Inform	nation				EB			W	В			NB			SB	
Approach Move	ement			L	Т	R	L	Т	•	R	L	Т	R	L	Т	R
Demand (v), ve	h/h				530	130	70	59	0					300	10	1010
				lir	1			1	li I							
Signal Informa	tion			e		_216										
Cycle, s	70.0	Reference Phase	2		₿"								1		3	4
Offset, s	0	Reference Point	End	Green	28.4	29.6	0.0	0.0) 0	.0	0.0	_				
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	4.0	4.0	0.0	0.0) 0	.0	0.0				1	Φ
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	2.0	0.0	0.0) 0	.0	0.0		5	6	7	8
Timer Results				EBL	-	EBT	WB		WBT	-	NBL	_ NBT		SBI	-	SBT
Assigned Phase	9					2			6	_						8
Case Number						8.0		\rightarrow	6.0	\rightarrow						11.0
Phase Duration	ase Duration, s pange Period, (Y+Rc), s					34.4		_	34.4	_						35.6
Change Period,	nange Period, (Y+Rc), s					6.0		_	6.0	\rightarrow						6.0
Max Allow Head	Max Allow Headway (<i>MAH</i>), s					2.2			2.2	_						4.3
Queue Clearan	Queue Clearance Time (g_s), s					12.3			25.2							29.0
Green Extensio	n lime	(<i>g</i> e), s			_	1.1		\rightarrow	0.7	_		_		<u> </u>		0.4
Phase Call Prol	Dability			<u> </u>		1.00	<u> </u>	_	1.00	+				<u> </u>		1.00
Max Out Proba	bility					0.00			0.63							1.00
Movement Gro	up Res	aults			FB			WF	}			NB			SB	
Approach Move	ement				T	B		Т	B			T	R	1	Т	B
Assigned Move	ment		_	_	2	12	-	6			_			3	8	18
Adjusted Flow F	Rate (v)	. veh/h	_		371	347	76	641	-					-	337	1098
Adjusted Satura	ation Flo	w Rate (<i>s</i>), veh/h/ln			1881	1753	717	1792	2	-					1743	1370
Queue Service	Time (a	ls), S			10.1	10.3	6.2	23.2	2						9.7	27.0
Cycle Queue C	learanc	e Time (<i>g</i> _c), s			10.1	10.3	16.4	23.2	2						9.7	27.0
Green Ratio (g/	(C)		_		0.41	0.41	0.41	0.41							0.42	0.42
Capacity (c), ve	h/h				763	711	289	727	-						737	1159
Volume-to-Capa	acity Ra	tio (<i>X</i>)			0.485	0.488	0.264	0.88	2						0.457	0.947
Available Capa	city (<i>Ca</i>),	, veh/h			763	711	289	727							737	1159
Back of Queue	(<i>Q</i>), veł	n/In (50th percentile)			3.9	3.7	1.0	10.8	3						3.5	9.9
Queue Storage	Ratio (RQ) (50th percentile)			0.00	0.00	0.25	0.00)						0.12	0.34
Uniform Delay ((d1), s/v	eh			15.4	15.4	21.5	19.2	2						14.5	19.5
Incremental De	icremental Delay (<i>d</i> ₂), s/veh				0.2	0.2	0.2	11.8	3						0.4	15.5
Initial Queue De	itial Queue Delay (d3), s/veh				0.0	0.0	0.0	0.0							0.0	0.0
Control Delay (Control Delay (<i>d</i>), s/veh				15.6	15.6	21.7	31.1							14.9	35.0
_evel of Service (LOS)				В	В	С	С							В	С	
Approach Delay, s/veh / LOS			15.6	;	В	30.1		С		0.0			30.2	2	С	
Intersection De	Intersection Delay, s/veh / LOS					26	6.5							С		
Multimodal Re	sults				EB			WE	3			NB			SB	
Pedestrian LOS	Score	/ LOS														
Bicycle LOS Sc	ore / LC	DS														

