

TRAFFIC ALTERNATIVES EVALUATION

Dressler Road

Jackson Township, Stark County, Ohio



Prepared For:

Stark County Engineer's Office
5165 Southway Street SW
Canton, OH 44706

Prepared By:

GPD Group
520 South Main Street
Suite 2531
Akron, OH 44311

September 2019



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Engineer's Seal



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I. Purpose:

This Traffic Alternatives Evaluation is being prepared at the request of the Stark County Engineer's Office to evaluate traffic operations along the Dressler Road and Everhard Road corridors. The purpose of this particular study is to analyze vehicular operating conditions within the study area in order to determine what roadway improvements are necessary to achieve acceptable operations for the projected design year conditions. In addition to mitigating any existing deficiencies, the study will also look to address future growth that is anticipated within the study area.

II. Project Setting:

Study Area

The limits of the two (2) corridors which are under consideration as a part of this study encompass Dressler Road from the University Street intersection to the Belden Village Street intersection and Everhard Road from the Belden Village Street intersection to the North Mall Driveway intersection. In addition to the Dressler Road and Everhard Road corridors, the study area also includes Belden Village Street from the Everhard Road intersection to the South Mall Driveway intersection. The land uses surrounding the study corridors are primarily commercial. Residential land uses surround the corridor, appearing further to the South, East, and West of the commercial uses. On Everhard Road and Belden Village Street, east of the study area, there are interchanges with Interstate 77 (I-77). See **Figure 1** for an aerial photograph of the study area.

Area Roadway System

Dressler Road currently exists as a five (5) lane asphalt roadway throughout the study area. The current posted speed limit on Dressler Road is 35 miles per hour (mph). According to information obtained from the Ohio Department of Transportation's (ODOT) Transportation Information Mapping System (TIMS), Dressler Road is classified as an Urban Minor Arterial roadway.

Everhard Road also currently exists as a five (5) lane asphalt roadway throughout the study area. The current posted speed limit on Everhard Road is 35 mph. According to information obtained from ODOT's TIMS, Everhard Road is classified as an Urban Minor Arterial roadway.

There are five (5) existing signalized intersections and six (6) unsignalized intersections that were included within the study area. See **Figure 2** for the existing lane usage and traffic control at each intersection included in this study. The eleven (11) intersections included within the study area are as follows:

Dressler Road / University Street / Petitti Drive Intersection:

This intersection is currently signalized using a typical mast arm configuration with signal poles located on each corner of the intersection. The intersection consists of four (4) approaches with the following lane configurations: EB University Street – two (2) lanes (left-thru, right), WB Petitti Drive – two (2) lanes (left-thru, right), NB and SB Dressler Road – three (3) lanes (left, thru, thru-right).

Dressler Road / Belden Park Crossing Intersection:

This intersection is currently signalized using a typical mast arm configuration with signal poles located on each corner of the intersection. The intersection consists of four (4) approaches with the following lane configurations: EB and WB Belden Park Crossing – two (2) lanes (left, thru-right), NB and SB Dressler Road – three (3) lanes (left, thru, thru-right).

Dressler Road / Everhard Road Intersection:

This intersection is currently signalized using a typical mast arm configuration with signal poles located on each corner of the intersection. The intersection consists of four (4) approaches with the following lane configurations: EB Everhard Road – three (3) lanes (left, thru, thru-right), WB Everhard Road – four (4) lanes (left, thru, thru, right), NB and SB Dressler Road – three (3) lanes (left, thru, thru-right).

Dressler Road / West Mall Drive Intersection:

This intersection is currently unsignalized with the WB West Mall Drive approach operating under stop control. The intersection consists of three (3) approaches with the following lane configurations: WB West Mall Drive – one (1) lane (right), NB Dressler Road – two (2) lanes (thru, thru-right), and SB Dressler Road – three (3) lanes (left, thru, thru). It should be noted that the left turn lane on SB Dressler Road is due to the availability of a center two-way left turn lane.

Dressler Road / Belden Village Street Intersection:

This intersection is currently signalized using a typical mast arm configuration with signal poles located on each corner of the intersection. The intersection consists of four (4) approaches with the following lane configurations: EB and WB Belden Village Street – three (3) lanes (left, thru, thru-right), NB and SB Dressler Road – three (3) lanes (left, thru, thru-right).

Everhard Road / Belden Village Street / Plaza Drive Intersection:

This intersection is currently signalized using a typical mast arm configuration with signal poles located on the SW and SE corners of the intersection. The intersection consists of four (4) approaches with the following lane configurations: EB Plaza Drive – one (1) lane (left-thru-right), WB Belden Village Street – two (2) lanes (left, left-thru-right), NB Everhard Road – four (4) lanes (left, thru, thru, right), and SB Everhard Road – three (3) lanes (left, thru, thru-right).

Everhard Road / Children's Physicians Drive / Holiday Inn Drive Intersection:

This intersection is currently unsignalized with the SB Children's Physicians Drive and NB Holiday Inn Drive approaches operating under stop control. The intersection consists of four (4) approaches with the following lane configurations: EB Everhard Road – three (3) lanes (left, thru, thru-right), WB Everhard Road – three (3) lanes (left, thru, thru-right), SB Children's Physicians Drive – one (1) lane (left-thru-right) and NB Holiday Inn Drive – one (1) lane (left-thru-right). It should be noted that the EB and WB left turn lanes on Everhard Road are due to the availability of a center two-way left turn lane.

Everhard Road / Everhard Professional Building Drive Intersection:

This intersection is currently unsignalized with the SB Everhard Professional Building Drive approach operating under stop control. The intersection consists of three (3) approaches with the following lane configurations: EB Everhard Road – three (3) lanes (left, thru, thru), WB Everhard Road – two (2) lanes (thru, thru-right), and SB Everhard Professional Building Drive – one (1) lane (left-right). It should be noted that the left turn lane on EB Everhard Road is due to the availability of a center two-way left turn lane.

Everhard Road / Inn Circle Intersection:

This intersection is currently unsignalized with the SB Inn Circle approach operating under stop control. The intersection consists of three (3) approaches with the following lane configurations: EB Everhard Road – three (3) lanes (left, thru, thru), WB Everhard Road – two (2) lanes (thru, thru-right), and SB Inn Circle – two (2) lanes (left, right).

Everhard Road / North Mall Drive Intersection:

This intersection is currently unsignalized with the NB North Mall Drive approach operating under stop control. The intersection consists of three (3) approaches with the following lane configurations: EB Everhard Road – two (2) lanes (thru, thru-right), WB Everhard Road – four (4) lanes (left, thru, thru, thru), NB North Mall Drive – two (2) lanes (left, right). It should be noted that the left turn lane on WB Everhard Road is due to the availability of a center two-way left turn lane.

Belden Village Street / South Mall Drive Intersection:

This intersection is currently unsignalized with the SB South Mall Drive approach operating under stop control. The intersection consists of three (3) approaches with the following lane configurations: EB Belden Village Street – two (2) lanes (left-thru, thru), WB Belden Village Street – two (2) lanes (thru, thru-right), SB South Mall Drive – two (2) lanes (left, right).

III. Traffic Volumes:

Existing Traffic Volumes

For this study, Cummins Consulting Services performed turning movement traffic counts on three (3) consecutive days; Thursday, November 15, 2018, Friday November 16, 2018 and Saturday, November 17, 2018. Traffic counts are typically conducted on a weekday (Tuesday – Thursday) but due to the highly commercialized nature of the study area, turning movements counts were also taken on a Friday and Saturday. The peak hour volumes for each day collected were compared to one another to determine which day had the highest peak hour volume moving through the study area. The comparison determined that Saturday had the highest peak hour volume of the three (3) days counted. Therefore, the analysis performed as a part of this study utilizes the Saturday peak hour volumes as the design hour. Based on the turning movement counts, the Saturday peak hour was found to occur from 1:00 PM – 2:00 PM. The turning movement traffic count data for Saturday is provided in **Appendix A**.

Historic Growth Trends

Developing future traffic volumes involves calculating a proposed growth rate based on historic traffic count data collected along roadways within the vicinity of the study area. Traffic volumes for Dressler Road, Everhard Road, and Belden Village Street have been collected since 1988 and the Average Daily Traffic (ADT) of these roadways are available on ODOT's website. In order to develop a more representative growth rate for recent years, only traffic counts between the years 2006 and 2016 were used in the growth rate calculations.

Based on the historic traffic volumes, GPD Group developed a growth rate for the Dressler Road study area. As shown in **Appendix B**, the locations that the Dressler Road and Belden Village Street traffic counts were taken show negative growth in the area and the locations where the Everhard Road traffic counts were taken show positive growth. Based on the varying growth rates that were calculated, an annual growth rate of +0.25% for the entire study area was determined to be appropriate.

ITE Trip Generation

In addition to the nine (9) intersections that were counted, trip generation calculations were performed for the Holiday Inn, the Everhard Professional Building, and the Children's Physicians Plaza located on Everhard Road in order to account for the impact these businesses have on the roadway network. Trip generation calculations for these businesses were performed utilizing the Institute of Transportation Engineers (ITE) [Trip Generation Manual, 10th Edition](#).

The generated traffic volumes were based on the weekday trip generation of the adjacent street during the PM peak hour. Due to the type of businesses located in these buildings, it was determined that the generated trips on a weekday would produce the most conservative estimate for the number of trips that could be utilizing these business drives on a Saturday. All ITE trip generation calculations can be found in **Appendix C**. It should be noted that only forty percent (40%) of the generated trips for the Holiday Inn were placed at the Everhard Road / Children's Physicians Drive / Holiday Inn Drive intersection due to the other available driveways located around the Holiday Inn property.

'No-Build' Traffic Volumes

Proposed improvements would be anticipated to be completed by the year 2023 which will serve as the 'Opening Year' for the study, making the 'Design Year' 2043 (twenty [20] year design criteria). It should be noted that the Opening Year was not considered for analysis because the Design Year accounts for the highest amount of traffic that will be utilizing the roadways within the study area. Therefore, all improvements will be based on the Design Year condition.

For this study, design level peak hour traffic volumes were developed. In order to develop the design hour traffic volumes, the raw existing Saturday traffic counts discussed previously were rounded to the nearest ten and then smoothed to create a balanced network. It should be noted that a break line was included on Dressler Road between the University Street and the Belden Park Crossing intersections due to the imbalance created by the large number of vehicles that enter and exit from the unsignalized driveways between them.

In order to develop the Design Year 2043 traffic volumes, the previously identified growth rate of +0.25% per year was applied linearly to the existing rounded and smoothed traffic volumes. Once the traffic volumes were grown to the design year, the assigned trip generation from the preceding section was added to the roadway network to develop the final 'No-Build' traffic volumes. These 'No-Build' traffic volumes represent the existing travel patterns of the current roadway network if no improvements or modifications are made. See **Figure 3** for the Design Year 2043 'No-Build' peak hour traffic volumes.

'Build' Traffic Volumes

The modified roadway configurations for the multiple 'Build' alternatives, which are discussed in greater detail later in this report, require a redistribution of the 'No-Build' traffic volumes to represent the revised roadway networks and new traffic patterns. The Design Year 2043 'No-Build' traffic volumes were redistributed throughout the roadway network to represent the new traffic patterns that will occur under the proposed roadway configurations. A total of four (4) Design Year 2043 'Build' traffic volume figures were developed for this study. The 'Build' configurations are discussed in the following section. See **Figures 4 – 7** for the Design Year 2043 'Build' traffic volumes of the four (4) 'Build' traffic alternatives.

IV. Discussion of Analysis Scenarios:

Traffic Analysis Methodology

All capacity analyses performed as part of this study were done utilizing the computer program Synchro (Version 10) developed by Trafficware. Synchro can provide a macroscopic analysis of an entire roadway system and take into account the interactions and impact of traffic which travels from one intersection to the next. The capacity analysis results reported are based on the Highway Capacity Manual (HCM) calculation outputs from the Synchro software and are reported in terms of Level-of-Service (LOS) where Levels-of-Service A – D are considered acceptable by industry standards in urban areas with motorists experiencing acceptable to no delay while Levels-of-Service E & F are considered unacceptable as motorists will experience a considerable amount of delay.

SimTraffic was also utilized for purposes of this study. SimTraffic is a supplemental program to Synchro that creates a visual microscopic simulation of the traffic model created in Synchro. This program allows the user to visualize how the intersection(s) will operate in the field with the type of detection, volumes and signal timings that were used in the Synchro traffic model.

Due to the unique nature of some of the 'Build' alternatives, standard LOS reports do not provide a fair and equal comparison of the alternatives. Therefore, in order to compare each 'Build' alternative equally, non-standard industry metrics for measuring performance were utilized. Synchro and SimTraffic both have built-in performance based metrics called 'Measures of Effectiveness' (MOE's). These MOE's detail the performance of the entire roadway network as a whole which will allow for a more direct comparison of each of the 'Build' alternatives. The MOE's utilized for this study are as follows:

- Total Delay / Vehicle (sec/veh)
- Total Delay (hour)
- Stops / Vehicle
- Number of Stops
- Average Speed (mph)
- Total Travel Time (hour)
- Distance Traveled (miles)
- Performance Index

It should be noted that these MOE's are based on the total number of vehicles that enter and exit the study roadway network over the course of the entire peak hour. The 'Performance Index' MOE is a general indicator of overall network performance, with lower Performance Index's indicating better performance. The Performance Index is based on Total Delay (sec) and Vehicle Stops (total stops during the hour).

Design Year 2043 'No-Build' Traffic Conditions

The Design Year 2043 'No-Build' traffic scenario represents the existing roadway conditions as they are today. While it is understood that minor signal timing adjustments would likely occur in the future, the existing signal timings were maintained for the 'No-Build' scenario. See **Appendix D** for the Design Year 2043 'No-Build' MOE printout.

Through the process of extensive traffic modeling, GPD identified multiple intersections that are anticipated to operate with unacceptable operations under the Design Year 2043 'No-Build' traffic conditions. The first intersection of concern is the Dressler Road / Everhard Road intersection. With this being the intersection of two (2) major thoroughfares, volumes are high on all approaches. These high traffic volumes lead to major congestion and lack of throughput along the Dressler Road and Everhard Road corridors.

At a typical intersection, the majority of the cycle length is devoted to the major route to keep traffic flowing as the side street volumes are usually lower and do not require as much time. However, in the case of the Dressler Road / Everhard Road intersection, each approach requires a significant amount of time in order to service the vehicles utilizing them. Further compounding this issue are the heavy left turn demands of the EB, WB, and SB approaches. Typically during the peak hours, these left turning vehicles are only able to turn left under the protected turn phase condition due to the limited number of gaps in the opposing traffic stream. Additionally, queues from these movements occasionally spill out of their respective storage bays and back into the adjacent thru travel lane. When this occurs it further limits the capacity of the intersection as it temporarily makes that approach operate with a single thru lane. The combination of high volumes on all approaches and inadequate capacity makes it difficult to service the full traffic demand of this intersection and to also provide good traffic progression along the Dressler Road and Everhard Road corridors.

A second intersection of concern is the Dressler Road / Belden Park Crossing intersection. Due to the high density of commercial properties located on the east and west sides of Dressler Road, this intersection experiences heavy left and right turn traffic demands. This heavy traffic demand created by the commercial properties, combined with inadequate capacity, makes the EB and WB approaches operate with major congestion and queuing issues. Additionally, the heavy traffic volumes on the EB and WB approaches makes it difficult for EB and WB left turning vehicles to find acceptable gaps in the traffic stream to complete a left turn under the permissive green condition. As such, EB and WB left turning vehicles can typically only turn left under the protected green arrow condition.

Further complicating the poor side street operation is the small amount of the cycle length the side street approaches receive. As previously mentioned, the majority of the cycle length is devoted to the major route (Dressler Road) to keep traffic flowing which limits the amount of time the side street approaches (Belden Park Crossing) receive. The minimal amount of the cycle length the side street receives combined with inadequate capacity and heavy traffic demands are the main factors contributing to the poor operation of the Dressler Road / Belden Park Crossing intersection.

Another factor contributing to the overall congestion experienced throughout the study area is the lack of access management, specifically on Dressler Road from Everhard Road to Belden Village Street and on Everhard Road from Dressler Road to Belden Village Street. The large number of unsignalized full movement driveways in these areas introduces volatility in traffic flow and creates repeat patterns of crashes as vehicles attempt to cross traffic to either enter or exit an unsignalized driveway. This is particularly evident for left turn movements at these driveways. It should be noted that the traffic models were developed and calibrated to replicate the congestion and extensive queueing issues currently experienced throughout the study area.

The combination of high traffic volumes, lack of capacity, and poor access management makes it difficult to accommodate the full traffic demand and provide proper progression through the study area. The identification of these areas of concern has led GPD to develop multiple 'Build' alternatives that will attempt to improve traffic flow throughout the study area and address each area of concern. Each 'Build' alternative will be discussed in greater detail below.

Design Year 2043 'Build' Alternatives

This evaluation developed four (4) different 'Build' alternatives for the study area network. 'Build Alternatives 1 & 2' are more traditional while 'Build Alternatives 3 & 4' are more unique and "out of the box" type improvements. 'Build Alternative 1' only focuses on retiming the Dressler Road corridor while 'Build Alternatives 2 – 4' focus primarily on improving operations in the triangular roadway network area created by the following 3 intersections:

1. Dressler Road / Everhard Road
2. Dressler Road / Belden Village Street
3. Everhard Road / Belden Village Street

While 'Build Alternatives 2 – 4' focus primarily on the triangular network described above, the following improvements were determined to be necessary to improve the operations of the Dressler Road / Belden Park Crossing intersection under every alternative:

- EB Approach – *lane assignment (left, thru, right)*
 - Construct a right turn lane.
 - Implement a right turn overlap signal phase to operate with the NB left turn signal phase.
- WB Approach – *lane assignment (left, thru, right)*
 - Construct a right turn lane.
 - Implement a right turn overlap signal phase to operate with the SB left turn signal phase.

The improvements detailed above are included in each of the 'Build Alternatives 2 – 4' and will be referred to as the 'Belden Park Crossing Improvements' for the remainder of this study. It should be noted that the 'Belden Park Crossing Improvements' can be constructed independently of each of the 'Build' alternatives.

'Build Alternative 1' – Signal Retiming

'Build Alternative 1' was developed as more of a short-term improvement option that could be implemented almost immediately if determined to be beneficial. When performing the retiming evaluation, it was determined that it would be beneficial to coordinate the Everhard Road / Belden Village Street / Plaza Drive intersection as well. Currently, this intersection operates as an isolated free operating intersection. The inclusion of the Everhard Road / Belden Village Street / Plaza Drive intersection as part of the Dressler Road corridor (University Street to Belden Village Street) promotes improved progression along Everhard Road. If desired by the county, additional signal coordination work could be done further east and south on Everhard Road and further north and south on Dressler Road, outside of the current study area.