HCS 2010 Signalized Intersection Results Summary

100 2010 012					2001	1110130	501101	i ne	Suns	ounn	nai	y				
General Inform	nation								Interse	ction I	nforr	matio	n		***	la L
Agency		GPD Group							Duratio	n. h	0	0.25				
Analyst		BMF		Analys	is Date	Mar 2	2015		Area Ty	/pe	- C	Other				۲. ۲.
Jurisdiction		City of Broadview H	leiahts	Time F	Period	PM P	eak Hou	ır	PHF		0	1.92		→	w∔e	
Intersection		Wallings Boad/I-77	NB/Mill	Analys	is Yea	2040			Analys	s Perio	d 1	1> 7:0	0			+ *
File Name		17. Wallings Bd 1-7	7 NB N	/ill Rd [Desian	Year 20	40 'Buile	d' PM	.xus		<u> </u>				5.1	
Project Descrip	tion	Design Year 2040 'F	Build' Pl	M Peak	Hour	1041 20	TO Dail		indo						" זי¢ר ף	1 1 1
r reject becomp		Doolgii Tour Lo to I	Jana II	ni oan	rioui											
Demand Inform	nation				EB			W	'B			NB			SB	
Approach Move	ement			L	Т	R	L		r R	1	-	Т	R	L	Т	R
Demand (v), ve	h/h			270	410	150	10	20	0 14	0 46	60	80	70			
				li-			Ĩ					_				
Signal Informa	tion			-	1		E E	4					<u> </u>			-+-
Cycle, s	70.0	Reference Phase	2		Ľ.	R	₿		5172			K	1	$\mathbf{\nabla}_{2}$	3	\mathbf{Y}_{4}
Offset, s	0	Reference Point	End	Green	7.0	1.0	23.7	20	.3 0.0) 0.	0			K		
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	4.0	0.0	4.0	4.() 0.0) 0.	0		× '			
Force Mode	Fixed	Simult. Gap N/S	On	On Red 2.0 0.0 2.0 2.0 0.0 0.0 5			6	7	8							
							1									
Timer Results				EBL	-	EBT	WB	L	WBT	N	BL		NBT	SBI	-	SBT
Assigned Phase	e			5		2	1	$ \rightarrow$	6				4			
Case Number				2.0		4.0	2.0	\rightarrow	3.0			1	10.0			
Phase Duration	e Duration, s			14.0		30.7	13.0)	29.7			2	26.3			
Change Period,	nge Period, (<i>Y</i> + <i>R</i> _c), s			6.0		6.0	6.0	\rightarrow	6.0				6.0			
Max Allow Head	ax Allow Headway (<i>MAH</i>), s			4.1		2.1	2.1		2.1				5.3			
Queue Clearan	Queue Clearance Time (g_s), s			7.8		25.3	2.4		8.0			2	21.0			
Green Extensio	n Time	(<i>g</i> _e), s		0.0		0.0	0.0	$ \rightarrow$	0.7				0.0			
Phase Call Prol	bability			1.00		1.00	1.00)	1.00			-	1.00			
Max Out Proba	bility			1.00		1.00	0.00)	0.00				1.00			
Movement Gro		ulte			ER			\٨/٢	2			NB			SB	
Approach Move	mont	Suits			т	B		T	, R	- I		т	R		Т	B
Assigned Move	ment			L 5	2	12	1	6	16			1	1/			
Adjusted Flow F	Rate (1/)	veh/h	_	293	609	12	11	217	7 152	500	1	- 163	17			
Adjusted Satura	ation Flo	w Bate (s) veh/h/ln		1723	1795		1740	188	1 1610	181		702				+
Queue Service	Time (o			5.8	23.3	1	0.4	6.0	4 8	19		53				
	learanc	e Time (<i>a</i> c) s		5.8	23.3		0.1	6.0	4.8	19		5.3				
Green Batio (a)	(C)			0.11	0.35		0.10	0.34	4 0.34	0.2	3 0) 29				
Capacity (c) ve	h/h			394	633		174	637	7 545	525	5 4	494				
Volume-to-Cap	acity Ra	tio (<i>X</i>)	_	0.745	0.961	1	0.062	0.34	1 0.27	9 0.95	3 0.	.330				
Available Capa	citv (<i>C</i> a).	. veh/h		394	633		174	637	7 545	525	5 4	494				+
Back of Queue	(<i>Q</i>), vel	n/In (50th percentile)		2.7	13.3		0.2	2.4	1.7	11.8	3 2	2.1				
Queue Storage	Ratio (RQ) (50th percentile)	0.08	0.00		0.02	0.0	0.15	0.6	5 0	0.00				
Uniform Delay ((d1), s/v	eh	,	30.0	22.2		28.5	17.	3 16.9	24.4	1 1	19.5				
Incremental De	lav (<i>d</i> ₂).	s/veh		7.5	26.2		0.1	0.1	0.1	27.9	9 (0.6				
Initial Queue De	I Queue Delay (<i>d</i> ₂), s/veh			0.0	0.0		0.0	0.0	0.0	0.0	(0.0				
Control Delav (ontrol Delay (<i>d</i>), s/veh			37.6	48.3		28.6	17.4	4 17.0	52.	3 2	20.1				
Level of Service	evel of Service (LOS)			D	D		С	В	В	D		С				
Approach Delay	Approach Delay, s/veh / LOS			44.8		D	17.6	3	В	4	1.4		D	0.0		
Intersection De	Intersection Delay, s/ven / LOS					39).4				-			D		
	intersection Delay, siven / LOS															
Multimodal Re	sults				EB			WE	3			NB			SB	
Pedestrian LOS	Score	/ LOS														
Bicycle LOS Sc	estrian LOS Score / LOS cle LOS Score / LOS															

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APPENDIX M STORAGE LENGTH CALCULATIONS

DESIGN YEAR 2040 'BUILD' CONDITIONS

STORAGE LENGTH CALCULATIONS DESIGN YEAR 2040 'BUILD' TRAFFIC VOLUMES - AM PEAK HOUR



WALLINGS ROAD / BROADVIEW ROAD

ANTICIPATED CYCLE LENGTH: 100 DESIGN SPEED: 35

0 SEC. 5 MPH

	WALLINGS ROAD EASTBOUND												
MOVEMENT:	LEFT		THRU		RIGHT								
VOLUME:	350		620		80								
LANE GROUP:	LEFT			THRU/RIGHT									
LANE GROUP VOLUME:	350			700									
NUMBER OF LANES:	1			1									
VEHICLES PER CYCLE:	10			20									
CONTROLING LANE GROUP:				Х									
DECELERATION LENGTH:	50												
STORAGE LENGTH:	375			675									
TOTAL TURN LANE LENGTH:	425			675									
TURN LANE LENGTH PER LANE	425			675									

WALLINGS ROAD WESTBOUND

MOVEMENT:	LEFT	THRU	RIGHT
VOLUME:	90	220	90
LANE GROUP:	LEFT	THRU	RIGHT
LANE GROUP VOLUME:	90	220	90
NUMBER OF LANES:	1	1	1
VEHICLES PER CYCLE:	3	7	3
CONTROLING LANE GROUP:		Х	
DECELERATION LENGTH:	50		50
STORAGE LENGTH:	150	275	150
TOTAL TURN LANE LENGTH:	200	275	200
TURN LANE LENGTH PER LANE	200	275	200

BROADVIEW ROAD NORTHBOUND

MOVEMENT:	LEFT	THRU		RIGHT
VOLUME:	60	620		420
LANE GROUP:	LEFT		THRU/RIGHT	
LANE GROUP VOLUME:	60		1040	
NUMBER OF LANES:	1		2	
VEHICLES PER CYCLE:	2		29	
CONTROLING LANE GROUP:			Х	
DECELERATION LENGTH:	50			
STORAGE LENGTH:	100		945	
TOTAL TURN LANE LENGTH:	150		945	
TURN LANE LENGTH PER LANE	150		472.5	