Currently, the Dressler Road corridor operates on a 120 second cycle length during the Saturday peak hour. The signal retiming analysis evaluated multiple cycle lengths for the Dressler Road corridor and determined that a lower cycle length (100 seconds) would be beneficial. This lower cycle length decreases queuing and delay throughout the entire study area. Additionally, it promotes improved traffic progression by increasing travel speeds and reducing travel time through the study network. Once the optimal corridor cycle length was determined, GPD optimized the split times and offsets at each intersection along the corridor.

Table 1 displays the Synchro Measures of Effectiveness (MOE) results of the Design Year 2043 'No-Build' vs. 'Build Alternative 1' traffic conditions. The Design Year 2043 'No-Build' traffic volumes were utilized for both scenarios. See **Appendix D** for the Design Year 2043 'No-Build' and 'Build Alternative 1' MOE reports.

Table 1: Synchro Measures of Effectiveness Summary – Design Year 2043 'No-Build' vs. 'Build Alternative 1'			
Measure of Effectiveness	'No-Build' Conditions	'Build Alternative 1' Conditions	Difference (%)
Total Delay / Vehicle (sec/veh)	24	19	-21%
Total Delay (hr)	197	163	-17%
Stops / Vehicle	0.45	0.46	0%
Stops (#)	13,619	13,691	+1%
Average Speed (mph)	14	16	+14%
Total Travel Time (hr)	338	304	-10%
Distance Traveled (mi)	4,877	4,876	0%
Performance Index	234.4	200.6	-14%

Note: Green highlighted cells indicate a positive change.
Red highlighted cells indicate a negative change.
Yellow highlighted cells indicate no change.

As shown in **Table 1**, by retiming the Dressler Road corridor the overall performance of the network is improved with decreases in total delay and travel time and an increase in travel speeds. Even though the new signal timings will slightly increase the number of stops occurring in the network, the reductions in delay and travel time outweigh it. As previously stated, the signal retiming was developed as a short-term improvement option and is only a temporary fix. Although it would provide immediate improvement, it will not address the long-term needs of the study area from a level-of-service perspective.

Table 2 displays the SimTraffic Measures of Effectiveness (MOE) results of the Design Year 2043 'No-Build' vs. 'Build Alternative 1' traffic conditions. The Design Year 2043 'No-Build' traffic volumes were utilized for both scenarios. See **Appendix E** for the Design Year 2043 'No-Build' and 'Build Alternative 1' MOE reports.

Table 2: SimTraffic Measures of Effectiveness Summary – Design Year 2043 'No-Build' vs. 'Build Alternative 1'			
Measure of Effectiveness	'No-Build' Conditions	'Build Alternative 1' Conditions	Difference (%)
Total Delay / Vehicle (sec/veh)	129.8	96.3	-26%
Total Delay (hr)	303.1	221.5	-27%
Stops / Vehicle	1.72	1.74	+1%
Stops (#)	14,490	14,431	0%
Average Speed (mph)	14	16	+14%
Total Travel Time (hr)	563.8	458.0	-19%

Note: Green highlighted cells indicate a positive change.
Red highlighted cells indicate a negative change.
Yellow highlighted cells indicate no change.

As shown in **Table 2**, the SimTraffic MOE's report similar results as the Synchro MOE's. The SimTraffic MOE's confirm that retiming the Dressler Road corridor will improve the overall performance of the network, reduce delay and travel time, and increase travel speeds. As previously stated, the signal retiming was developed as a short-term improvement option and is only a temporary fix. Although it would provide immediate improvement, it will not address the long-term needs of the study area from a level-of-service perspective.

'Build Alternative 2' – Capacity & Access Management

The 'Build Alternative 2' traffic scenario was developed to improve access management and increase the capacity of the Dressler Road / Everhard Road intersection. The 'Build Alternative 2' traffic scenario incorporates the previously identified 'Belden Park Crossing Improvements' as well as the following additional improvements:

- Install a raised median on Dressler Road from:
 - Everhard Road to Belden Village Street.
 - Belden Park Crossing to University Street.

- Install a raised median on Everhard Road from:
 - Dressler Road to the Children’s Physicians Drive / Holiday Inn Drive intersection.
- Construct a traffic signal at the Everhard Road / Children’s Physicians Drive / Holiday Inn Drive intersection.
- Construct an access road from the Everhard Road / Children’s Physicians Drive / Holiday Inn Drive intersection to Inn Circle through a cross-access arrangement between the Everhard Professional Building and the Children’s Physicians Office Building properties.
- Dressler Road / Everhard Road Intersection:
 - EB Approach – *lane assignment (left, left, thru, thru-right)*
 - Construct a second dedicated left turn lane.
 - Implement protected only signal phasing for the dual left turns.
 - WB Approach – *lane assignment (left, left, thru, thru, right)*
 - Construct a second dedicated left turn lane.
 - Implement protected only signal phasing for the dual left turns.
 - SB Approach – *lane assignment (left, left, thru, thru-right)*
 - Construct a second dedicated left turn lane.
 - Implement protected only signal phasing for the dual left turns.
 - NB Approach – *lane assignment (thru, thru-right)*
 - Restrict left turn movement.
- Convert the Dressler Road / West Mall Drive intersection to right-in / right-out.
- Convert the Belden Village Street / South Mall Drive intersection to right-in / right-out.
- Incorporate corridor signal retiming.

See **Figure 8** for the proposed lane configuration and traffic control at each study intersection under ‘Build Alternative 2’.

The installation of raised medians throughout the study area provides two (2) important benefits. First, it improves safety by eliminating conflict points at unsignalized intersections. Second, it improves traffic operations as it reduces volatility in the flow of traffic along the mainline roadways as vehicles are unable to make left turns in or out of unsignalized driveways.

With the proposal of a raised median to be installed on Everhard Road from Dressler Road to the Children’s Physicians Drive / Holiday Inn Drive intersection, the EB and SB left turn movements of the Everhard Road / Inn Circle intersection will be eliminated. When determining where to reroute these now restricted movements there were two (2) options considered. These movements could either be rerouted to utilize the Dressler Road / Belden Park Crossing and Dressler Road / Everhard Road intersections, both of which are currently congested and over capacity, or they could be rerouted to utilize the Everhard Road / Children’s Physicians Drive / Holiday Inn Drive intersection.

Both reroute options were modeled and it was determined that routing additional traffic through the Dressler Road / Belden Park Crossing and Dressler Road / Everhard Road intersections would be too detrimental and require additional capacity improvements. Therefore, it was determined that it would be best to reroute these movements through the Everhard Road / Children's Physicians Drive / Holiday Inn Drive intersection. This rerouting of vehicles led to the proposed improvements of signaling the Everhard Road / Children's Physicians Drive / Holiday Inn Drive intersection and creating an access road to Inn Circle through a cross-access arrangement between the Everhard Professional Building and the Children's Physicians Office Building properties. These two (2) improvements would help encourage the use of this new travel route to and from Inn Circle. It should be noted that the Everhard Road / Inn Circle intersection would still be maintained as a right-in / right-out (RI/RO) only intersection.

The addition of a second dedicated left turn lane on the EB, WB, and SB approaches of the Dressler Road / Everhard Road intersection increases its capacity. Providing dual left turn lanes on these three (3) approaches will allow the Dressler Road / Everhard Road intersection to service more vehicles each signal cycle while also reducing queuing. With the Dressler Road / Everhard Road intersection being the constraining point of the Dressler Road corridor, the capacity improvements should also improve the overall traffic flow and operation throughout the rest of the study area.

Table 3 displays the Synchro Measures of Effectiveness (MOE) results of the Design Year 2043 'No-Build' vs. 'Build Alternative 2' traffic conditions. See **Appendix D** for the Design Year 2043 'No-Build' and 'Build Alternative 2' MOE reports.

Table 3: Synchro Measures of Effectiveness Summary – Design Year 2043 'No-Build' vs. 'Build Alternative 2'			
Measure of Effectiveness	'No-Build' Conditions	'Build Alternative 2' Conditions	Difference (%)
Total Delay / Vehicle (sec/veh)	24	18	-25%
Total Delay (hr)	197	159	-19%
Stops / Vehicle	0.45	0.42	-7%
Stops (#)	13,619	13,798	+1%
Average Speed (mph)	14	16	+14%
Total Travel Time (hr)	338	300	-11%
Distance Traveled (mi)	4,877	4,861	0%
Performance Index	234.4	197.2	-16%

Note: Green highlighted cells indicate a positive change.

Red highlighted cells indicate a negative change.

Yellow highlighted cells indicate no change.

As shown in **Table 3**, the improvements of 'Build Alternative 2' will improve the overall performance of the network. The proposed improvements will greatly reduce the total delay experienced by motorists throughout the network. With increased capacity at the constraining Dressler Road / Everhard Road intersection, traffic flow and operations throughout the entire study network are improved. It should be noted that a large part of the benefit shown comes from optimizing the signal timings, as can be seen from the results of 'Build Alternative 1', with the additional proposed improvements.

Table 4 displays the SimTraffic Measures of Effectiveness (MOE's) results of the Design Year 2043 'No-Build' vs. 'Build Alternative 2' traffic conditions. See **Appendix E** for the Design Year 2043 'No-Build' and 'Build Alternative 2' MOE's reports.

Table 4: SimTraffic Measures of Effectiveness Summary – Design Year 2043 'No-Build' vs. 'Build Alternative 2'			
Measure of Effectiveness	'No-Build' Conditions	'Build Alternative 2' Conditions	Difference (%)
Total Delay / Vehicle (sec/veh)	129.8	85.4	-34%
Total Delay (hr)	303.1	198.5	-35%
Stops / Vehicle	1.72	1.58	-8%
Stops (#)	14,490	13,248	-9%
Average Speed (mph)	14	17	+21%
Total Travel Time (hr)	563.8	439.2	-22%

Note: Green highlighted cells indicate a positive change.
Red highlighted cells indicate a negative change.
Yellow highlighted cells indicate no change.

As shown in **Table 4**, the SimTraffic MOE's report improvements for all the performance metrics from the Design Year 2043 'No-Build' to the Design Year 2043 'Build Alternative 2' conditions. With the proposed improvements, motorists will incur far less delay, stop less frequently, and travel at faster speeds. These results indicate that the improvements of 'Build Alternative 2' will greatly improve the traffic operations and addresses the long-term needs of the study area.

'Build Alternative 3' – Jug Handle

The 'Build Alternative 3' traffic scenario was developed as a simple, non-traditional improvement that attempts to improve the operation of the Dressler Road / Everhard Road intersection without constructing any additional capacity improvements. The 'Build Alternative 3' traffic scenario incorporates all of the 'Build Alternative 2' improvements, with the exception of the improvements at the Dressler Road / Everhard Road intersection. For 'Build Alternative 3', the following improvements are proposed for the Dressler Road / Everhard Road intersection:

- SB Approach – *lane assignment (thru, thru, thru-right)*
 - Restrict left turn movement.
 - Restripe existing left turn lane as a thru-only lane.
- NB Approach – *lane assignment (thru, thru-right)*
 - Restrict left turn movement.
 - Restripe existing left turn lane as a SB travel lane.

See **Figure 9** for the proposed lane configuration and traffic control at each study intersection under 'Build Alternative 3'.

The intent behind eliminating the SB left turn movement is that the SB left turn phase could also be eliminated, which would allow for green time in the signal cycle to be redistributed to the other signal phases of the intersection. Although the SB left turn movement is restricted, it does not remove the vehicles from the Dressler Road / Everhard intersection, and actually causes them to pass through the intersection twice.

Vehicles currently making the SB left turn movement at the Dressler Road / Everhard Road intersection will now need to continue south through the intersection, then make a SB right turn at the Dressler Road / Belden Village Street intersection, then a WB right turn at the Everhard Road / Belden Village Street / Plaza Drive intersection, and then finally travel back thru the Dressler Road / Everhard Road intersection as an EB thru vehicle. It should be noted that it is most likely that some of these vehicles are destined for SB I-77 as there is an interchange located east of the study area on Everhard Road. Since there is another partial interchange located east of the study area on Belden Village Street with access to SB I-77, it is likely that some of these rerouted vehicles may turn left instead of right at the Dressler Road / Belden Village Street intersection. For purposes of this study it was assumed that 100% of vehicles followed the reroute path described earlier in this paragraph. However, if this were to occur it would only further degrade the already poor operation of the Dressler Road / Belden Village Street intersection.

Table 5 displays the Synchro Measures of Effectiveness (MOE) results of the Design Year 2043 'No-Build' vs. 'Build Alternative 3' traffic conditions. See **Appendix D** for the Design Year 2043 'No-Build' and 'Build Alternative 3' MOE reports.

Table 5: Synchro Measures of Effectiveness Summary – Design Year 2043 'No-Build' vs. 'Build Alternative 3'			
Measure of Effectiveness	'No-Build' Conditions	'Build Alternative 3' Conditions	Difference (%)
Total Delay / Vehicle (sec/veh)	24	18	-25%
Total Delay (hr)	197	165	-16%
Stops / Vehicle	0.45	0.47	+4%
Stops (#)	13,619	15,139	+11%
Average Speed (mph)	14	16	+14%
Total Travel Time (hr)	338	311	-8%
Distance Traveled (mi)	4,877	5,059	+4%
Performance Index	234.4	206.6	-12%

Note: Green highlighted cells indicate a positive change.
Red highlighted cells indicate a negative change.
Yellow highlighted cells indicate no change.

As shown in **Table 5**, the improvements of 'Build Alternative 3' will improve the overall performance of the network. The proposed improvements will drastically reduce the total delay experienced by motorists throughout the network. Even with the rerouted vehicles needing to travel a further distance, the total travel time was reduced by 8%. However, the increase in the number of vehicle stops is concerning and indicates that it is difficult to provide smooth progression along each of the study corridors. As such, the improvements of 'Build Alternative 3' may not address the long-term needs of the study area.

Table 6 displays the SimTraffic Measures of Effectiveness (MOE's) results of the Design Year 2043 'No-Build' vs. 'Build Alternative 3' traffic conditions. See **Appendix E** for the Design Year 2043 'No-Build' and 'Build Alternative 3' MOE's reports.

Table 6: SimTraffic Measures of Effectiveness Summary – Design Year 2043 'No-Build' vs. 'Build Alternative 3'			
Measure of Effectiveness	'No-Build' Conditions	'Build Alternative 3' Conditions	Difference (%)
Total Delay / Vehicle (sec/veh)	129.8	90.8	-30%
Total Delay (hr)	303.1	206.4	-32%
Stops / Vehicle	1.72	1.68	-2%
Stops (#)	14,490	13,784	-5%
Average Speed (mph)	14	17	+21%
Total Travel Time (hr)	563.8	449.8	-20%

Note: Green highlighted cells indicate a positive change.
Red highlighted cells indicate a negative change.
Yellow highlighted cells indicate no change.

As shown in **Table 6**, the SimTraffic MOE's report improvements for all the performance metrics from the Design Year 2043 'No-Build' to the Design Year 2043 'Build Alternative 3' conditions. One thing to note, is that SimTraffic indicates that the number of vehicle stops would actually decrease under the 'Build Alternative 3' conditions when compared to the 'No-Build' conditions. This is contradictory to what the previous Synchro results indicated. Therefore, according to these results, the improvements of 'Build Alternative 3' will improve the traffic operations and potentially address the long-term needs of the study area.

'Build Alternative 4' – One-Way Circulation

'Build Alternative 4' is a concept that the Stark County Engineer's Office requested GPD to investigate for potential viability. This alternative would convert the "triangular" roadway network into one-way streets. This configuration would offer increased capacity and is typically safer because it reduces the amount of conflict points at intersections and the potential for crashes. However, one-way streets do come with some disadvantages as well. One-way streets can be difficult to navigate (especially for non-local traffic), they lead to more vehicle miles traveled, and business owners believe that they do not receive as much visibility from passing traffic as compared to two-way streets. Another difficulty with implementing one-way streets in this area are the lane alignment issues that would occur when a one-way approach opposes a two-way approach.

Since it is not known which direction of one-way travel around the "triangle" would be the most beneficial, this evaluation modeled one-way circulation in both directions. As such, 'Build Alternative 4' was broken down into the following two (2) sub-builds:

- 'Build Alternative 4A' – Counter-Clockwise Circulation
- 'Build Alternative 4B' – Clockwise Circulation

Each 'Build' alternative took into account the number of lanes available at each intersection, where those lanes lead to at the next intersection and how those lanes will develop or drop when they oppose a two-way approach. See **Figures 10 & 11** for the proposed lane configuration and traffic control at each study intersection under 'Build Alternatives 4A & 4B', respectively.

Table 7 displays the Synchro Measures of Effectiveness (MOE) results of the Design Year 2043 'No-Build' vs. 'Build Alternatives 4A & 4B' traffic conditions. See **Appendix D** for the Design Year 2043 'No-Build' and 'Build Alternatives 4A & 4B' MOE reports.

Table 7: Synchro Measures of Effectiveness Summary – Design Year 2043 'No-Build' vs. 'Build Alternatives 4A & 4B'					
Measure of Effectiveness	'No-Build' Conditions	'Build Alternative 4A' Conditions		'Build Alternative 4B' Conditions	
		MOE's	Difference (%)	MOE's	Difference (%)
Total Delay / Vehicle (sec/veh)	24	19	-21%	19	-21%
Total Delay (hr)	197	169	-14%	165	-16%
Stops / Vehicle	0.45	0.42	-7%	0.44	-2%
Stops (#)	13,619	13,583	0%	13,920	+2%
Average Speed (mph)	14	16	+14%	16	+14%
Total Travel Time (hr)	338	320	-5%	314	-7%
Distance Traveled (mi)	4,877	5,177	+6%	5,109	+5%
Performance Index	234.4	206.6	-12%	204.0	-13%

Note: Green highlighted cells indicate a positive change.
Red highlighted cells indicate a negative change.
Yellow highlighted cells indicate no change.

As shown in **Table 7**, the improvements of 'Build Alternatives 4A & 4B' will improve the overall performance of the network. Converting the "triangular" network to one-way operation will reduce the total delay experienced by motorists even with the increase in distance traveled. This can be mostly attributed to the improved operation of the signalized intersections in the "triangular" network as the one-way operations require fewer signal phases and therefore, have more time that can be given to other phases. When comparing 'Build Alternatives 4A & 4B', 'Build Alternatives 4B' (Clockwise Circulation) offers slightly better operations overall.

Table 8 displays the SimTraffic Measures of Effectiveness (MOE) results of the Design Year 2043 'No-Build' vs. 'Build Alternatives 4A & 4B' traffic conditions. See **Appendix E** for the Design Year 2043 'Build Alternatives 4A & 4B' MOE reports.

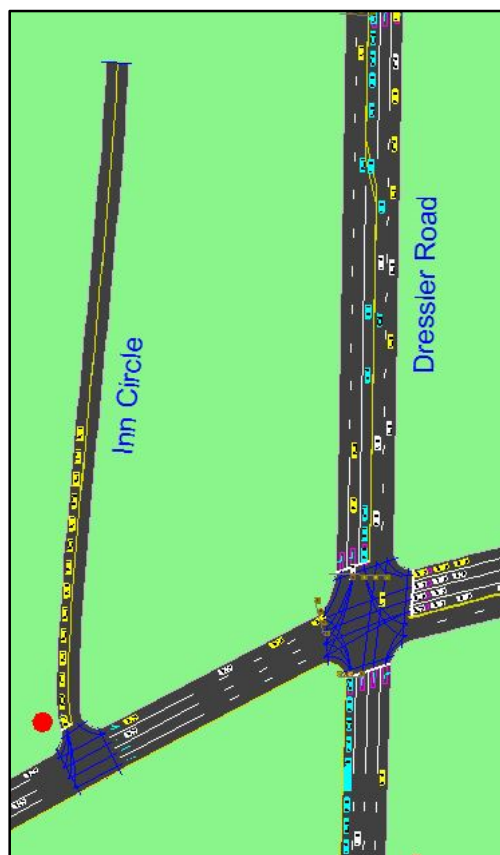
Table 8: SimTraffic Measures of Effectiveness Summary – Design Year 2043 'No-Build' vs. 'Build Alternatives 4A & 4B'					
Measure of Effectiveness	'No-Build' Conditions	'Build Alternatives 4A' Conditions		'Build Alternatives 4B' Conditions	
		MOE's	Difference (%)	MOE's	Difference (%)
Total Delay / Vehicle (sec/veh)	129.8	97.1	-25%	127.9	-1%
Total Delay (hr)	303.1	227.0	-25%	291.9	-4%
Stops / Vehicle	1.72	1.53	-11%	1.79	+4%
Stops (#)	14,490	12,907	-11%	14,710	+2%
Average Speed (mph)	14	16	+14%	14	0%
Total Travel Time (hr)	563.8	480.8	-15%	634.3	+13%

Note: Green highlighted cells indicate a positive change.
Red highlighted cells indicate a negative change.
Yellow highlighted cells indicate no change.

As shown in **Table 8**, the SimTraffic MOE's report improvements in all performance metrics for the Design Year 2043 'Build Alternative 4A' conditions and in only two (2) of the six (6) metrics for the Design Year 2043 'Build Alternative 4B' conditions. Contrary to the results of the Synchro analysis, the SimTraffic analysis results indicate that 'Build Alternative 4A' (Counter-Clockwise Circulation) would be the most beneficial one-way alternative.

The discrepancy between the Synchro and SimTraffic results of 'Build Alternatives 4A & 4B' is most likely due to the turning movement changes at the unsignalized intersections. Under 'Build Alternative 4A', a majority of the turning movements at the unsignalized intersections would be right turns, whereas under 'Build Alternative 4B' they would be left turns. The effects of this is apparent when watching the SimTraffic simulations, particularly at the Everhard Road / Inn Circle intersection.

Under 'Build Alternative 4B', when the EB approach of the Dressler Road / Everhard Road intersection begins to develop a queue it temporarily blocks the SB approach of Inn Circle due to their close proximity. This queue blocking prevents vehicles on Inn Circle from turning left onto Everhard Road. This issue, coupled with finding acceptable gaps in the EB traffic stream on Everhard Road, makes it difficult for vehicles to turn left out of Inn Circle. Alternatively, under 'Build Alternative 4A' (when vehicles exiting Inn Circle turn right onto Everhard Road) queue blocking no longer becomes an issue and vehicles have an easier time turning onto Everhard Road. These effects are captured in the SimTraffic simulations and are reflected in the MOE's. Screenshots from the SimTraffic simulations of 'Build Alternatives 4A & 4B' are shown below to display these effects.



'Build Alternative 4A'



'Build Alternative 4B'

Analysis Conclusion:

Through the process of extensive traffic modeling, GPD identified multiple intersections throughout the study area that are anticipated to operate with unacceptable operations under the Design Year 2043 'No-Build' traffic conditions. It was also determined that a lack of proper access management contributes to the overall congestion experienced throughout the study area, specifically on Dressler Road from Everhard Road to Belden Village Street and on Everhard Road from Dressler Road to Belden Village Street. The combination of high traffic volumes, lack of capacity, and poor access management makes it difficult to accommodate the full traffic demand and provide proper progression through the study area. The identification of these areas of concern lead GPD to develop multiple 'Build' traffic scenarios that would improve traffic flow throughout the study area.

GPD developed and analyzed four (4) different 'Build' alternatives as part of this study in an attempt to mitigate the congestion in the study area and improve traffic flow through the study area. **Tables 9 & 10** compare the Synchro and SimTraffic Measures of Effectiveness (MOE's) results, respectively, of the Design Year 2043 'No-Build' versus each of the 'Build' alternatives.

Table 9: Synchro Measures of Effectiveness Summary – Design Year 2043 'No-Build' vs. 'Build Alternatives 1 – 4'							
Total Delay / Vehicle (sec/veh)	Total Delay (hr)	Stops / Vehicle	Stops (#)	Average Speed (mph)	Total Travel Time (hr)	Distance Traveled (mi)	Performance Index
'No-Build' Conditions							
24	197	0.45	13,619	14	338	4,877	234.4
'Build Alternative 1' – Signal Retiming							
19	163	0.46	13,691	16	304	4,876	200.6
-21%	-17%	0%	+1%	+14%	-10%	0%	-14%
'Build Alternative 2' – Capacity & Access Management							
18	159	0.42	13,798	16	300	4,861	197.2
-25%	-19%	-7%	+1%	+14%	-11%	0%	-16%
'Build Alternative 3' – Jug Handle							
18	165	0.47	15,139	16	311	5,059	206.6
-25%	-16%	+4%	+11%	+14%	-8%	+4%	-12%
'Build Alternative 4A' – One-Way (Counter-Clockwise Circulation)							
19	169	0.42	13,583	16	320	5,177	206.6
-21%	-14%	-7%	0%	+14%	-5%	+6%	-12%
'Build Alternative 4B' – One-Way (Clockwise Circulation)							
19	165	0.44	13,920	16	314	5,109	204.0
-21%	-16%	-2%	+2%	+14%	-7%	+5%	-13%

Note: Green highlighted cells indicate a positive change.

Red highlighted cells indicate a negative change.

Yellow highlighted cells indicate no change.

Table 10: SimTraffic Measures of Effectiveness Summary – Design Year 2043 'No-Build' vs. 'Build Alternatives 1 – 4'					
Total Delay / Vehicle (sec/veh)	Total Delay (hr)	Stops / Vehicle	Stops (#)	Average Speed (mph)	Total Travel Time (hr)
'No-Build' Conditions					
129.8	303.1	1.72	14,490	14	563.8
'Build Alternative 1' – Signal Retiming					
96.3	221.5	1.74	14,431	16	458.0
-26%	-27%	+1%	0%	+14%	-19%
'Build Alternative 2' – Capacity & Access Management					
85.4	198.5	1.58	13,248	17	439.2
-34%	-35%	-8%	-9%	+21%	-22%
'Build Alternative 3' – Jug Handle					
90.8	206.4	1.68	13,784	17	449.8
-30%	-32%	-2%	-5%	+21%	-20%
'Build Alternative 4A' – One-Way (Counter-Clockwise Circulation)					
97.1	227.0	1.53	12,907	16	480.8
-25%	-25%	-11%	-11%	+14%	-15%
'Build Alternative 4B' – One-Way (Clockwise Circulation)					
127.9	291.9	1.79	14,710	14	634.3
-1%	-4%	+4%	+2%	0%	+13%

Note: Green highlighted cells indicate a positive change.

Red highlighted cells indicate a negative change.

Yellow highlighted cells indicate no change.

As can be seen from **Tables 9 & 10**, the Synchro and SimTraffic MOE's indicate that the improvements of 'Build Alternative 2' will be the most beneficial option to address the congestion and traffic flow concerns throughout the study area. A summary of the improvements included within the 'Build Alternative 2' traffic scenario are detailed below:

- Install a raised median on Dressler Road from:
 - Everhard Road to Belden Village Street.
 - Belden Park Crossing to University Street.
- Install a raised median on Everhard Road from:
 - Dressler Road to the Children's Physicians Drive / Holiday Inn Drive intersection.
- Construct a traffic signal at the Everhard Road / Children's Physicians Drive / Holiday Inn Drive intersection.
- Construct an access road from the Everhard Road / Children's Physicians Drive / Holiday Inn Drive intersection to Inn Circle through a cross-access arrangement between the Everhard Professional Building and the Children's Physicians Office Building properties.
- Convert the Dressler Road / West Mall Drive intersection to right-in / right-out.
- Convert the Belden Village Street / South Mall Drive intersection to right-in / right-out.
- Incorporate corridor signal retiming.

- Dressler Road / Everhard Road Intersection:
 - EB Approach – *lane assignment (left, left, thru, thru-right)*
 - Construct a second dedicated left turn lane.
 - Implement protected only signal phasing for the dual left turns.
 - WB Approach – *lane assignment (left, left, thru, thru, right)*
 - Construct a second dedicated left turn lane.
 - Implement protected only signal phasing for the dual left turns.
 - SB Approach – *lane assignment (left, left, thru, thru-right)*
 - Construct a second dedicated left turn lane.
 - Implement protected only signal phasing for the dual left turns.
 - NB Approach – *lane assignment (thru, thru-right)*
 - Restrict left turn movement.
 - Restripe existing left turn lane with transverse stripes.
- Dressler Road / Belden Park Crossing Intersection:
 - EB Approach – *lane assignment (left, thru, right)*
 - Construct a right turn lane.
 - Implement right turn overlap signal phase to operate with the NB left turn signal phase.
 - WB Approach – *lane assignment (left, thru, right)*
 - Construct a right turn lane.
 - Implement right turn overlap signal phase to operate with the SB left turn signal phase.

It should be noted that the improvements proposed at the Dressler Road / Belden Park Crossing intersection can be constructed independently of the other 'Build' improvements as they provide independent utility from the Dressler Road corridor. Meaning that they do not need to be constructed at the same time in order to provide improvement to the Dressler Road corridor. However, in order to provide the most benefit to the corridor and address all the traffic concerns detailed in this report, all proposed improvements should be constructed at the same time. See **Figure 12** for a conceptual rendering of the 'Build Alternative 2' improvements.

Since the proposed improvements of 'Build Alternative 2' are more of a traditional type of improvement, the HCM Levels-of-Service and delay comparing the Design Year 2043 'No-Build' vs. 'Build Alternative 2' conditions were provided. **Table 11** displays the HCM Intersection Capacity Analysis and details the Levels-of-Service and delay experienced under the Design Year 2043 'No-Build' vs. 'Build Alternative 2' traffic conditions for the signalized intersections within the study area. See **Appendix F** for the HCM Intersection Capacity Analysis reports.

Table 11: HCM Intersection Capacity Analysis Summary – Design Year 2043 'No-Build' vs. 'Build Alternative 2' Conditions – Signalized Intersections				
Intersection / Movement	'No-Build' Conditions		'Build Alternative 2' Conditions	
	LOS	Delay (sec)	LOS	Delay (sec)
Dressler Road / Belden Village Street				
Eastbound Left	D	40.1	C	29.5
Eastbound Thru	D	47.9	D	41.8
Eastbound Thru-Right	D	48.2	D	42.2
<i>Eastbound Approach</i>	<i>D</i>	<i>47.1</i>	<i>D</i>	<i>40.5</i>
Westbound Left	F	135.3	E	75.2
Westbound Thru	D	52.3	D	40.9
Westbound Thru-Right	E	60.5	D	42.3
<i>Westbound Approach</i>	<i>F</i>	<i>82.6</i>	<i>D</i>	<i>52.5</i>
Northbound Left	C	20.0	C	22.8
Northbound Thru	D	36.0	D	54.6
Northbound Thru-Right	D	36.5	E	56.1
<i>Northbound Approach</i>	<i>C</i>	<i>34.7</i>	<i>D</i>	<i>52.2</i>
Southbound Left	C	32.8	D	54.6
Southbound Thru	A	4.7	D	36.5
Southbound Thru-Right	A	4.6	D	36.4
<i>Southbound Approach</i>	<i>B</i>	<i>11.6</i>	<i>D</i>	<i>40.9</i>
Intersection Total	D	43.0	D	47.2
Dressler Road / Everhard Road				
Eastbound Left	F	85.0	D	47.4
Eastbound Thru	D	49.2	D	37.8
Eastbound Thru-Right	D	49.2	D	37.7
<i>Eastbound Approach</i>	<i>E</i>	<i>62.4</i>	<i>D</i>	<i>41.3</i>
Westbound Left	E	73.7	D	50.9
Westbound Thru	D	44.9	D	39.4
Westbound Right	C	34.4	C	29.2
<i>Westbound Approach</i>	<i>D</i>	<i>50.0</i>	<i>D</i>	<i>39.8</i>
Northbound Left	C	31.5		
Northbound Thru	C	33.3	D	48.9
Northbound Thru-Right	C	33.3	D	48.9
<i>Northbound Approach</i>	<i>C</i>	<i>33.2</i>	<i>D</i>	<i>48.9</i>
Southbound Left	D	51.4	D	46.6
Southbound Thru	D	43.3	A	5.1
Southbound Thru-Right	D	43.5	A	5.3
<i>Southbound Approach</i>	<i>D</i>	<i>45.1</i>	<i>B</i>	<i>15.5</i>
Intersection Total	D	47.2	C	34.2

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

Table 11: HCM Intersection Capacity Analysis Summary (Cont.) – Design Year 2043 'No-Build' vs. 'Build Alternative 2' Conditions – Signalized Intersections				
Intersection / Movement	'No-Build' Conditions		'Build Alternative 2' Conditions	
	LOS	Delay (sec)	LOS	Delay (sec)
Dressler Road / Belden Park Crossing				
Eastbound Left	F	246.5	D	48.6
Eastbound Thru	E	55.8	C	34.2
Eastbound Right			C	27.3
<i>Eastbound Approach</i>	F	154.5	D	39.2
Westbound Left	F	113.1	D	40.1
Westbound Thru	F	100.6	D	36.0
Westbound Right			D	36.1
<i>Westbound Approach</i>	F	106.1	D	37.8
Northbound Left	D	38.8	D	37.4
Northbound Thru	D	47.1	C	23.2
Northbound Thru-Right	D	47.4	C	23.7
<i>Northbound Approach</i>	D	45.6	C	26.3
Southbound Left	C	26.6	B	18.6
Southbound Thru	C	33.7	C	31.0
Southbound Thru-Right	C	33.5	C	30.9
<i>Southbound Approach</i>	C	32.8	C	29.5
Intersection Total	E	67.4	C	31.0
Dressler Road / University Street / Petitti Drive				
Eastbound Left-Thru	F	253.6	F	143.7
Eastbound Right	D	38.7	C	28.3
<i>Eastbound Approach</i>	F	80.4	D	50.7
Westbound Left-Thru	F	82.7	D	49.2
Westbound Right	D	36.9	C	28.7
<i>Westbound Approach</i>	E	63.1	D	40.4
Northbound Left	C	20.8	B	17.8
Northbound Thru	A	2.5	A	1.2
Northbound Thru-Right	A	2.5	A	1.2
<i>Northbound Approach</i>	A	5.6	A	4.0
Southbound Left	B	12.5	B	12.7
Southbound Thru	C	20.4	C	22.1
Southbound Thru-Right	C	20.4	C	22.0
<i>Southbound Approach</i>	C	20.3	C	21.9
Intersection Total	C	21.0	B	17.0

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

Table 11: HCM Intersection Capacity Analysis Summary (Cont.) – Design Year 2043 'No-Build' vs. 'Build Alternative 2' Conditions – Signalized Intersections				
Intersection / Movement	'No-Build' Conditions		'Build Alternative 2' Conditions	
	LOS	Delay (sec)	LOS	Delay (sec)
Everhard Road / Belden Village Street / Plaza Drive				
Eastbound Left-Thru-Right	D	41.5	D	45.6
<i>Eastbound Approach</i>	<i>D</i>	<i>41.5</i>	<i>D</i>	<i>45.6</i>
Westbound Left	C	33.7	D	38.3
Westbound Left-Thru-Right	D	37.7	D	49.3
<i>Westbound Approach</i>	<i>D</i>	<i>35.9</i>	<i>D</i>	<i>44.3</i>
Northbound Left	B	19.8	B	19.5
Northbound Thru	B	15.0	B	15.5
Northbound Right	A	4.7	A	4.9
<i>Northbound Approach</i>	<i>B</i>	<i>12.1</i>	<i>B</i>	<i>12.5</i>
Southbound Left	C	29.2	C	34.0
Southbound Thru	B	15.2	B	16.0
Southbound Thru-Right	B	15.1	B	15.9
<i>Southbound Approach</i>	<i>B</i>	<i>16.8</i>	<i>B</i>	<i>18.1</i>
Intersection Total	B	19.3	C	21.9
Everhard Road / Children's Physicians Drive / Holiday Inn Drive				
Eastbound Left			A	2.2
Eastbound Thru			A	0.5
Eastbound Thru-Right			A	0.5
<i>Eastbound Approach</i>			A	0.8
Westbound Left			A	2.2
Westbound Thru			A	3.4
Westbound Thru-Right			A	3.4
<i>Westbound Approach</i>			A	3.4
Northbound Left-Thru-Right			D	38.9
<i>Northbound Approach</i>			<i>D</i>	<i>38.9</i>
Southbound Left-Thru-Right			D	43.6
<i>Southbound Approach</i>			<i>D</i>	<i>43.6</i>
Intersection Total			A	4.7

As shown in **Table 11**, the analysis of the Design Year 2043 'No-Build' traffic conditions shows that four (4) of the five (5) study intersections are anticipated to operate with unacceptable Levels-of-Service during the Saturday peak hour without any improvements being made to the network. These intersections operate with unacceptable levels-of-service due to poor signal timings and lack of capacity to accommodate their projected traffic demands. As can be seen in **Table 11**, the recommended 'Build Alternative 2' improvements have shown to improve traffic operations throughout the study area and lessen the impact of existing deficiencies that will continue to persist into the future without further action. The two (2) intersections that benefit the most from the proposed improvements are the Dressler Road / Everhard Road and Dressler Road / Belden Park Crossing intersections.

The overall intersection delays of the Dressler Road / Everhard Road and Dressler Road / Belden Park Crossing intersections are anticipated to decrease by approximately 13 seconds (28%) and 36 seconds (54%), respectively. The capacity analysis results detailed above illustrate the effectiveness the proposed improvements will have on these intersections. The increased capacity will allow more vehicles to be served which will in turn improve traffic flow and operations along the Dressler Road corridor. An additional benefit not quantified in the capacity analysis is the proposed access management which will also help improve traffic flow and operations throughout the study area.

Table 12 displays the HCM Intersection Capacity Analysis and details the Levels-of-Service and delay experienced under the Design Year 2043 'No-Build' vs. 'Build Alternative 2' traffic conditions for the unsignalized intersections within the study area. See **Appendix F** for the HCM Capacity Analysis reports.