BROADVIEW ROAD SOUTHBOUND							
MOVEMENT:	LEFT		THRU		RIGHT		
VOLUME:	80		210		90		
LANE GROUP:	LEFT			THRU/RIGHT			
LANE GROUP VOLUME:	80			300			
NUMBER OF LANES:	1			2			
VEHICLES PER CYCLE:	3			9			
CONTROLING LANE GROUP:	Х						
DECELERATION LENGTH:	50						
STORAGE LENGTH:	150			350			
TOTAL TURN LANE LENGTH:	200			350			
TURN LANE LENGTH PER LANE	200			175			

STORAGE LENGTH CALCULATIONS DESIGN YEAR 2040 'BUILD' TRAFFIC VOLUMES - PM PEAK HOUR



WALLINGS ROAD / BROADVIEW ROAD

ANTICIPATED CYCLE LENGTH: 100 DESIGN SPEED: 35

00 SEC. 5 MPH

WALLINGS ROAD EASTBOUND							
MOVEMENT:	LEFT		THRU		RIGHT		
VOLUME:	150		260		110		
LANE GROUP:	LEFT			THRU/RIGHT			
LANE GROUP VOLUME:	150			370			
NUMBER OF LANES:	1			1			
VEHICLES PER CYCLE:	5			11			
CONTROLING LANE GROUP:				Х			
DECELERATION LENGTH:	50						
STORAGE LENGTH:	200			400			
TOTAL TURN LANE LENGTH:	250			400			
TURN LANE LENGTH PER LANE	250			400			

WALLINGS ROAD WESTBOUND

MOVEMENT:	LEFT	THRU	RIGHT
VOLUME:	390	810	180
LANE GROUP:	LEFT	THRU	RIGHT
LANE GROUP VOLUME:	390	810	180
NUMBER OF LANES:	1	1	1
VEHICLES PER CYCLE:	11	23	5
CONTROLING LANE GROUP:		Х	
DECELERATION LENGTH:	50		50
STORAGE LENGTH:	400	775	200
TOTAL TURN LANE LENGTH:	450	775	250
TURN LANE LENGTH PER LANE	450	775	250

BROADVIEW ROAD NORTHBOUND

MOVEMENT:	LEFT	THRU		RIGHT
VOLUME:	150	480		160
LANE GROUP:	LEFT		THRU/RIGHT	
LANE GROUP VOLUME:	150		640	
NUMBER OF LANES:	1		2	
VEHICLES PER CYCLE:	5		18	
CONTROLING LANE GROUP:			Х	
DECELERATION LENGTH:	50			
STORAGE LENGTH:	200		625	
TOTAL TURN LANE LENGTH:	250		625	
TURN LANE LENGTH PER LANE	250		312.5	

BROADVIEW ROAD SOUTHBOUND							
MOVEMENT:	LEFT		THRU		RIGHT		
VOLUME:	230		680		290		
LANE GROUP:	LEFT			THRU/RIGHT			
LANE GROUP VOLUME:	230			970			
NUMBER OF LANES:	1			2			
VEHICLES PER CYCLE:	7			27			
CONTROLING LANE GROUP:				Х			
DECELERATION LENGTH:	50						
STORAGE LENGTH:	275			885			
TOTAL TURN LANE LENGTH:	325			885			
TURN LANE LENGTH PER LANE	325			442.5			

STORAGE LENGTH CALCULATIONS DESIGN YEAR 2040 'BUILD' TRAFFIC VOLUMES - AM PEAK HOUR



TOTAL TURN LANE LENGTH: TURN LANE LENGTH PER LANE

WALLINGS ROAD / McCREARY ROAD

ANTICIPATED CYCLE LENGTH: 60 DESIGN SPEED: 35

SEC. MPH

WALLINGS ROAD EASTBOUND							
MOVEMENT:	LEFT		THRU		RIGHT		
VOLUME:	30		1060		0		
LANE GROUP:							
LANE GROUP VOLUME:							
NUMBER OF LANES:							
VEHICLES PER CYCLE:							
CONTROLING LANE GROUP:							
DECELERATION LENGTH:							
STORAGE LENGTH:							
TOTAL TURN LANE LENGTH:							
TURN LANE LENGTH PER LANE							

WALLINGS ROAD WESTBOUND

MOVEMENT:	LEFT	THRU	RIGHT
VOLUME:	0	380	30
LANE GROUP:			RIGHT
LANE GROUP VOLUME:			30
NUMBER OF LANES:			1
VEHICLES PER CYCLE:			1
CONTROLING LANE GROUP:			Х
DECELERATION LENGTH:			50
STORAGE LENGTH:			50
TOTAL TURN LANE LENGTH:			100
TURN LANE LENGTH PER LANE			100

NORTHBOUND N/A								
MOVEMENT:	LEFT		THRU		RIGHT			
VOLUME:	0		0		0			
LANE GROUP:								
LANE GROUP VOLUME:								
NUMBER OF LANES:								
VEHICLES PER CYCLE:								
CONTROLING LANE GROUP:								
DECELERATION LENGTH:								
STORAGE LENGTH:								

<u>^</u>	ICCREARY ROAD S	OUTHBOUND	
MOVEMENT:	LEFT	THRU	RIGHT
VOLUME:	20	0	10
LANE GROUP:			
LANE GROUP VOLUME:			
NUMBER OF LANES:			
VEHICLES PER CYCLE:			
CONTROLING LANE GROUP:			
DECELERATION LENGTH:			
STORAGE LENGTH:			
TOTAL TURN LANE LENGTH:			
TURN LANE LENGTH PER LANE			

STORAGE LENGTH CALCULATIONS DESIGN YEAR 2040 'BUILD' TRAFFIC VOLUMES - PM PEAK HOUR



WALLINGS ROAD / McCREARY ROAD

ANTICIPATED CYCLE LENGTH: 60 SEC. DESIGN SPEED: 35 MPH

WALLINGS ROAD EASTBOUND							
MOVEMENT:	LEFT		THRU		RIGHT		
VOLUME:	10		630		0		
LANE GROUP:							
LANE GROUP VOLUME:							
NUMBER OF LANES:							
VEHICLES PER CYCLE:							
CONTROLING LANE GROUP:							
DECELERATION LENGTH:							
STORAGE LENGTH:							
TOTAL TURN LANE LENGTH:							
TURN LANE LENGTH PER LANE							