Table 12: HCM Intersection Capacity Analysis Summary – Design Year 2043 'No-Build' vs. 'Build Alternative 2' Conditions – Unsignalized Intersections				
Intersection / Movement	'No-Build' Conditions		'Build Alternative 2' Conditions	
	LOS	Delay (sec)	LOS	Delay (sec)
Everhard Road / Children's Physicians Drive / Holiday Inn Drive				
Eastbound Left	B	10.3		
Eastbound Approach	A	0.1		
Westbound Left	B	10.5		
Westbound Approach	A	0.1		
Northbound Left-Thru-Right	E	39.4		
Northbound Approach	E	39.4		
Southbound Left-Thru-Right	E	38.8		
Southbound Approach	E	38.8		
Everhard Road / Inn Circle				
Eastbound Left	B	10.6		
Eastbound Thru	A	0.9	A	0.0
Eastbound Approach	A	2.3	A	0.0
Southbound Left	F	86.1		
Southbound Right	C	17.3	C	15.5
Southbound Approach	D	28.1	C	15.5
Everhard Road / Everhard Professional Building Drive				
Eastbound Left	B	10.4		
Eastbound Thru	A	0.0	A	0.0
Eastbound Approach	A	0.1	A	0.0
Southbound Left	C	17.4		
Southbound Right			B	11.9
Southbound Approach			B	11.9

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

Table 12: HCM Intersection Capacity Analysis Summary (Cont.) – Design Year 2043 'No-Build' vs. 'Build Alternative 2' Conditions – Unsignalized Intersections				
Intersection / Movement	'No-Build' Conditions		'Build Alternative 2' Conditions	
	LOS	Delay (sec)	LOS	Delay (sec)
Everhard Road / North Mall Drive				
Westbound Left	B	11.1	B	11.5
Westbound Approach	A	0.7	A	0.7
Northbound Left	C	24.1	C	24.6
Northbound Right	B	14.7	C	15.3
Northbound Approach	C	16.0	C	16.6
Dressler Road / West Mall Drive				
Westbound Right	B	13.5	B	13.1
Westbound Approach	B	13.5	B	13.1
Southbound Left	B	10.8		
Southbound Thru	A	0.0	A	0.0
Southbound Approach	A	0.4	A	0.0
Belden Village Street / South Mall Drive				
Eastbound Left	C	16.8		
Eastbound Thru	A	2.8	A	0.0
Eastbound Approach	A	3.7	A	0.0
Southbound Left	E	36.5		
Southbound Right	C	19.3	C	20.6
Southbound Approach	C	20.3	C	20.6

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

As shown in **Table 12**, it can be seen that the two (2) movements that are anticipated to operate at unacceptable Levels-of Service during the Saturday peak hour under the Design Year 2043 'No-Build' traffic conditions will be mitigated by the access management proposed under 'Build Alternative 2'. Additionally, the unacceptable Levels-of-Service anticipated to occur for the side street approaches of the Everhard Road / Children's Physicians Drive / Holiday Inn Drive intersection will be mitigated with the construction of a traffic signal.

V. Summary and Recommendations:

In Summary:

This Traffic Alternatives Evaluation is being prepared at the request of the Stark County Engineer's Office to evaluate traffic operations along the Dressler Road and Everhard Road corridors. The purpose of this particular study is to analyze vehicular operating conditions within the study area in order to determine what roadway improvements are necessary to achieve acceptable operation for the projected design year conditions.

The traffic analysis performed as part of this study identified multiple intersections that are anticipated to operate with unacceptable operations under the Design Year 2043 'No-Build' traffic conditions. Additionally, it captured the major congestion and lack of traffic flow experienced along the Dressler Road and Everhard Road corridors. The unacceptable intersection operations and major congestion experienced throughout the study area can be attributed to the high traffic volumes, lack of roadway capacity and poor access management.

Four (4) 'Build' alternatives were evaluated in order to determine which alternative provides the best solution for addressing the identified areas of concern under the Design Year 2043 'No-Build' traffic conditions. Through the process of extensive traffic modeling, this study identified multiple potential improvements which will address the existing deficiencies of the Dressler Road and Everhard Road corridors.

Recommendations:

GPD Group recommends the improvements proposed under 'Build Alternative 2' in order to address the access management concerns and provide additional capacity to deficient intersections. The improvements of 'Build Alternative 2' will improve both safety and traffic operations throughout the study area.

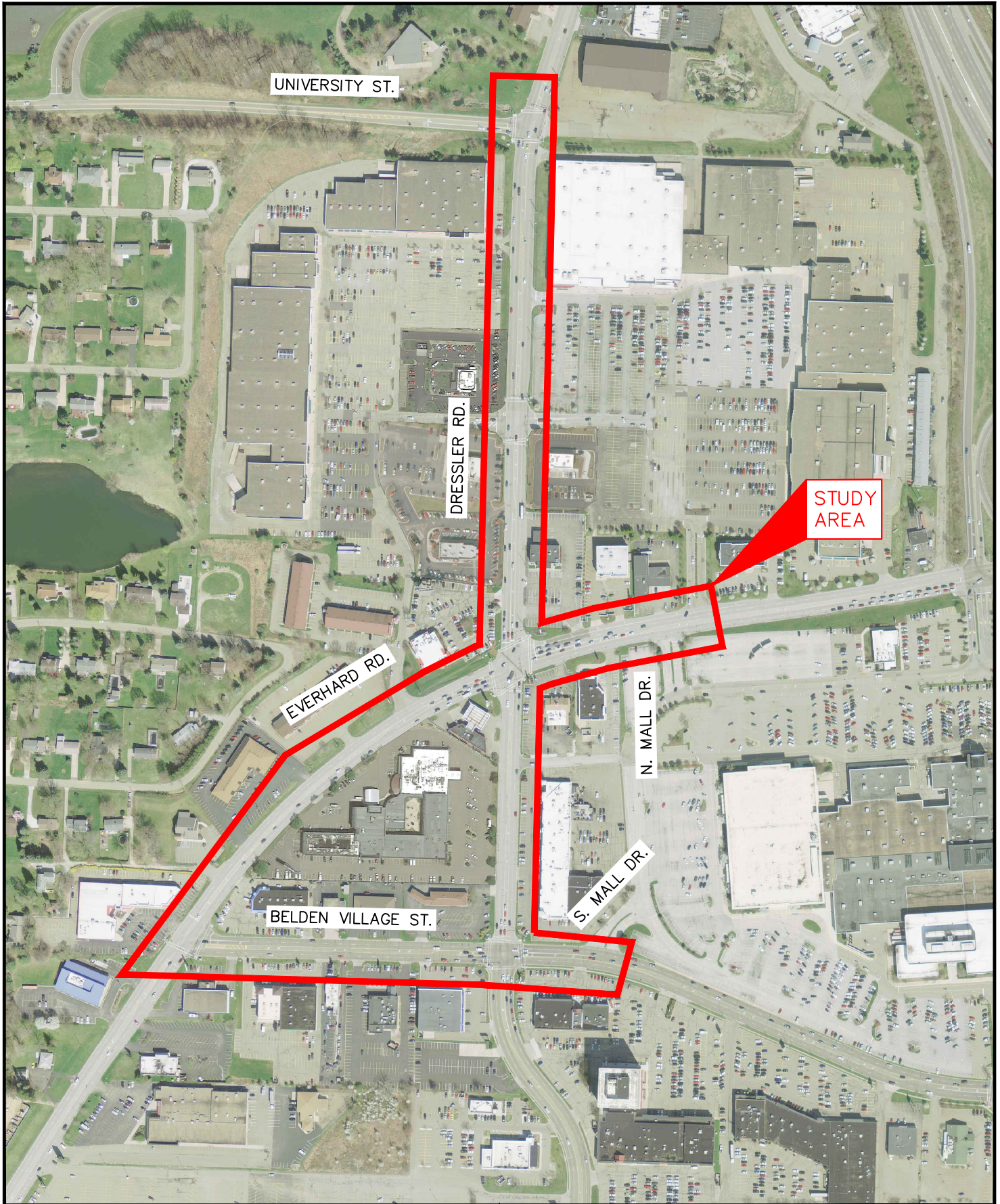
A summary of the 'Build Alternative 2' improvements are detailed below:

- Install a raised median on Dressler Road from:
 - Everhard Road to Belden Village Street.
 - Belden Park Crossing to University Street.
- Install a raised median on Everhard Road from:
 - Dressler Road to the Children's Physicians Drive / Holiday Inn Drive intersection.
- Construct a traffic signal at the Everhard Road / Children's Physicians Drive / Holiday Inn Drive intersection.
- Construct an access road from the Everhard Road / Children's Physicians Drive / Holiday Inn Drive intersection to Inn Circle through a cross-access arrangement between the Everhard Professional Building and the Children's Physicians Office Building properties.
- Convert the Dressler Road / West Mall Drive intersection to right-in / right-out.
- Convert the Belden Village Street / South Mall Drive intersection to right-in / right-out.

- Incorporate corridor signal retiming.
- Dressler Road / Everhard Road Intersection:
 - EB Approach – *lane assignment (left, left, thru, thru-right)*
 - Construct a second dedicated left turn lane.
 - Implement protected only signal phasing for the dual left turns.
 - WB Approach – *lane assignment (left, left, thru, thru, right)*
 - Construct a second dedicated left turn lane.
 - Implement protected only signal phasing for the dual left turns.
 - SB Approach – *lane assignment (left, left, thru, thru-right)*
 - Construct a second dedicated left turn lane.
 - Implement protected only signal phasing for the dual left turns.
 - NB Approach – *lane assignment (thru, thru-right)*
 - Restrict left turn movement.
- Dressler Road / Belden Park Crossing Intersection:
 - EB Approach – *lane assignment (left, thru, right)*
 - Construct a right turn lane.
 - Implement a right turn overlap signal phase to operate with the NB left turn signal phase.
 - WB Approach – *lane assignment (left, thru, right)*
 - Construct a right turn lane.
 - Implement a right turn overlap signal phase to operate with the SB left turn signal phase.

It should be noted that the improvements proposed at the Dressler Road / Belden Park Crossing intersection can be constructed independently of the other 'Build' improvements as they provide independent utility from the Dressler Road corridor. Meaning that they do not need to be constructed at the same time in order to provide improvement to the Dressler Road corridor. However, in order to provide the most benefit to the corridor and address all the traffic concerns detailed in this report, all proposed improvements should be constructed at the same time.

FIGURES



UNIVERSITY ST.

DRESSLER RD.

EVERHARD RD.

BELDEN VILLAGE ST.

N. MALL DR.

S. MALL DR.

STUDY
AREA

FIGURE 1

AERIAL PHOTOGRAPH

SEPTEMBER 2019



N.T.S.



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Drawing File: C:\Users\20190626\OneDrive\Operations Study\Figures\Figure 2 - Existing Conditions.dwg Layout: Layout1
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Technician: bferrell

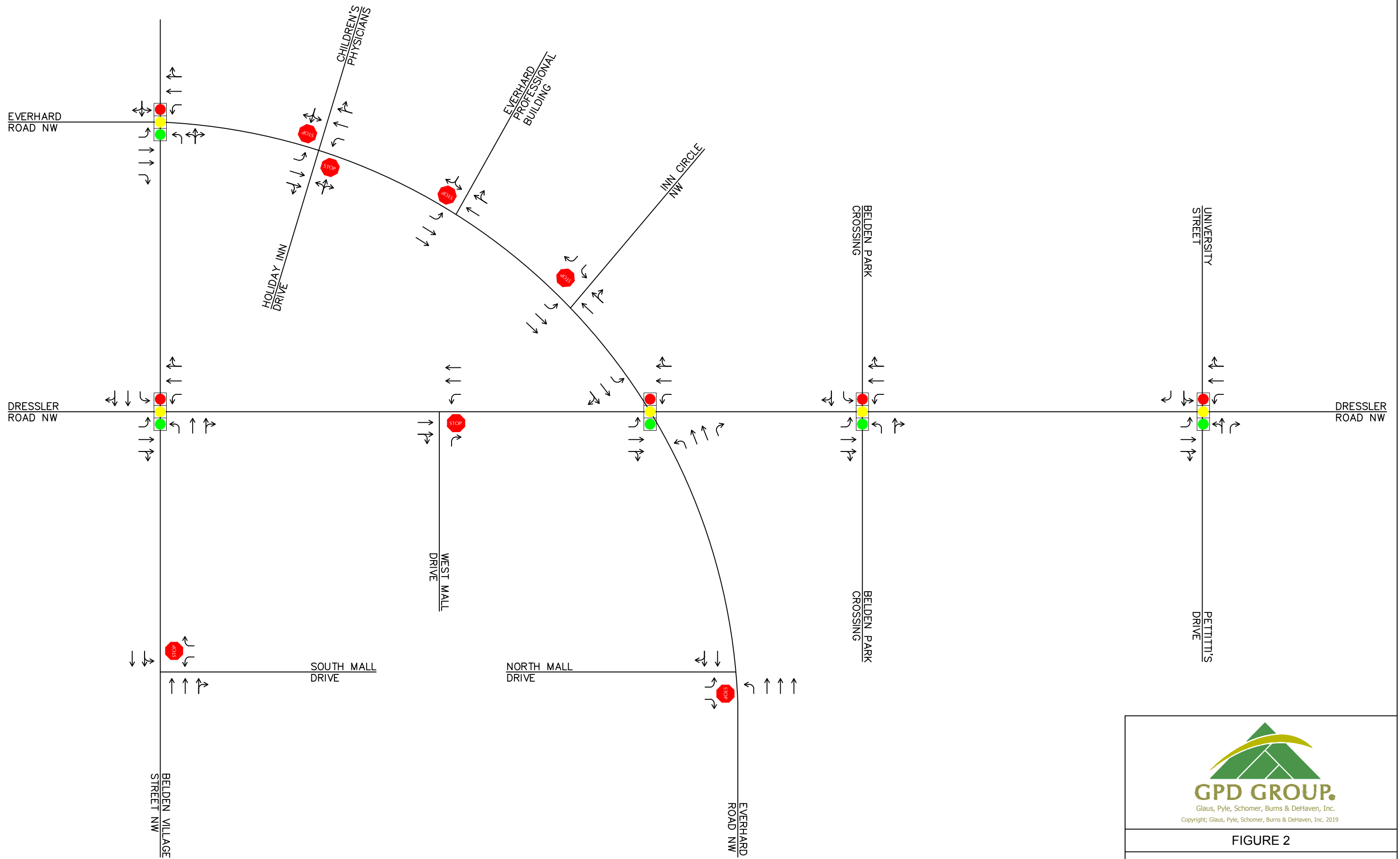


FIGURE 2

EXISTING TRAFFIC CONTROL

SEPTEMBER 2019

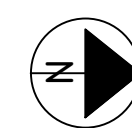
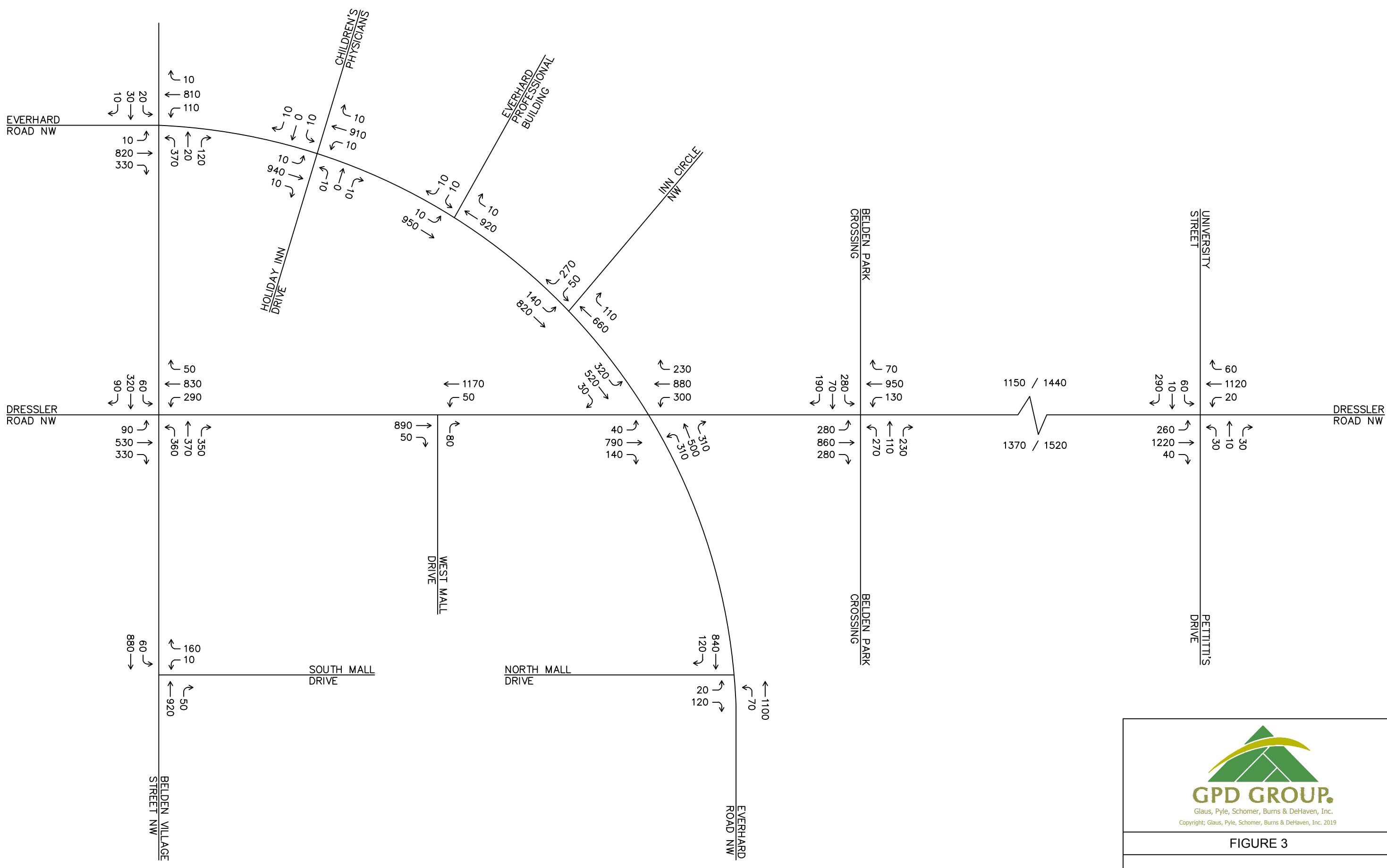


FIGURE 3

DESIGN YEAR 2043
'NO-BUILD'
PEAK HOUR TRAFFIC VOLUMES

SEPTEMBER 2019

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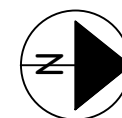
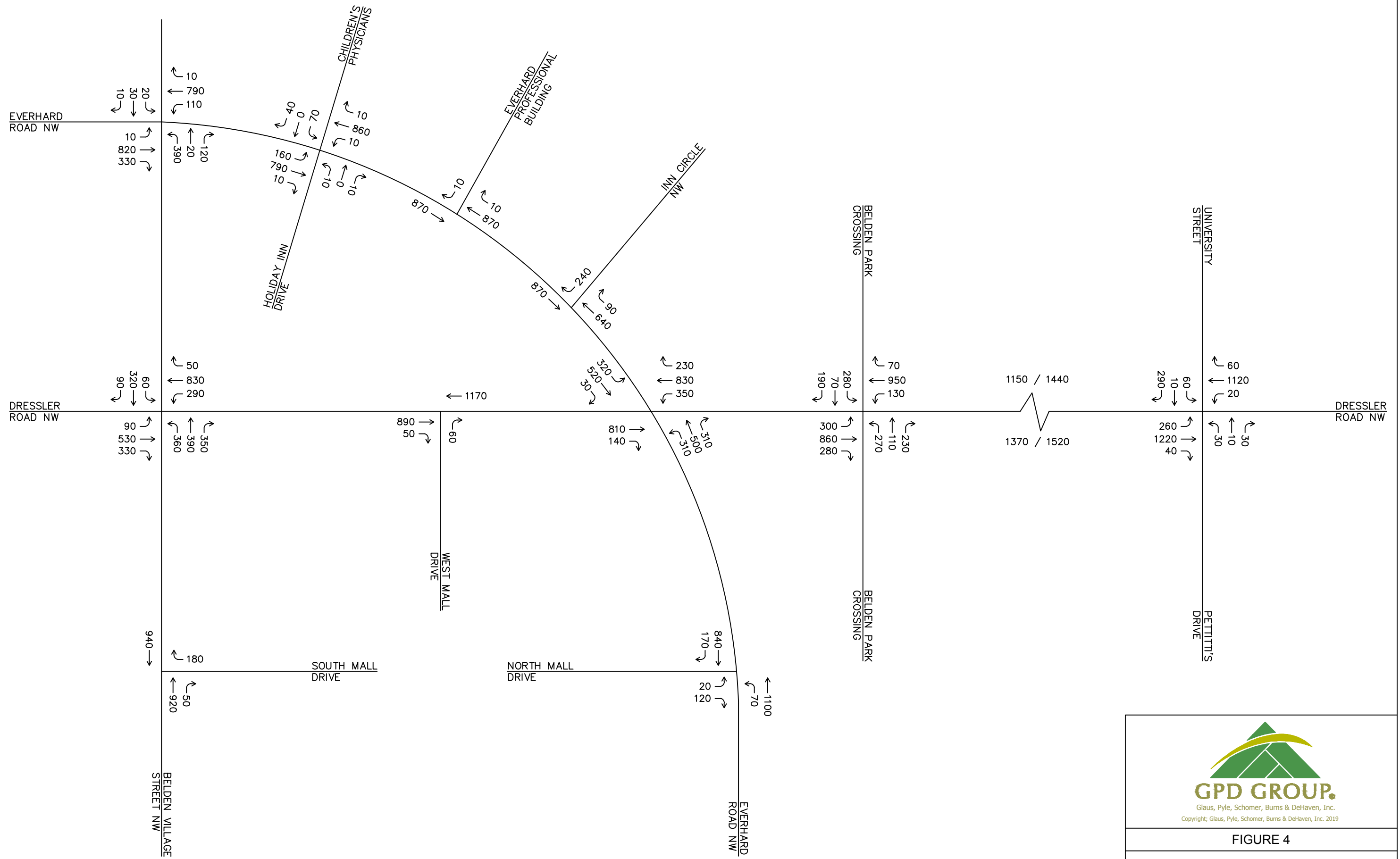


FIGURE 4

DESIGN YEAR 2043
'BUILD ALTERNATIVE 2'
PEAK HOUR TRAFFIC VOLUMES

SEPTEMBER 2019

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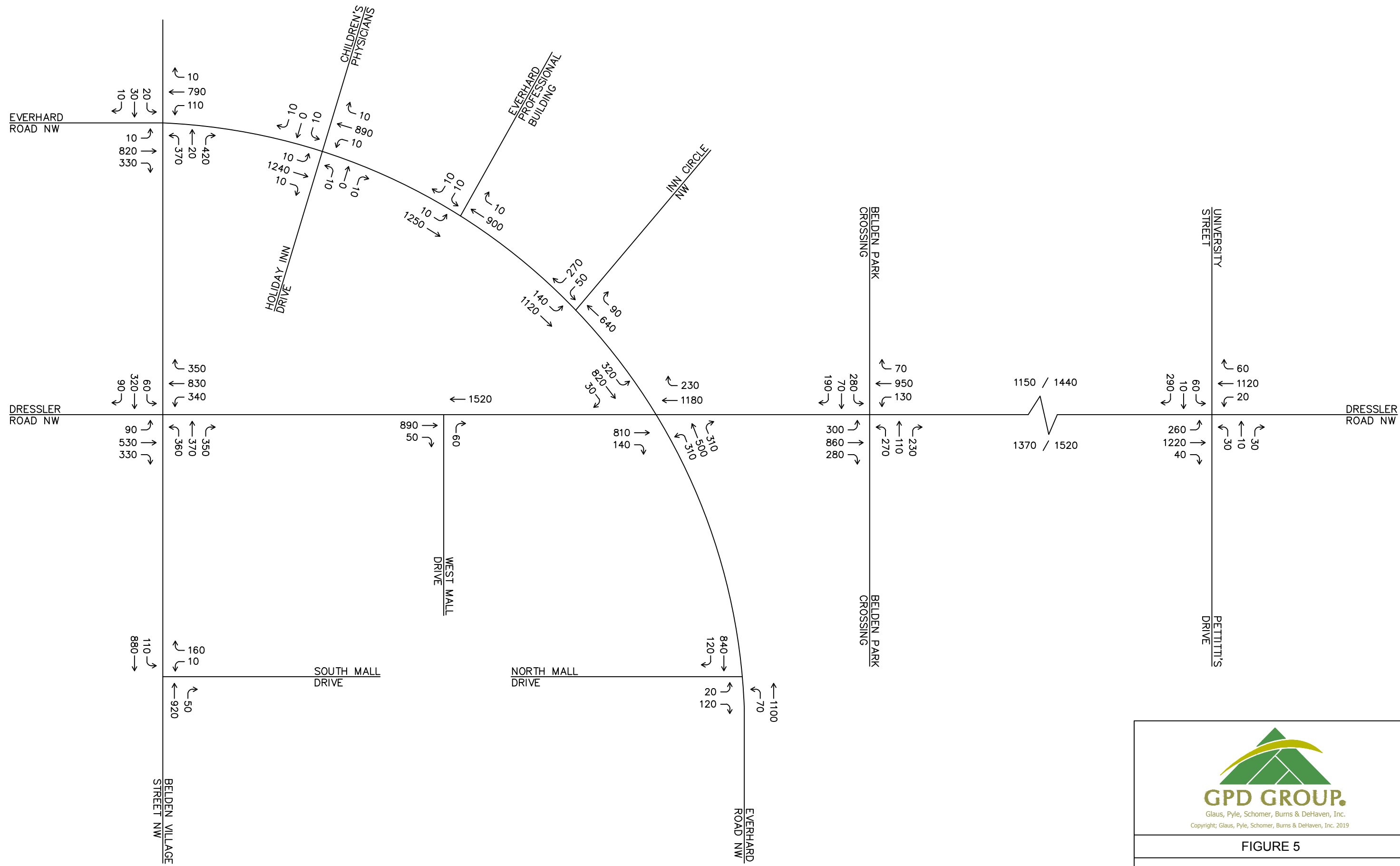
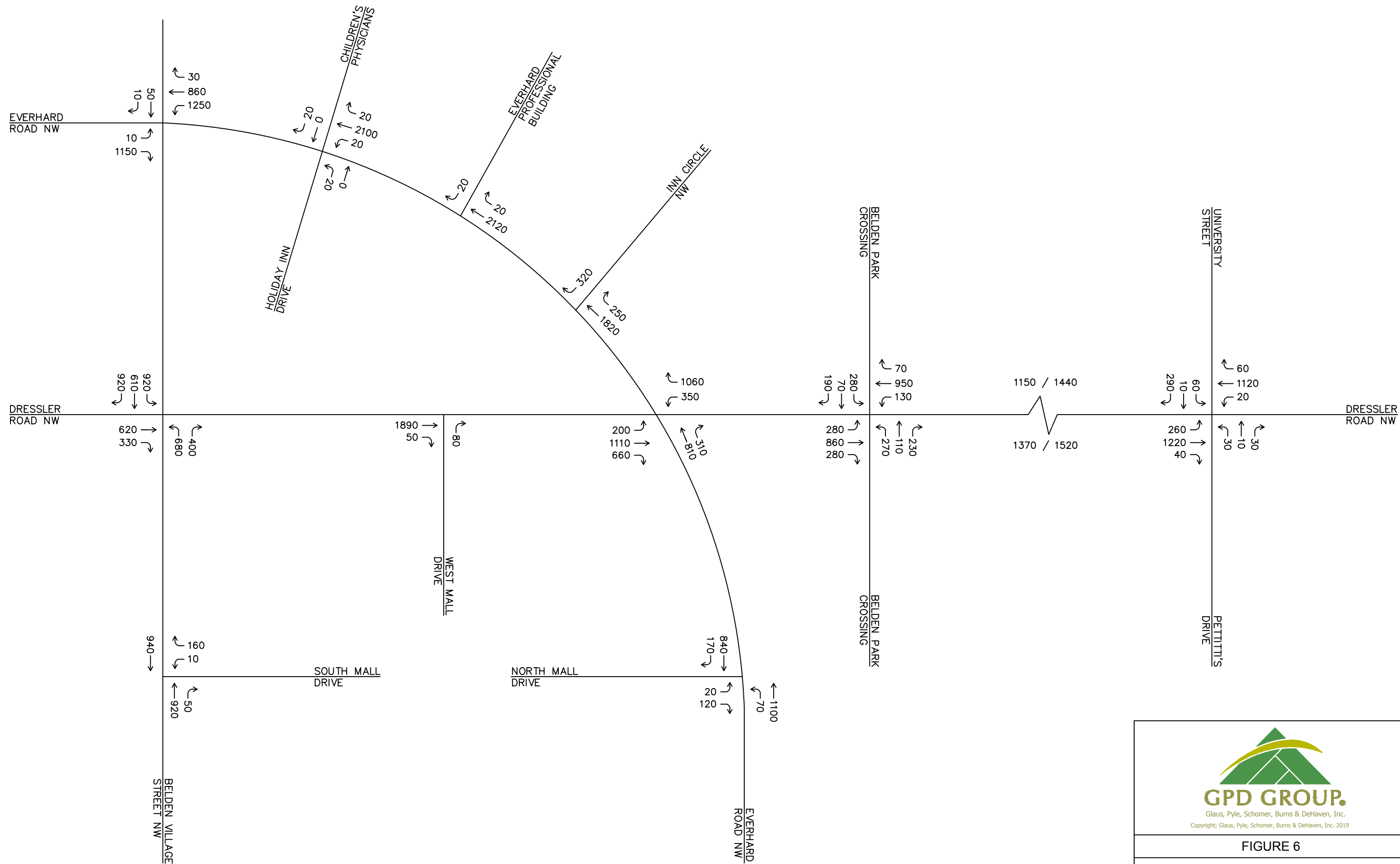


FIGURE 5

DESIGN YEAR 2043
'BUILD ALTERNATIVE 3'
PEAK HOUR TRAFFIC VOLUMES

SEPTEMBER 2019

Drawing File: C:\Users\jg\OneDrive\Documents\Operations Study\Figures\Figure 6 - Alternative 4A Volumes.dwg
Date: 9/11/2019 Time: 9:52:10 AM
Technician: bferrell



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FIGURE 6

DESIGN YEAR 2043
'BUILD ALTERNATIVE 4A'
PEAK HOUR TRAFFIC VOLUMES

SEPTEMBER 2019

Drawing File: C:\Users\j20190626\OneDrive\Operations Study\Figures\Figure 7 - 'Alternative 4B' Volumes.dwg Layout: Layout1
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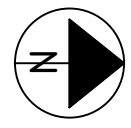
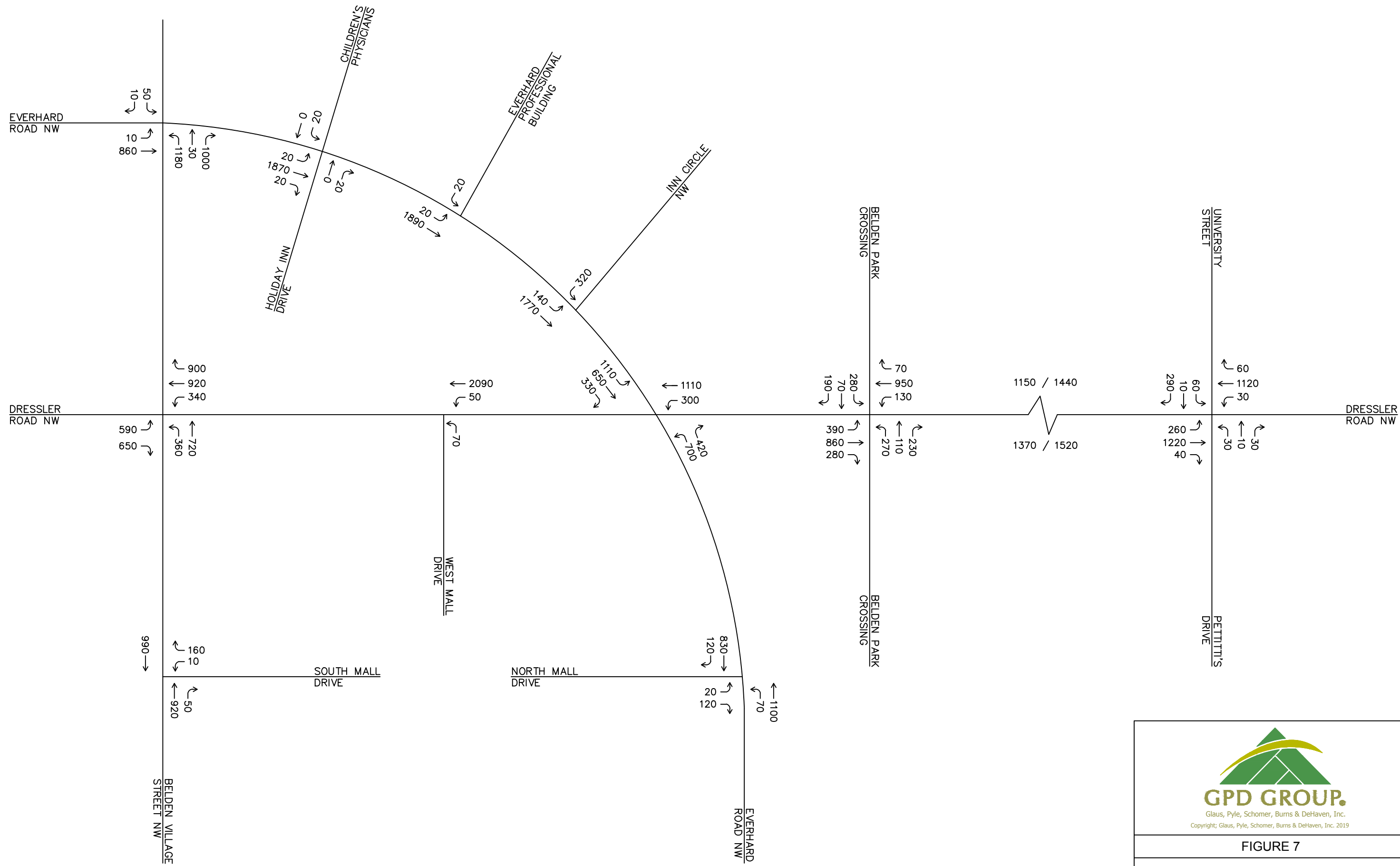