WALLINGS ROAD WESTBOUND

MOVEMENT:	LEFT	THRU	RIGHT
VOLUME:	0	1380	80
LANE GROUP:			RIGHT
LANE GROUP VOLUME:			80
NUMBER OF LANES:			1
VEHICLES PER CYCLE:			2
CONTROLING LANE GROUP:			Х
DECELERATION LENGTH:			50
STORAGE LENGTH:			100
TOTAL TURN LANE LENGTH:			150
TURN LANE LENGTH PER LANE			150

	NORTHBOUN	ND N/A		
MOVEMENT:	LEFT		THRU	RIGHT
VOLUME:	0		0	0
LANE GROUP:				
LANE GROUP VOLUME:				
NUMBER OF LANES:				
VEHICLES PER CYCLE:				
CONTROLING LANE GROUP:				
DECELERATION LENGTH:				
STORAGE LENGTH:				
TOTAL TURN LANE LENGTH:				
TURN LANE LENGTH PER LANE				

MOVEMENT:	LEFT	TH	RU	RIGHT
VOLUME:	30	(0	50
LANE GROUP:				
LANE GROUP VOLUME:				
NUMBER OF LANES:				
VEHICLES PER CYCLE:				
CONTROLING LANE GROUP:				
DECELERATION LENGTH:				
STORAGE LENGTH:				
TOTAL TURN LANE LENGTH:				
TURN LANE LENGTH PER LANE				

STORAGE LENGTH CALCULATIONS DESIGN YEAR 2040 'BUILD' TRAFFIC VOLUMES - AM PEAK HOUR



WALLINGS ROAD / WYATT ROAD

ANTICIPATED CYCLE LENGTH: 60 SEC. DESIGN SPEED: 35 MPH

WALLINGS ROAD EASTBOUND						
MOVEMENT:	LEFT		THRU		RIGHT	
VOLUME:			1070		10	
LANE GROUP:				THRU/RIGHT		
LANE GROUP VOLUME:				1080		
NUMBER OF LANES:				1		
VEHICLES PER CYCLE:				18		
CONTROLING LANE GROUP:				Х		
DECELERATION LENGTH:						
STORAGE LENGTH:				625		
TOTAL TURN LANE LENGTH:				625		
TURN LANE LENGTH PER LANE				625		

WALLINGS ROAD WESTBOUND

MOVEMENT:	LEFT	THRU	RIGHT
VOLUME:	60	360	
LANE GROUP:	LEFT	THRU	
LANE GROUP VOLUME:	60	360	
NUMBER OF LANES:	1	1	
VEHICLES PER CYCLE:	1	6	
CONTROLING LANE GROUP:		Х	
DECELERATION LENGTH:	50		
STORAGE LENGTH:	50	250	
TOTAL TURN LANE LENGTH:	100	250	
TURN LANE LENGTH PER LANE	100	250	

WYATT ROAD NORTHBOUND

MOVEMENT:	LEFT	THRU	RIGHT
VOLUME:	50		260
LANE GROUP:		LEFT/RIGHT	
LANE GROUP VOLUME:		310	
NUMBER OF LANES:		1	
VEHICLES PER CYCLE:		6	
CONTROLING LANE GROUP:		Х	
DECELERATION LENGTH:			
STORAGE LENGTH:		250	
TOTAL TURN LANE LENGTH:		250	
TURN LANE LENGTH PER LANE		250	

MOVEMENT:	LEFT	THRU	RIGHT
VOLUME:			
LANE GROUP:			
LANE GROUP VOLUME:			
NUMBER OF LANES:			
VEHICLES PER CYCLE:			
CONTROLING LANE GROUP:			
DECELERATION LENGTH:			
STORAGE LENGTH:			
TOTAL TURN LANE LENGTH:			
TURN LANE LENGTH PER LANE			

STORAGE LENGTH CALCULATIONS DESIGN YEAR 2040 'BUILD' TRAFFIC VOLUMES - PM PEAK HOUR



WALLINGS ROAD / WYATT ROAD

ANTICIPATED CYCLE LENGTH: 60 SEC. DESIGN SPEED: 35 MPH

WALLINGS ROAD EASTBOUND						
MOVEMENT:	LEFT		THRU		RIGHT	
VOLUME:			590		70	
LANE GROUP:			THRU/RIGHT			
LANE GROUP VOLUME:				660		
NUMBER OF LANES:				1		
VEHICLES PER CYCLE:				11		
CONTROLING LANE GROUP:				Х		
DECELERATION LENGTH:						
STORAGE LENGTH:				400		
TOTAL TURN LANE LENGTH:				400		
TURN LANE LENGTH PER LANE				400		

WALLINGS ROAD WESTBOUND

MOVEMENT:	LEFT	THRU	RIGHT
VOLUME:	200	1400	
LANE GROUP:	LEFT	THRU	
LANE GROUP VOLUME:	200	1400	
NUMBER OF LANES:	1	1	
VEHICLES PER CYCLE:	4	24	
CONTROLING LANE GROUP:		Х	
DECELERATION LENGTH:	50		
STORAGE LENGTH:	175	800	
TOTAL TURN LANE LENGTH:	225	800	
TURN LANE LENGTH PER LANE	225	800	

WYATT ROAD NORTHBOUND

MOVEMENT:	LEFT	THRU	RIGHT
VOLUME:	60		60
LANE GROUP:		LEFT/RIGHT	
LANE GROUP VOLUME:		120	
NUMBER OF LANES:		1	
VEHICLES PER CYCLE:		2	
CONTROLING LANE GROUP:		Х	
DECELERATION LENGTH:			
STORAGE LENGTH:		100	
TOTAL TURN LANE LENGTH:		100	
TURN LANE LENGTH PER LANE		100	