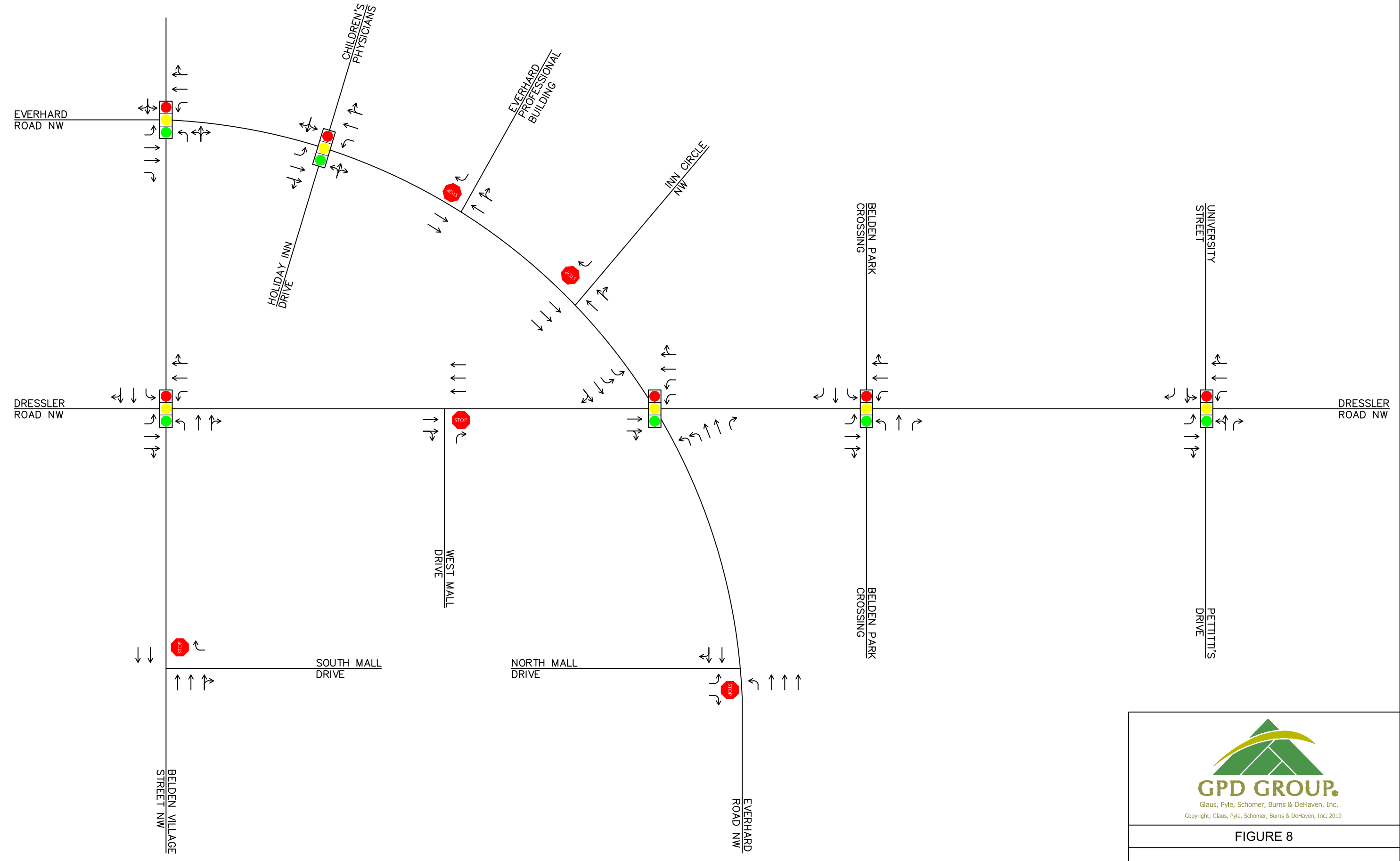
FIGURE 7

DESIGN YEAR 2043
'BUILD ALTERNATIVE 4B'
PEAK HOUR TRAFFIC VOLUMES

SEPTEMBER 2019

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Technician: ddombrosky





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FIGURE 8

PROPOSED 'BUILD ALTERNATIVE 2'
LANE CONFIGURATION

SEPTEMBER 2019

Drawing File: C:\Users\20190606\OneDrive\Operations Study\Figures\Figure 9 - Build Alternative 3.dwg Layout: Layout1
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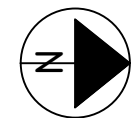
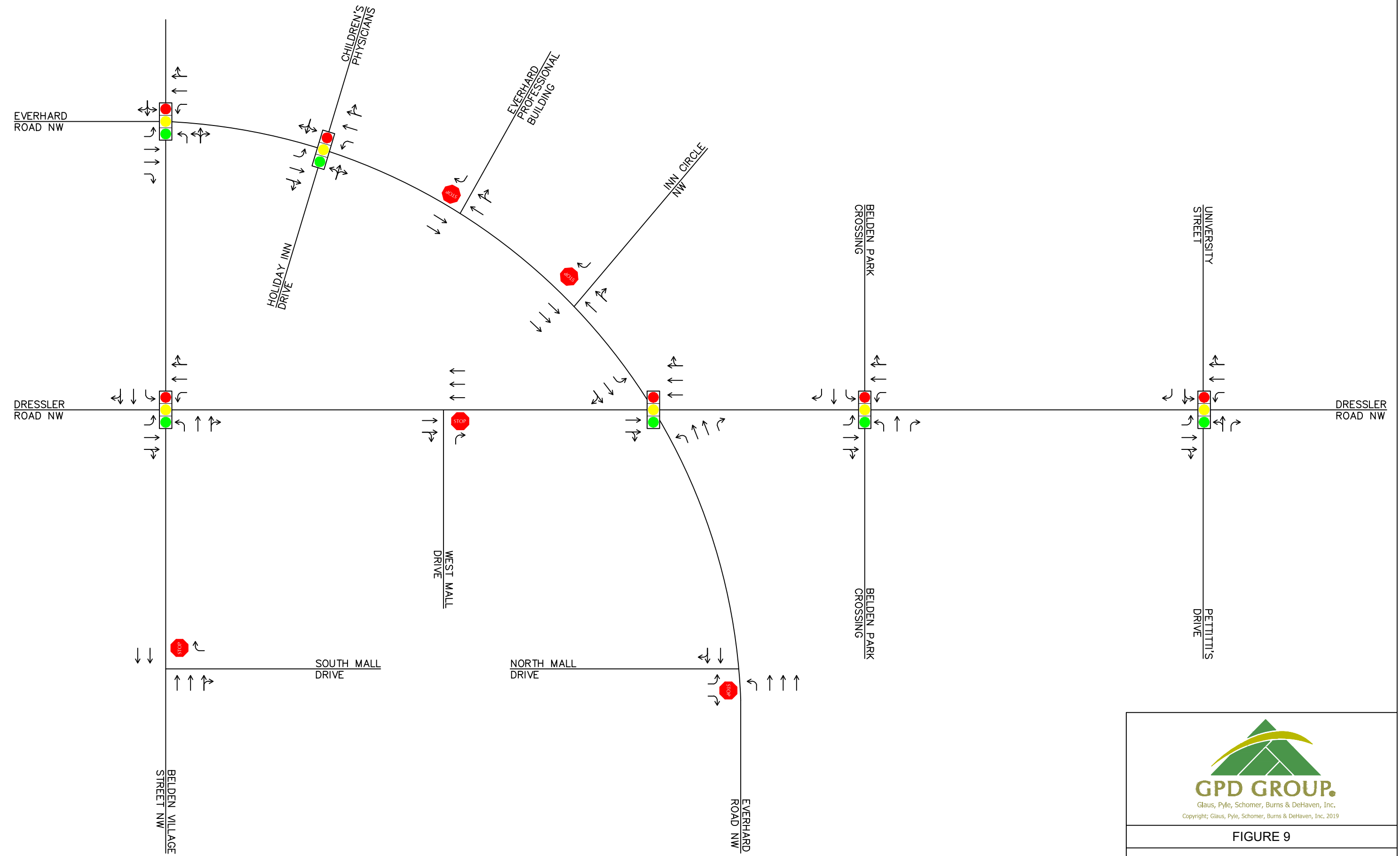


FIGURE 9

PROPOSED 'BUILD ALTERNATIVE 3'
LANE CONFIGURATION

SEPTEMBER 2019

Drawing File: C:\Users\20190505\OneDrive\Operations Study\Figures\Figure 10 - Build Alternative 4A.dwg Layout: Layout1
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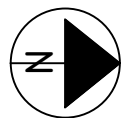
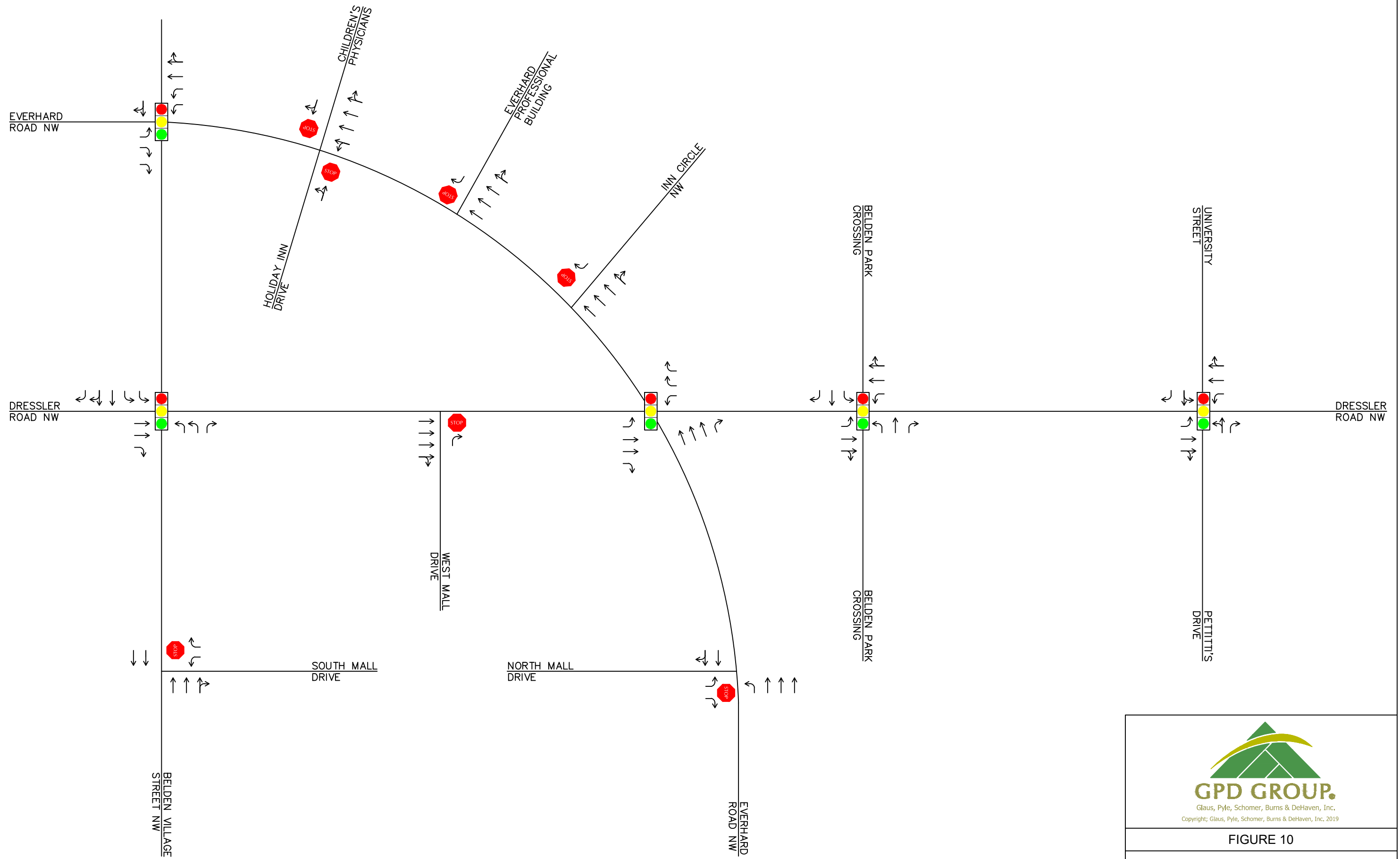


FIGURE 10

PROPOSED 'BUILD ALTERNATIVE 4A'
LANE CONFIGURATION

SEPTEMBER 2019

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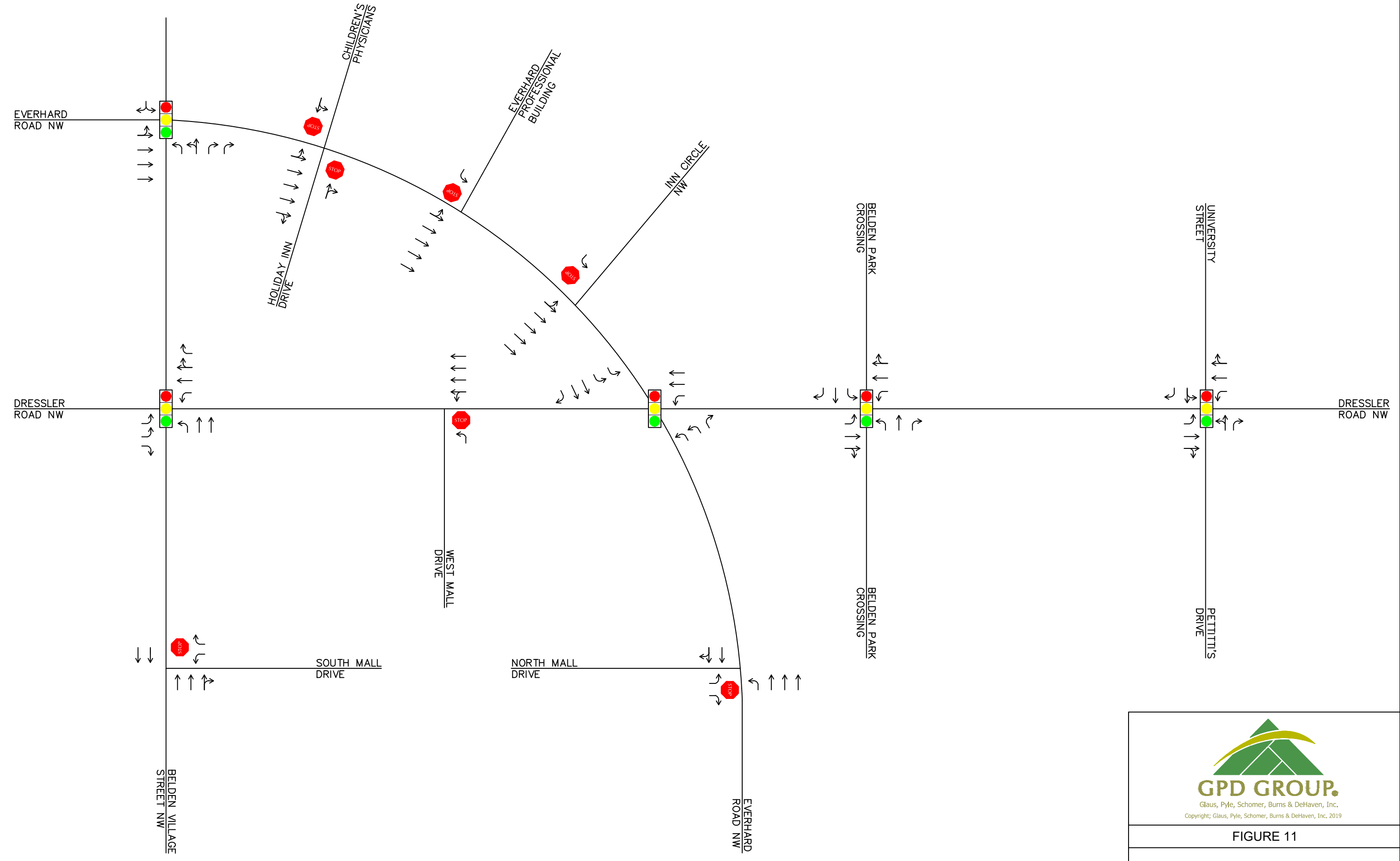
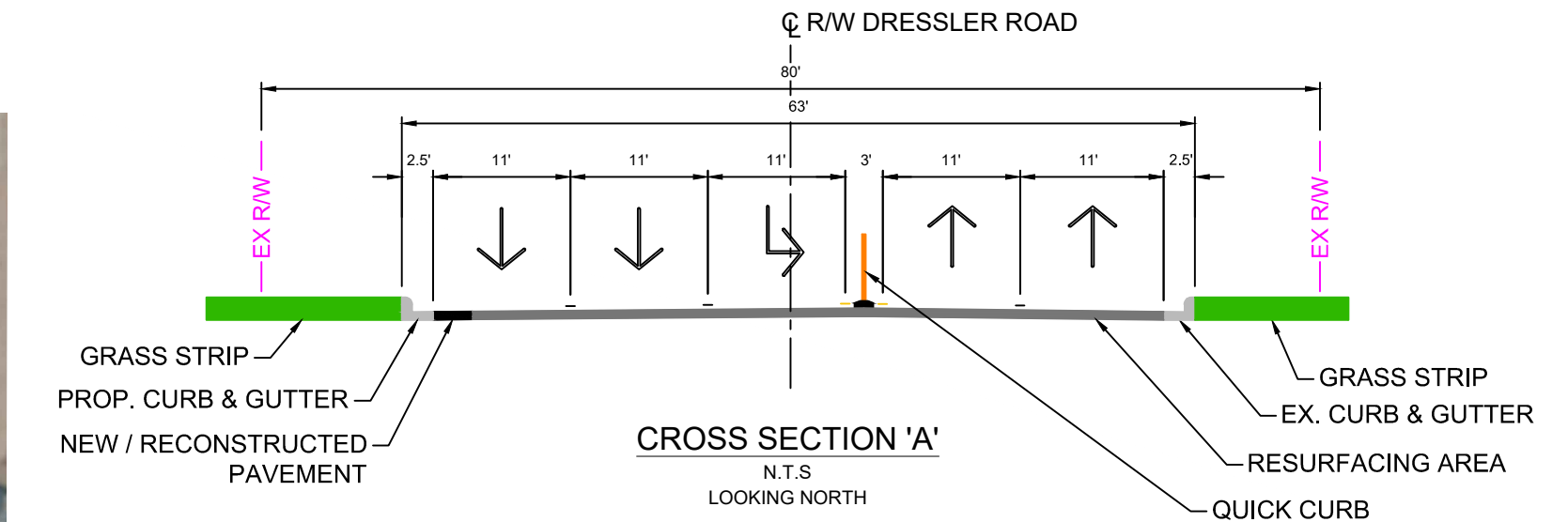
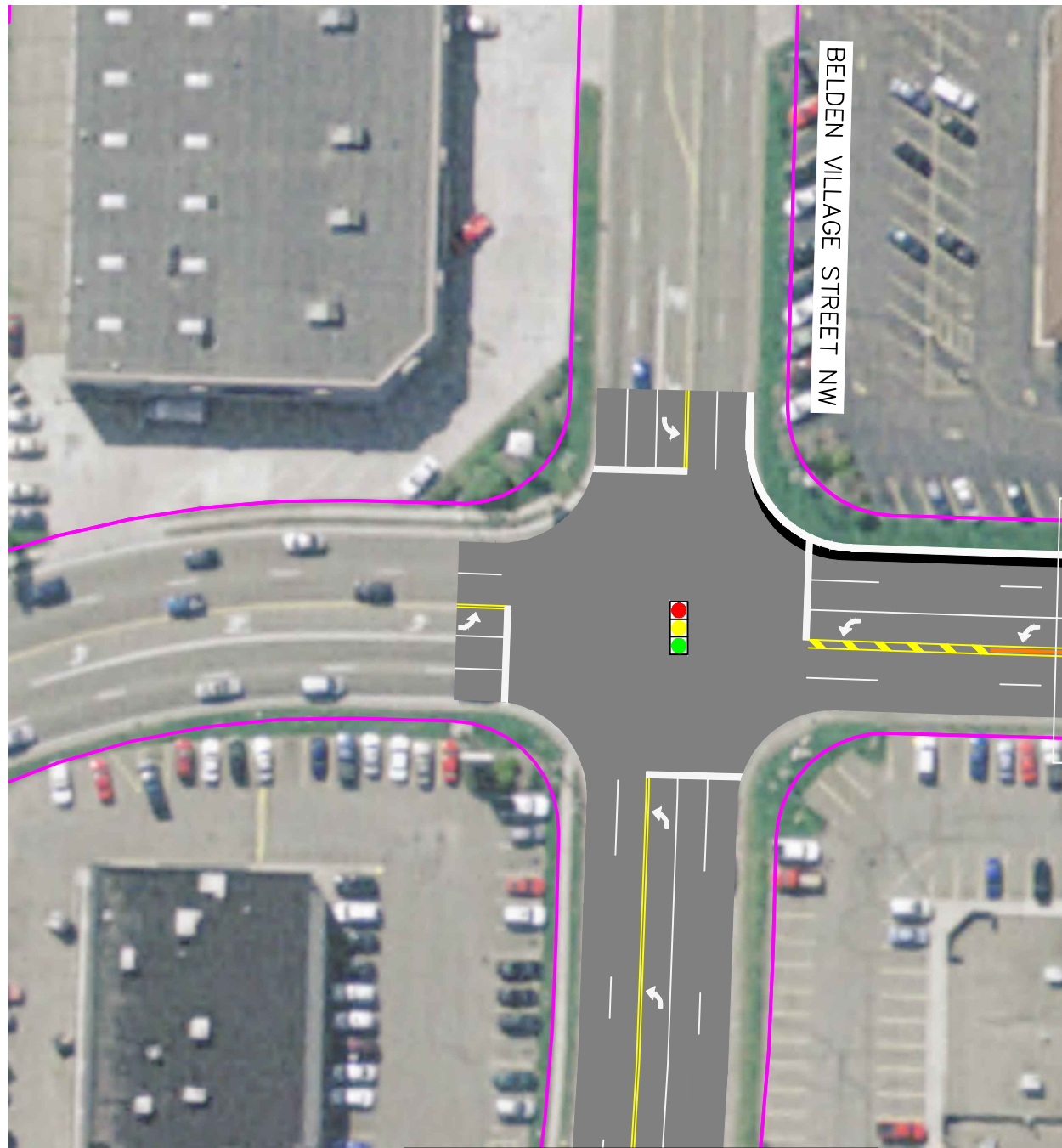


FIGURE 11

PROPOSED 'BUILD ALTERNATIVE 4B'
LANE CONFIGURATION

SEPTEMBER 2019

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Date: Sep 25, 2019 Time: 1:28 pm User: jwst
LAYOUT: 1 of 7
Technician: ddombrosky



LEGEND

- RESURFACING AREA
- NEW/RECONSTRUCTED PAVEMENT
- RAISED PAVEMENT
- PROPOSED CURB AND GUTTER
- EXISTING RIGHT OF WAY
- QUICK KURB
- SIGNALIZED INTERSECTION

MATCH LINE F

MATCH LINE A

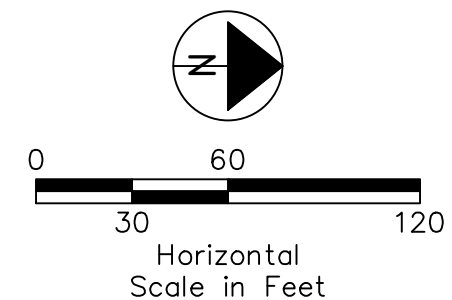
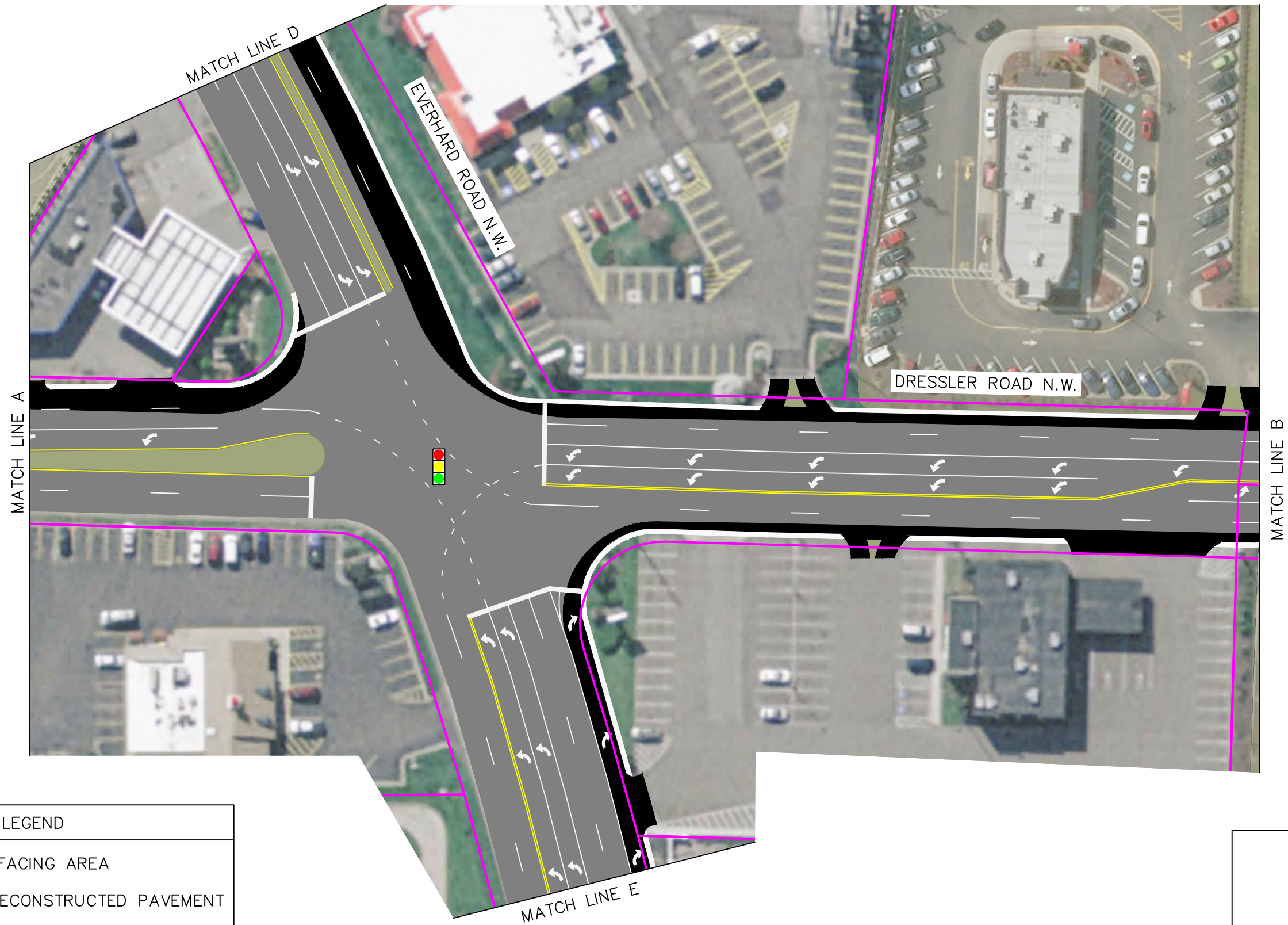


FIGURE 12

PROPOSED IMPROVEMENTS
RENDERING
1 OF 7

SEPTEMBER 2019

Drawing File: C:\2019\20190905\Operations Study\Figures\Figure 12 - Rendering.dwg
Date: Sep 25, 2019 Time: 1:27 pm
Layout: 2 of 7
Technician: ddombrosky



LEGEND

- RESURFACING AREA
- NEW/RECONSTRUCTED PAVEMENT
- RAISED PAVEMENT
- PROPOSED CURB AND GUTTER
- EXISTING RIGHT OF WAY
- QWICK KURB
- SIGNALIZED INTERSECTION

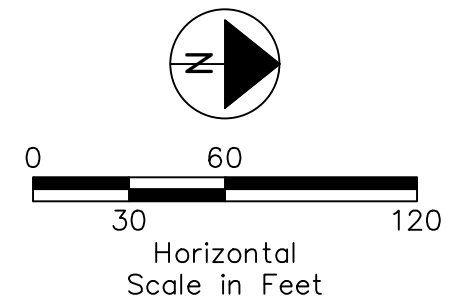


FIGURE 12

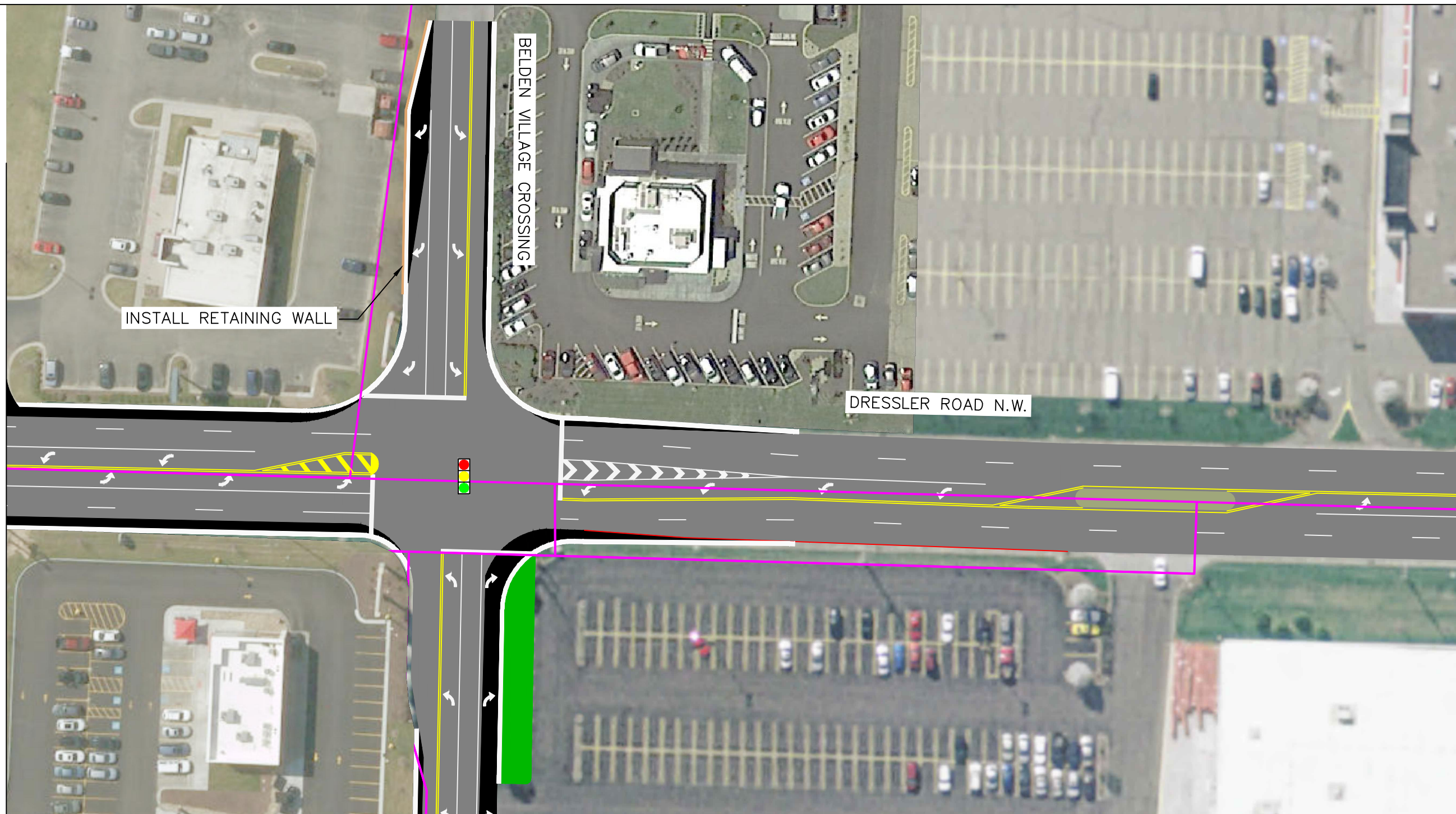
PROPOSED IMPROVEMENTS
RENDERING
2 OF 7

SEPTEMBER 2019

Drawing File: C:\2019\20190905\Operations Study\Figures\Figure 12 - Rendering.dwg Layout: 3 of 7
Date: Sep 25, 2019 Time: 1:27 pm
Technician: ddombrosky

MATCH LINE B

MATCH LINE C



LEGEND

- RESURFACING AREA
- NEW/RECONSTRUCTED PAVEMENT
- RAISED PAVEMENT
- PROPOSED CURB AND GUTTER
- EXISTING RIGHT OF WAY
- QWICK KURB
- SIGNALIZED INTERSECTION

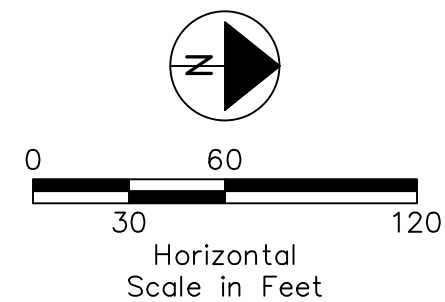
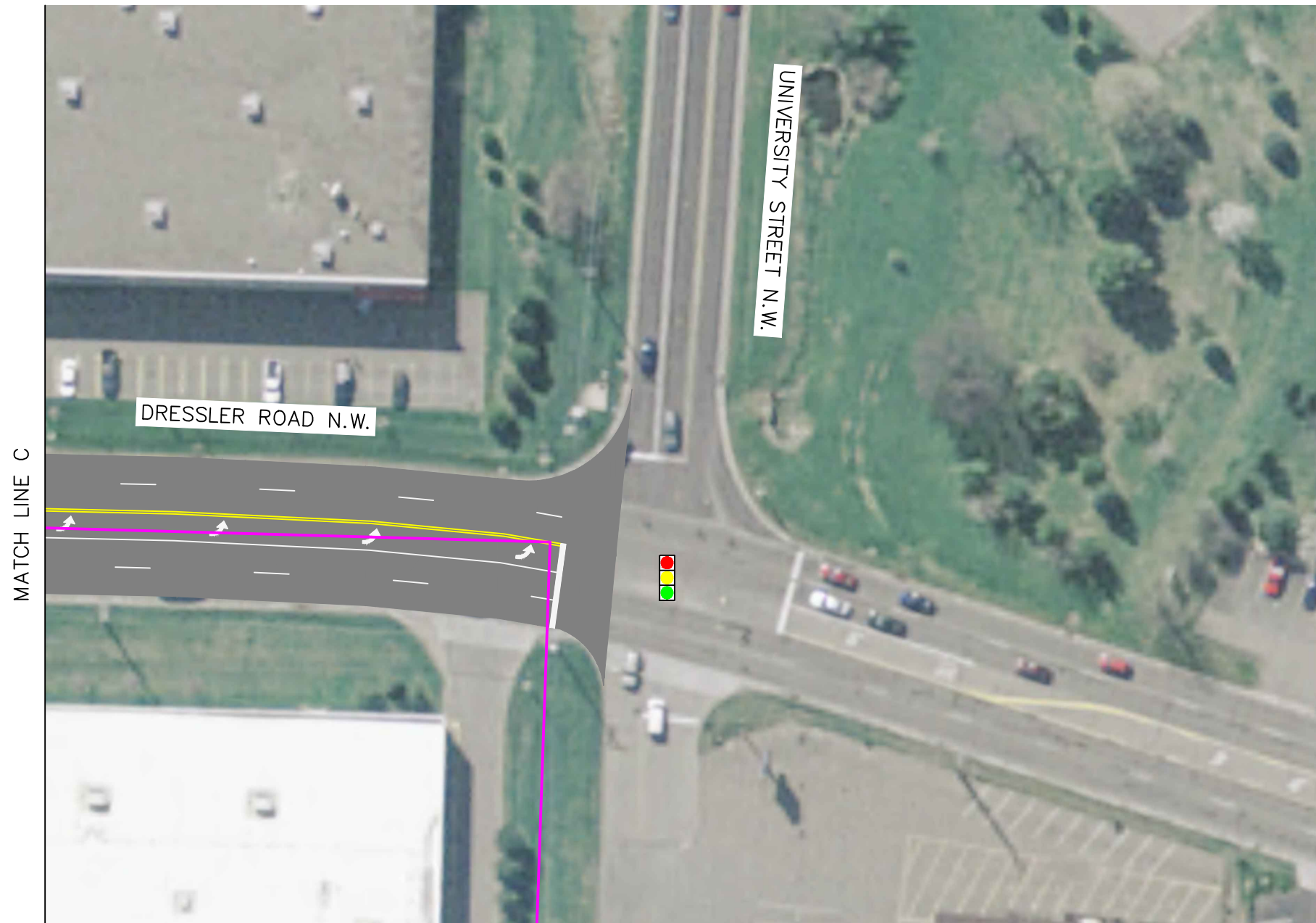


FIGURE 12

PROPOSED IMPROVEMENTS
RENDERING
3 OF 7

SEPTEMBER 2019

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Technician: ddambrosky



LEGEND

- RESURFACING AREA
- NEW/RECONSTRUCTED PAVEMENT
- RAISED PAVEMENT
- PROPOSED CURB AND GUTTER
- EXISTING RIGHT OF WAY
- QWICK KURB
- SIGNALIZED INTERSECTION

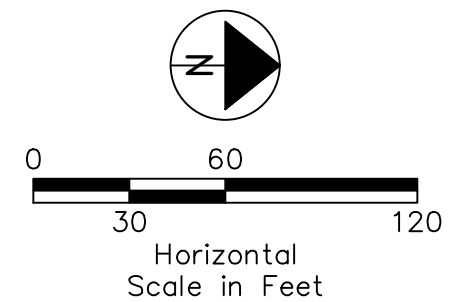
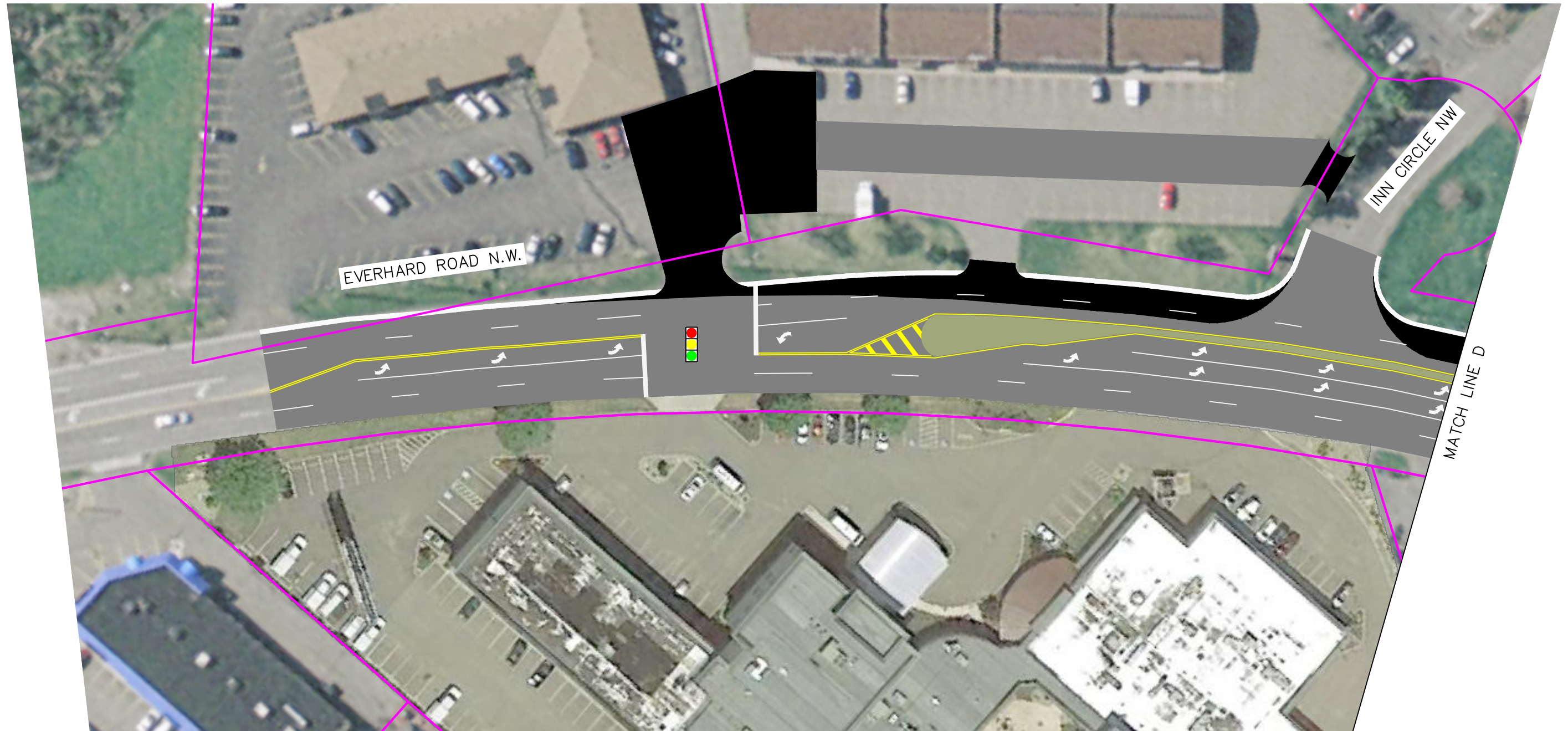