MOVEMENT:	LEFT	THRU	RIGHT
VOLUME:			
LANE GROUP:			
LANE GROUP VOLUME:			
NUMBER OF LANES:			
VEHICLES PER CYCLE:			
CONTROLING LANE GROUP:			
DECELERATION LENGTH:			
STORAGE LENGTH:			
TOTAL TURN LANE LENGTH:			
TURN LANE LENGTH PER LANE			

STORAGE LENGTH CALCULATIONS DESIGN YEAR 2040 'BUILD' TRAFFIC VOLUMES - AM PEAK HOUR



WALLINGS ROAD / JOYCE ROAD / FIRESTATION DRIVE

ANTICIPATED CYCLE LENGTH: 60 DESIGN SPEED: 35

SEC. MPH

WALLINGS ROAD EASTBOUND							
MOVEMENT:	LEFT		THRU		RIGHT		
VOLUME:	10		1330		30		
LANE GROUP:					RIGHT		
LANE GROUP VOLUME:					30		
NUMBER OF LANES:					1		
VEHICLES PER CYCLE:					1		
CONTROLING LANE GROUP:					Х		
DECELERATION LENGTH:					50		
STORAGE LENGTH:					50		
TOTAL TURN LANE LENGTH:					100		
TURN LANE LENGTH PER LANE					100		

WALLINGS ROAD WESTBOUND

MOVEMENT:	LEFT	THRU	RIGHT
VOLUME:	10	400	10
LANE GROUP:			
LANE GROUP VOLUME:			
NUMBER OF LANES:			
VEHICLES PER CYCLE:			
CONTROLING LANE GROUP:			
DECELERATION LENGTH:			
STORAGE LENGTH:			
TOTAL TURN LANE LENGTH:			
TURN LANE LENGTH PER LANE			

JOYCE ROAD NORTHBOUND

MOVEMENT:	LEFT	THRU	RIGHT
VOLUME:	10	10	10
LANE GROUP:			
LANE GROUP VOLUME:			
NUMBER OF LANES:			
VEHICLES PER CYCLE:			
CONTROLING LANE GROUP:			
DECELERATION LENGTH:			
STORAGE LENGTH:			
TOTAL TURN LANE LENGTH:			
TURN LANE LENGTH PER LANE			

FIRE STATION DRIVE SOUTHBOUND

MOVEMENT:	LEFT	THRU	RIGHT
VOLUME:	10	10	10
LANE GROUP:			
LANE GROUP VOLUME:			
NUMBER OF LANES:			
VEHICLES PER CYCLE:			
CONTROLING LANE GROUP:			
DECELERATION LENGTH:			
STORAGE LENGTH:			
TOTAL TURN LANE LENGTH:			
TURN LANE LENGTH PER LANE			

STORAGE LENGTH CALCULATIONS DESIGN YEAR 2040 'BUILD' TRAFFIC VOLUMES - PM PEAK HOUR



WALLINGS ROAD / JOYCE ROAD / FIRESTATION DRIVE

ANTICIPATED CYCLE LENGTH: 60 SEC. DESIGN SPEED: 35 MPH

WALLINGS ROAD EASTBOUND									
MOVEMENT:	LEFT		THRU		RIGHT				
VOLUME:	10		630		10				
LANE GROUP:					RIGHT				
LANE GROUP VOLUME:					10				
NUMBER OF LANES:					1				
VEHICLES PER CYCLE:					1				
CONTROLING LANE GROUP:					Х				
DECELERATION LENGTH:					50				
STORAGE LENGTH:					50				
TOTAL TURN LANE LENGTH:					100				
TURN LANE LENGTH PER LANE					100				

WALLINGS ROAD WESTBOUND

MOVEMENT:	LEFT	THRU	RIGHT
VOLUME:	10	1570	10
LANE GROUP:			
LANE GROUP VOLUME:			
NUMBER OF LANES:			
VEHICLES PER CYCLE:			
CONTROLING LANE GROUP:			
DECELERATION LENGTH:			
STORAGE LENGTH:			
TOTAL TURN LANE LENGTH:			
TURN LANE LENGTH PER LANE			

JOYCE ROAD NORTHBOUND

MOVEMENT:	LEFT	THRU	RIGHT
VOLUME:	10	10	10
LANE GROUP:			
LANE GROUP VOLUME:			
NUMBER OF LANES:			
VEHICLES PER CYCLE:			
CONTROLING LANE GROUP:			
DECELERATION LENGTH:			
STORAGE LENGTH:			
TOTAL TURN LANE LENGTH:			
TURN LANE LENGTH PER LANE			

FIRE STATION DRIVE SOUTHBOUND

MOVEMENT:	LEFT	THRU	RIGHT
VOLUME:	10	10	10
LANE GROUP:			
LANE GROUP VOLUME:			
NUMBER OF LANES:			
VEHICLES PER CYCLE:			
CONTROLING LANE GROUP:			
DECELERATION LENGTH:			
STORAGE LENGTH:			
TOTAL TURN LANE LENGTH:			
TURN LANE LENGTH PER LANE			

STORAGE LENGTH CALCULATIONS DESIGN YEAR 2040 'BUILD' TRAFFIC VOLUMES - AM PEAK HOUR



WALLINGS ROAD / WRIGHT ROAD

ANTICIPATED CYCLE LENGTH: 60 SEC. DESIGN SPEED: 35 MPH

WALLINGS ROAD EASTBOUND									
MOVEMENT:	LEFT		THRU		RIGHT				
VOLUME:	20		1320		10				
LANE GROUP:									
LANE GROUP VOLUME:									
NUMBER OF LANES:									
VEHICLES PER CYCLE:									
CONTROLING LANE GROUP:									
DECELERATION LENGTH:									
STORAGE LENGTH:									
TOTAL TURN LANE LENGTH:									
TURN LANE LENGTH PER LANE									

WALLINGS ROAD WESTBOUND

MOVEMENT:	LEFT	THRU	RIGHT
VOLUME:	10	390	10
LANE GROUP:			RIGHT
LANE GROUP VOLUME:			10
NUMBER OF LANES:			1
VEHICLES PER CYCLE:			1
CONTROLING LANE GROUP:			Х
DECELERATION LENGTH:			50
STORAGE LENGTH:			50
TOTAL TURN LANE LENGTH:			100
TURN LANE LENGTH PER LANE			100

WRIGHT ROAD NORTHBOUND

MOVEMENT:	LEFT	THRU	RIGHT
VOLUME:	20	20	10
LANE GROUP:			
LANE GROUP VOLUME:			
NUMBER OF LANES:			
VEHICLES PER CYCLE:			
CONTROLING LANE GROUP:			
DECELERATION LENGTH:			
STORAGE LENGTH:			
TOTAL TURN LANE LENGTH:			
TURN LANE LENGTH PER LANE			

WRIGHT ROAD SOUTHBOUND									
MOVEMENT:	LEFT		THRU		RIGHT				
VOLUME:	60		10		10				
LANE GROUP:									
LANE GROUP VOLUME:									
NUMBER OF LANES:									
VEHICLES PER CYCLE:									
CONTROLING LANE GROUP:									
DECELERATION LENGTH:									
STORAGE LENGTH:									
TOTAL TURN LANE LENGTH:									
TURN LANE LENGTH PER LANE									

STORAGE LENGTH CALCULATIONS DESIGN YEAR 2040 'BUILD' TRAFFIC VOLUMES - PM PEAK HOUR



WALLINGS ROAD / WRIGHT ROAD

ANTICIPATED CYCLE LENGTH: 60 SEC. DESIGN SPEED: 35 MPH

RIGHT 20

WALLINGS ROAD EASTBOUND									
MOVEMENT:	LEFT		THRU		RIGHT				
VOLUME:	10		630		10				
LANE GROUP:									
LANE GROUP VOLUME:									
NUMBER OF LANES:									
VEHICLES PER CYCLE:									
CONTROLING LANE GROUP:									
DECELERATION LENGTH:									
STORAGE LENGTH:									
TOTAL TURN LANE LENGTH:									
TURN LANE LENGTH PER LANE									

WALLINGS ROAD WESTBOUND

MOVEMENT:	LEFT	THRU	RIGHT
VOLUME:	20	1550	30
LANE GROUP:			RIGHT
LANE GROUP VOLUME:			30
NUMBER OF LANES:			1
VEHICLES PER CYCLE:			1
CONTROLING LANE GROUP:			Х
DECELERATION LENGTH:			50
STORAGE LENGTH:			50
TOTAL TURN LANE LENGTH:			100
TURN LANE LENGTH PER LANE			100

WRIGHT ROAD NORTHBOUND

MOVEMENT:	LEFT	THRU	RIGHT
VOLUME:	20	10	10
LANE GROUP:			
LANE GROUP VOLUME:			
NUMBER OF LANES:			
VEHICLES PER CYCLE:			
CONTROLING LANE GROUP:			
DECELERATION LENGTH:			
STORAGE LENGTH:			
TOTAL TURN LANE LENGTH:			
TURN LANE LENGTH PER LANE			

	WRIGHT ROAD SOUTHBOUND						
MOVEMENT:	LEFT		THRU				
VOLUME:	20		10				
LANE GROUP:							
ROUP VOLUME:							

LANE GROUP VOLUME:			
NUMBER OF LANES:			
VEHICLES PER CYCLE:			
CONTROLING LANE GROUP:			
DECELERATION LENGTH:			
STORAGE LENGTH:			
TOTAL TURN LANE LENGTH:			
TURN LANE LENGTH PER LANE			

STORAGE LENGTH CALCULATIONS DESIGN YEAR 2040 'BUILD' TRAFFIC VOLUMES - AM PEAK HOUR



WALLINGS ROAD / WEST MILL ROAD

ANTICIPATED CYCLE LENGTH: 60 SEC. DESIGN SPEED: 35 MPH

WALLINGS ROAD EASTBOUND					
MOVEMENT:	LEFT	THRU	RIGHT		
VOLUME:	0	1240	180		
LANE GROUP:			RIGHT		
LANE GROUP VOLUME:			180		
NUMBER OF LANES:			1		
VEHICLES PER CYCLE:			3		
CONTROLING LANE GROUP:			Х		
DECELERATION LENGTH:			50		
STORAGE LENGTH:			150		
TOTAL TURN LANE LENGTH:			200		
TURN LANE LENGTH PER LANE			200		

WALLINGS ROAD WESTBOUND

MOVEMENT:	LEFT	THRU	RIGHT
VOLUME:	10	400	0
LANE GROUP:			
LANE GROUP VOLUME:			
NUMBER OF LANES:			
VEHICLES PER CYCLE:			
CONTROLING LANE GROUP:			
DECELERATION LENGTH:			
STORAGE LENGTH:			
TOTAL TURN LANE LENGTH:			
TURN LANE LENGTH PER LANE			

WEST	MILL	ROAD	NORT	HBOUND
		1.07.10		

MOVEMENT:	LEFT	THRU	RIGHT
VOLUME:	10	0	60
LANE GROUP:			
LANE GROUP VOLUME:			
NUMBER OF LANES:			
VEHICLES PER CYCLE:			
CONTROLING LANE GROUP:			
DECELERATION LENGTH:			
STORAGE LENGTH:			
TOTAL TURN LANE LENGTH:			
TURN LANE LENGTH PER LANE			

MOVEMENT:	LEFT	THRU	RIGHT
VOLUME:			
LANE GROUP:			
LANE GROUP VOLUME:			
NUMBER OF LANES:			
VEHICLES PER CYCLE:			
CONTROLING LANE GROUP:			
DECELERATION LENGTH:			
STORAGE LENGTH:			
TOTAL TURN LANE LENGTH:			
TURN LANE LENGTH PER LANE			
STORAGE LENGTH CALCULATIONS DESIGN YEAR 2040 'BUILD' TRAFFIC VOLUMES - PM PEAK HOUR



WALLINGS ROAD / WEST MILL ROAD

ANTICIPATED CYCLE LENGTH: 60 SEC. DESIGN SPEED: 35 MPH

WALLINGS ROAD EASTBOUND						
MOVEMENT:	LEFT		THRU		RIGHT	
VOLUME:	0		650		10	
LANE GROUP:					RIGHT	
LANE GROUP VOLUME:					10	
NUMBER OF LANES:					1	
VEHICLES PER CYCLE:					1	
CONTROLING LANE GROUP:					Х	
DECELERATION LENGTH:					50	
STORAGE LENGTH:					50	
TOTAL TURN LANE LENGTH:					100	
TURN LANE LENGTH PER LANE					100	

WALLINGS ROAD WESTBOUND

MOVEMENT:	LEFT	THRU	RIGHT
VOLUME:	10	1590	0
LANE GROUP:			
LANE GROUP VOLUME:			
NUMBER OF LANES:			
VEHICLES PER CYCLE:			
CONTROLING LANE GROUP:			
DECELERATION LENGTH:			
STORAGE LENGTH:			
TOTAL TURN LANE LENGTH:			
TURN LANE LENGTH PER LANE			

MOVEMENT:	LEFT	THRU	RIGHT
VOLUME:	10	0	10
LANE GROUP:			
LANE GROUP VOLUME:			
NUMBER OF LANES:			
VEHICLES PER CYCLE:			
CONTROLING LANE GROUP:			
DECELERATION LENGTH:			
STORAGE LENGTH:			
TOTAL TURN LANE LENGTH:			
TURN LANE LENGTH PER LANE			

	SOUTHBOUN	ID N/A				
MOVEMENT:	LEFT		THRU		RIGHT	
VOLUME:						
LANE GROUP:						
LANE GROUP VOLUME:						
NUMBER OF LANES:						
VEHICLES PER CYCLE:						
CONTROLING LANE GROUP:						
DECELERATION LENGTH:						
STORAGE LENGTH:						
TOTAL TURN LANE LENGTH:						
TURN LANE LENGTH PER LANE						
RECOMMENDED STORAGE LENGTHS INCLUDE 50' DIVERGING TAPER						

STORAGE LENGTH CALCULATIONS DESIGN YEAR 2040 'BUILD' TRAFFIC VOLUMES - AM PEAK HOUR



WALLINGS ROAD / INTERSTATE 77 SB RAMPS

ANTICIPATED CYCLE LENGTH: 90 SEC. DESIGN SPEED: 35 MPH

WALLINGS ROAD EASTBOUND						
MOVEMENT:	LEFT		THRU		RIGHT	
VOLUME:			1050		250	
LANE GROUP:				THRU/RIGHT		
LANE GROUP VOLUME:				1300		
NUMBER OF LANES:				2		
VEHICLES PER CYCLE:				33		
CONTROLING LANE GROUP:				Х		
DECELERATION LENGTH:						
STORAGE LENGTH:				1065		
TOTAL TURN LANE LENGTH:				1065		
TURN LANE LENGTH PER LANE				532.5		

WALLINGS ROAD WESTBOUND

MOVEMENT:	LEFT	THRU	RIGHT
VOLUME:	70	240	
LANE GROUP:	LEFT	THRU	
LANE GROUP VOLUME:	70	240	
NUMBER OF LANES:	1	1	
VEHICLES PER CYCLE:	2	6	
CONTROLING LANE GROUP:		Х	
DECELERATION LENGTH:	50		
STORAGE LENGTH:	100	250	
TOTAL TURN LANE LENGTH:	150	250	
TURN LANE LENGTH PER LANE	150	250	

	NORTHBOUN	ID N/A		
MOVEMENT:	LEFT		THRU	RIGHT
VOLUME:				
LANE GROUP:				
LANE GROUP VOLUME:				
NUMBER OF LANES:				
VEHICLES PER CYCLE:				
CONTROLING LANE GROUP:				
DECELERATION LENGTH:				
STORAGE LENGTH:				
TOTAL TURN LANE LENGTH:				
TURN LANE LENGTH PER LANE				

MOVEMENT:	LEFT		THRU	RIGHT
VOLUME:	160		10	170
LANE GROUP:		LEFT/THRU		RIGHT
LANE GROUP VOLUME:		170		170
NUMBER OF LANES:		1		2
VEHICLES PER CYCLE:		5		5
CONTROLING LANE GROUP:		Х		
DECELERATION LENGTH:		50		
STORAGE LENGTH:		200		200
TOTAL TURN LANE LENGTH:		250		200
TURN LANE LENGTH PER LANE		250		100

STORAGE LENGTH CALCULATIONS DESIGN YEAR 2040 'BUILD' TRAFFIC VOLUMES - PM PEAK HOUR



WALLINGS ROAD / INTERSTATE 77 SB RAMPS

ANTICIPATED CYCLE LENGTH: 70 SEC. DESIGN SPEED: 35 MPH

WALLINGS ROAD EASTBOUND						
MOVEMENT:	LEFT		THRU		RIGHT	
VOLUME:			530		130	
LANE GROUP:				THRU/RIGHT		
LANE GROUP VOLUME:				660		
NUMBER OF LANES:				2		
VEHICLES PER CYCLE:				17		
CONTROLING LANE GROUP:				Х		
DECELERATION LENGTH:						
STORAGE LENGTH:				600		
TOTAL TURN LANE LENGTH:				600		
TURN LANE LENGTH PER LANE				300		

WALLINGS ROAD WESTBOUND

MOVEMENT:	LEFT	THRU	RIGHT
VOLUME:	70	590	
LANE GROUP:	LEFT	THRU	
LANE GROUP VOLUME:	70	590	
NUMBER OF LANES:	1	1	
VEHICLES PER CYCLE:	2	15	
CONTROLING LANE GROUP:		Х	
DECELERATION LENGTH:	50		
STORAGE LENGTH:	100	525	
TOTAL TURN LANE LENGTH:	150	525	
TURN LANE LENGTH PER LANE	150	525	

NORTHBOUND N/A							
MOVEMENT:	LEFT		THRU		RIGHT		
VOLUME:							
LANE GROUP:							
LANE GROUP VOLUME:							
NUMBER OF LANES:							
VEHICLES PER CYCLE:							
CONTROLING LANE GROUP:							
DECELERATION LENGTH:							
STORAGE LENGTH:							
TOTAL TURN LANE LENGTH:							
TURN LANE LENGTH PER LANE							

<u>/</u>	-77 SB EXII	RAMP		
MOVEMENT:	LEFT		THRU	RIGHT
VOLUME:	300		10	1010
LANE GROUP:		LEFT/THRU		RIGHT
LANE GROUP VOLUME:		310		1010
NUMBER OF LANES:		1		2
VEHICLES PER CYCLE:		8		26
CONTROLING LANE GROUP:				Х
DECELERATION LENGTH:		50		
STORAGE LENGTH:		325		855
TOTAL TURN LANE LENGTH:		375		855
TURN LANE LENGTH PER LANE		375		427.5

STORAGE LENGTH CALCULATIONS DESIGN YEAR 2040 'BUILD' TRAFFIC VOLUMES - AM PEAK HOUR



WALLINGS ROAD / I-77 NB RAMPS

ANTICIPATED CYCLE LENGTH: 90 SEC. DESIGN SPEED: 35 MPH

WALLINGS ROAD EASTBOUND							
MOVEMENT:	LEFT		THRU		RIGHT		
VOLUME:	930		190		90		
LANE GROUP:	LEFT			THRU/RIGHT			
LANE GROUP VOLUME:	930			280			
NUMBER OF LANES:	2			1			
VEHICLES PER CYCLE:	24			7			
CONTROLING LANE GROUP:	Х						
DECELERATION LENGTH:	125	75					
STORAGE LENGTH:	400	400		275			
TOTAL TURN LANE LENGTH:	525	475		275			
TURN LANE LENGTH PER LANE				275			

WALLINGS ROAD WESTBOUND

MOVEMENT:	LEFT	THRU	RIGHT
VOLUME:	20	120	280
LANE GROUP:	LEFT	THRU	RIGHT
LANE GROUP VOLUME:	20	120	280
NUMBER OF LANES:	1	1	1
VEHICLES PER CYCLE:	1	3	7
CONTROLING LANE GROUP:			Х
DECELERATION LENGTH:	50	50	50
STORAGE LENGTH:	50	150	275
TOTAL TURN LANE LENGTH:	100	200	325
TURN LANE LENGTH PER LANE	100	200	325

MOVEMENT:	LEFT	THRU		RIGHT	
VOLUME:	190	250		80	
LANE GROUP:	LEFT		THRU/RIGHT		
LANE GROUP VOLUME:	190		330		
NUMBER OF LANES:	1		1		
VEHICLES PER CYCLE:	5		9		
CONTROLING LANE GROUP:			Х		
DECELERATION LENGTH:	50				
STORAGE LENGTH:	200		350		
TOTAL TURN LANE LENGTH:	250		350		
TURN LANE LENGTH PER LANE	250		350		

MOVEMENT:	LEFT	THRU	RIGHT
VOLUME:			
LANE GROUP:			
LANE GROUP VOLUME:			
NUMBER OF LANES:			
VEHICLES PER CYCLE:			
CONTROLING LANE GROUP:			
DECELERATION LENGTH:			
STORAGE LENGTH:			
TOTAL TURN LANE LENGTH:			
TURN LANE LENGTH PER LANE			

STORAGE LENGTH CALCULATIONS DESIGN YEAR 2040 'BUILD' TRAFFIC VOLUMES - PM PEAK HOUR



WALLINGS ROAD / I-77 NB RAMPS

ANTICIPATED CYCLE LENGTH: 70 SEC. DESIGN SPEED: 35 MPH

WALLINGS ROAD EASTBOUND							
MOVEMENT:	LEFT		THRU		RIGHT		
VOLUME:	270		410		150		
LANE GROUP:	LEFT			THRU/RIGHT			
LANE GROUP VOLUME:	270			560			
NUMBER OF LANES:	2			1			
VEHICLES PER CYCLE:	7			14			
CONTROLING LANE GROUP:	Х			Х			
DECELERATION LENGTH:	125	75					
STORAGE LENGTH:	137.5	137.5		500			
TOTAL TURN LANE LENGTH:	262.5	212.5		500			
TURN LANE LENGTH PER LANE				500			

WALLINGS ROAD WESTBOUND

MOVEMENT:	LEFT	THRU	RIGHT
VOLUME:	10	200	140
LANE GROUP:	LEFT	THRU	RIGHT
LANE GROUP VOLUME:	10	200	140
NUMBER OF LANES:	1	1	1
VEHICLES PER CYCLE:	1	5	4
CONTROLING LANE GROUP:		Х	
DECELERATION LENGTH:	50		50
STORAGE LENGTH:	50	200	175
TOTAL TURN LANE LENGTH:	100	200	225
TURN LANE LENGTH PER LANE	100	200	225

MOVEMENT:	LEFT	THRU		RIGHT
VOLUME:	460	80		70
LANE GROUP:	LEFT		THRU/RIGHT	-
LANE GROUP VOLUME:	460		150	
NUMBER OF LANES:	1		1	
VEHICLES PER CYCLE:	12		4	
CONTROLING LANE GROUP:	Х			
DECELERATION LENGTH:	50			
STORAGE LENGTH:	450		175	
TOTAL TURN LANE LENGTH:	500		175	
TURN LANE LENGTH PER LANE	500		175	

MOVEMENT:	LEFT	THRU	RIGHT
VOLUME:			
LANE GROUP:			
LANE GROUP VOLUME:			
NUMBER OF LANES:			
VEHICLES PER CYCLE:			
CONTROLING LANE GROUP:			
DECELERATION LENGTH:			
STORAGE LENGTH:			
TOTAL TURN LANE LENGTH:			
TURN LANE LENGTH PER LANE			