FIGURE 12

PROPOSED IMPROVEMENTS
RENDERING
4 OF 7

SEPTEMBER 2019

Drawing File: c:\2019\20190501\Operations Study\Figures\Figure 12 - Rendering.dwg Layout: 5 of 7
Date: Sep 25, 2019 Time: 1:28 pm User: j13707953
Technician: ddombrosky



LEGEND

-  RESURFACING AREA
-  NEW/RECONSTRUCTED PAVEMENT
-  RAISED PAVEMENT
-  PROPOSED CURB AND GUTTER
-  EXISTING RIGHT OF WAY
-  QWICK KURB
-  SIGNALIZED INTERSECTION

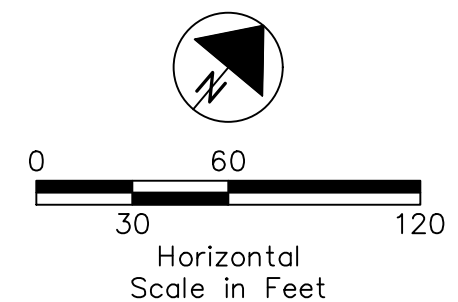


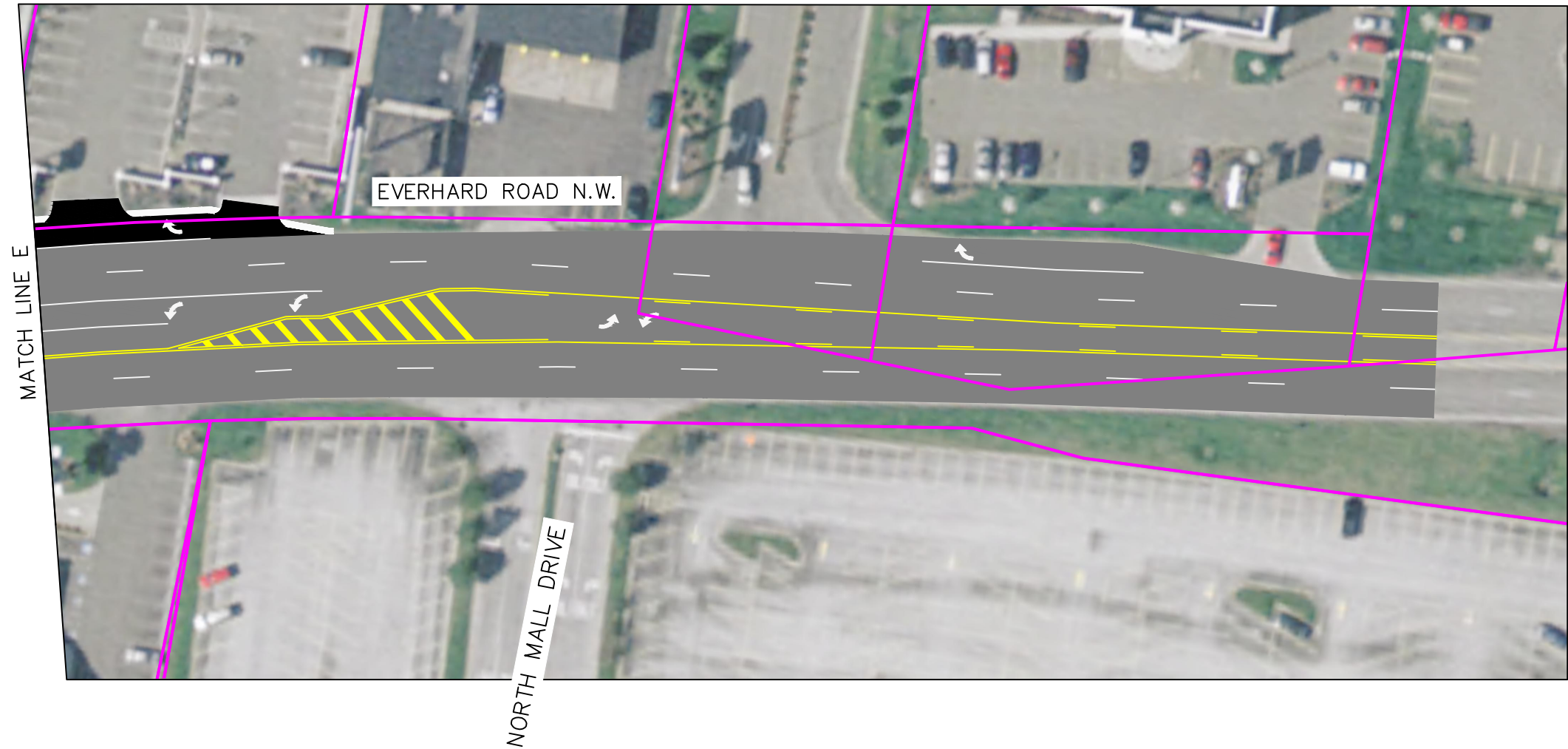
FIGURE 12

PROPOSED IMPROVEMENTS
RENDERING
5 OF 7

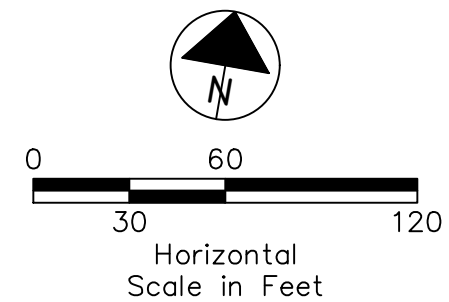
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Technician: ddombrosky



LEGEND	
	RESURFACING AREA
	NEW/RECONSTRUCTED PAVEMENT
	RAISED PAVEMENT
	PROPOSED CURB AND GUTTER
	EXISTING RIGHT OF WAY
	QWICK KURB
	SIGNALIZED INTERSECTION





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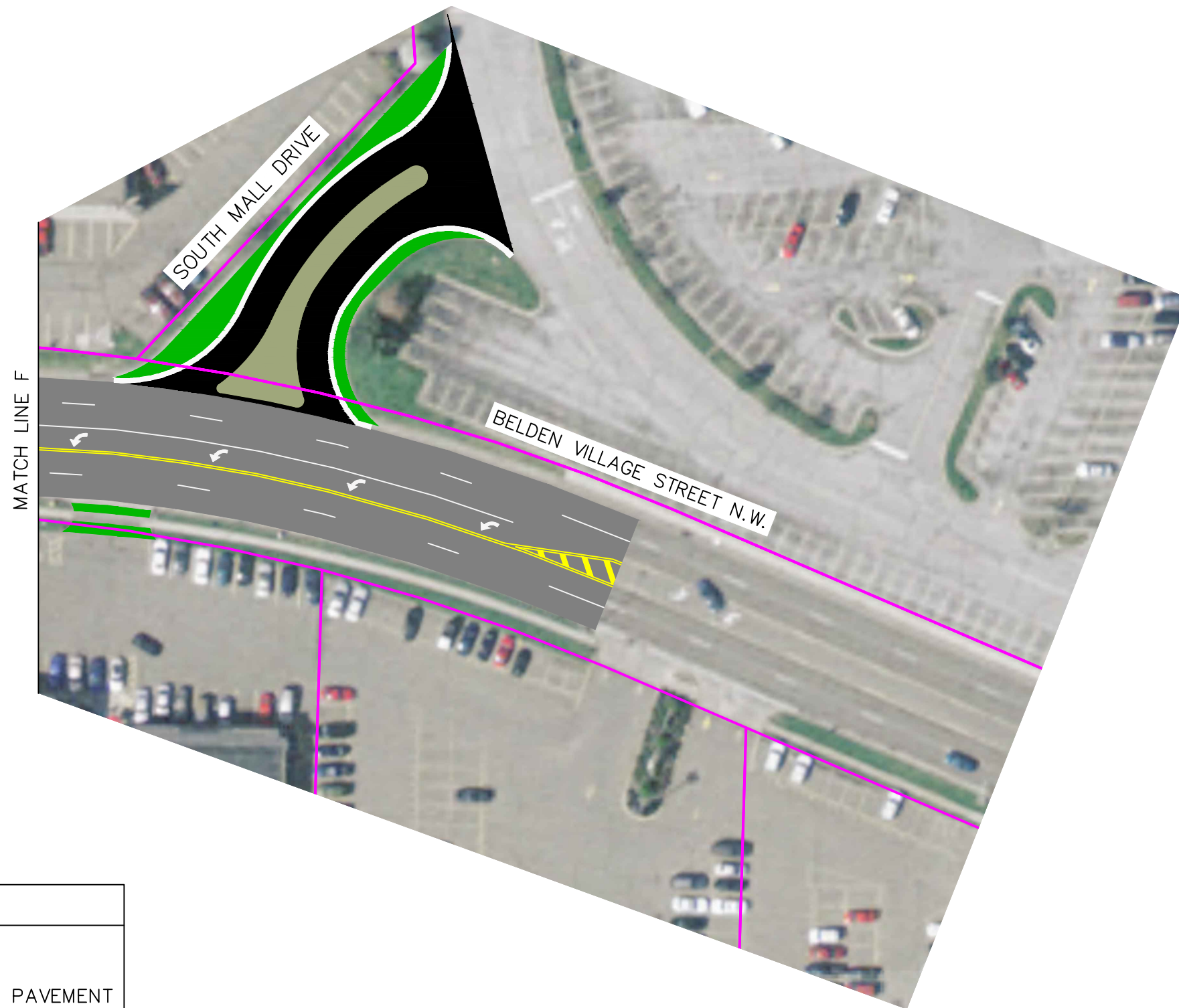
FIGURE 12

PROPOSED IMPROVEMENTS
RENDERING
6 OF 7

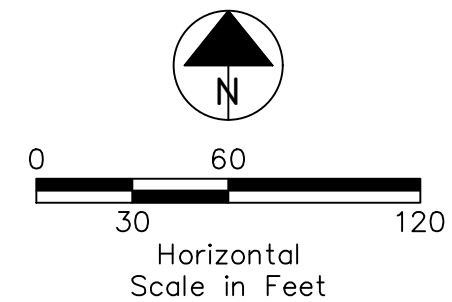
SEPTEMBER 2019

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Technician: ddombrosky



LEGEND	
	RESURFACING AREA
	NEW/RECONSTRUCTED PAVEMENT
	RAISED PAVEMENT
	PROPOSED CURB AND GUTTER
	EXISTING RIGHT OF WAY
	QWICK KURB
	SIGNALIZED INTERSECTION





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FIGURE 12

PROPOSED IMPROVEMENTS
RENDERING
7 OF 7

SEPTEMBER 2019

APPENDIX A
TURNING MOVEMENT TRAFFIC COUNTS



55 Degrees and Sunny

File Name : Dressler_Road_NW_at_University_Street_NW_597338_11-17-2018
Site Code : Site 4 - Saturday
Start Date : 11/17/2018
Page No : 1

[illegible]



GPD Group

520 South Main Street, Suite 2531

Akron, OH 44311

Telephone: (330) 572-2100

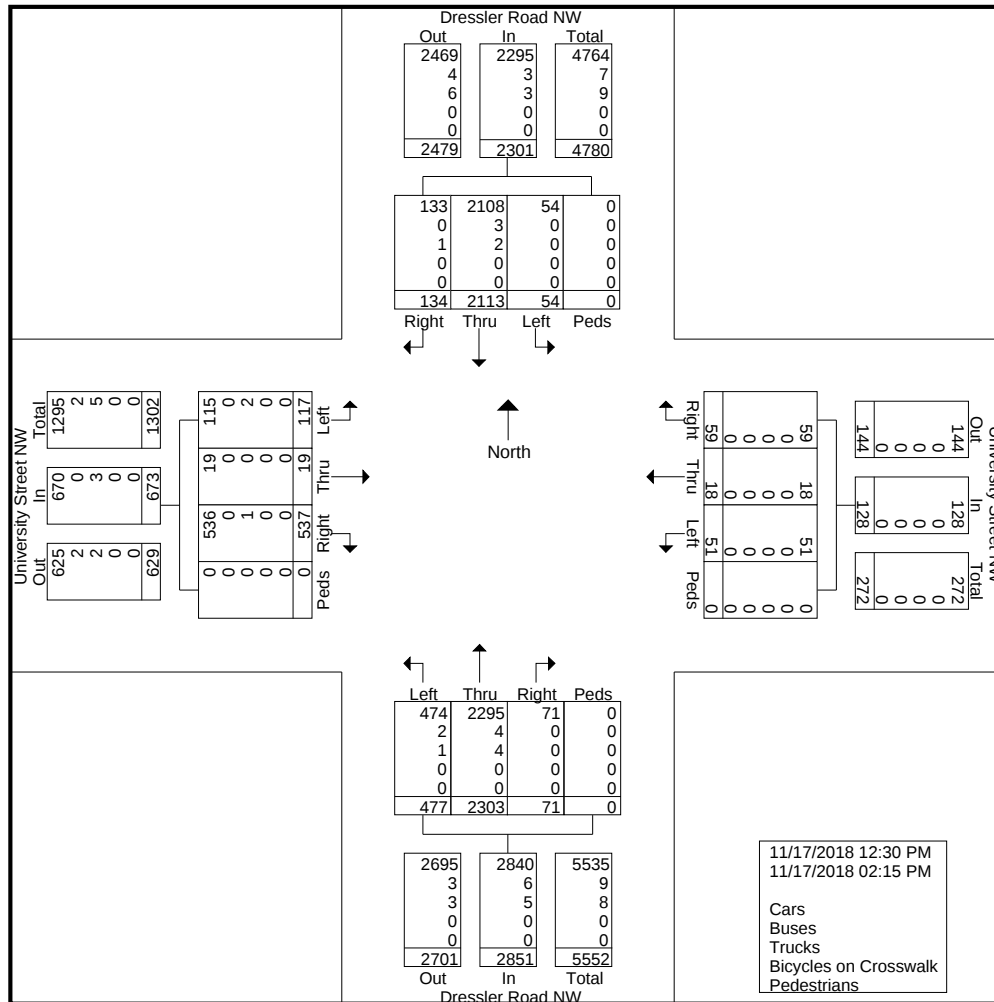
Dressler Road NW / University Street NW Intersection

File Name : Dressler_Road_NW_at_University_Street_NW_597338_11-17-2018

Site Code : Site 4 - Saturday

Start Date : 11/17/2018

Page No : 2





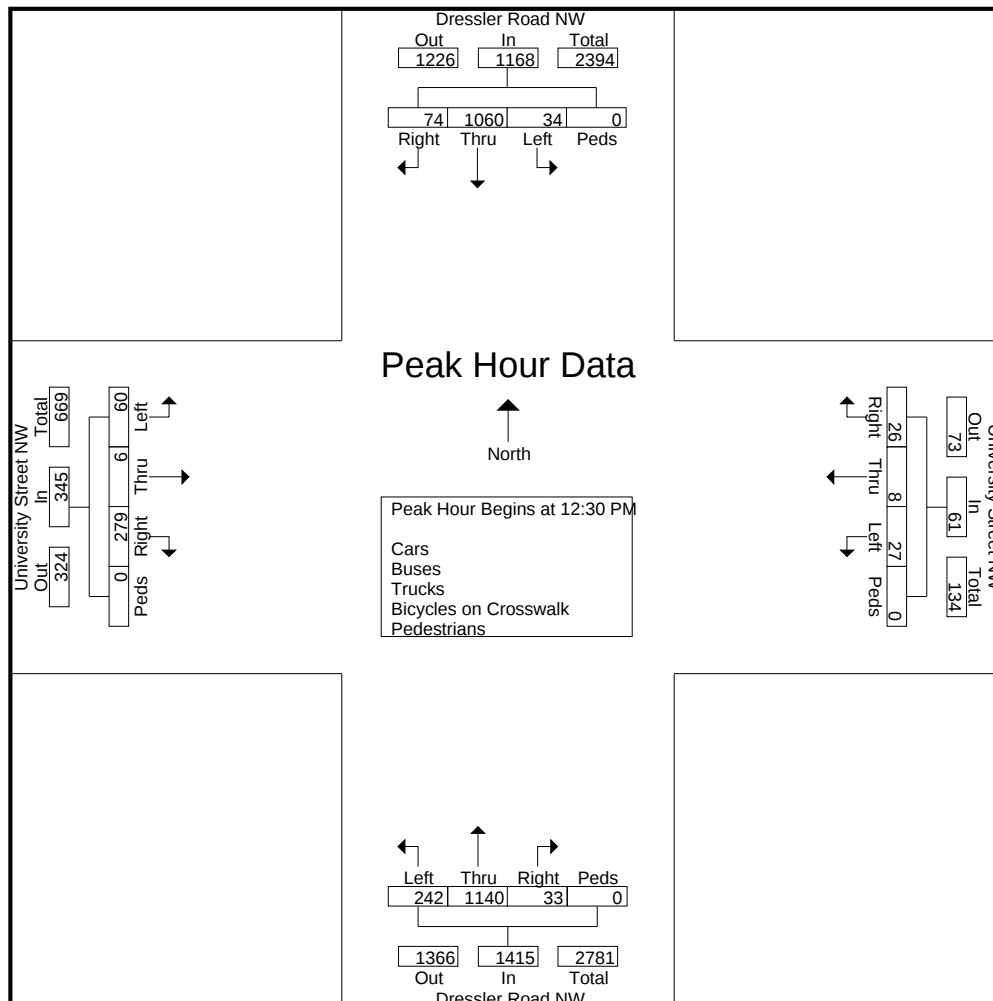
GPD Group

520 South Main Street, Suite 2531
Akron, OH 44311
Telephone: (330) 572-2100

Dressler Road NW / University Street NW Intersection

File Name : Dressler_Road_NW_at_University_Street_NW_597338_11-17-2018
Site Code : Site 4 - Saturday
Start Date : 11/17/2018
Page No : 3

	University Street NW Eastbound					University Street NW Westbound					Dressler Road NW Northbound					Dressler Road NW Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:30 PM to 01:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:30 PM																					
12:30 PM	11	4	49	0	64	5	3	7	0	15	53	288	6	0	347	11	268	25	0	304	730
12:45 PM	21	1	76	0	98	4	2	8	0	14	60	281	6	0	347	7	271	20	0	298	757
01:00 PM	14	1	76	0	91	7	3	7	0	17	64	288	6	0	358	7	259	15	0	281	747
01:15 PM	14	0	78	0	92	11	0	4	0	15	65	283	15	0	363	9	262	14	0	285	755
Total Volume	60	6	279	0	345	27	8	26	0	61	242	1140	33	0	1415	34	1060	74	0	1168	2989
% App. Total	17.4	1.7	80.9	0		44.3	13.1	42.6	0		17.1	80.6	2.3	0		2.9	90.8	6.3	0		
PHF	.714	.375	.894	.000	.880	.614	.667	.813	.000	.897	.931	.990	.550	.000	.975	.773	.978	.740	.000	.961	.987





55 Degrees and Sunny

File Name : Dressler_Road_NW_at_Shopping_Plaza_Drive_597343_11-17-2018
Site Code : Site 7 - Saturday
Start Date : 11/17/2018
Page No : 1

[illegible]



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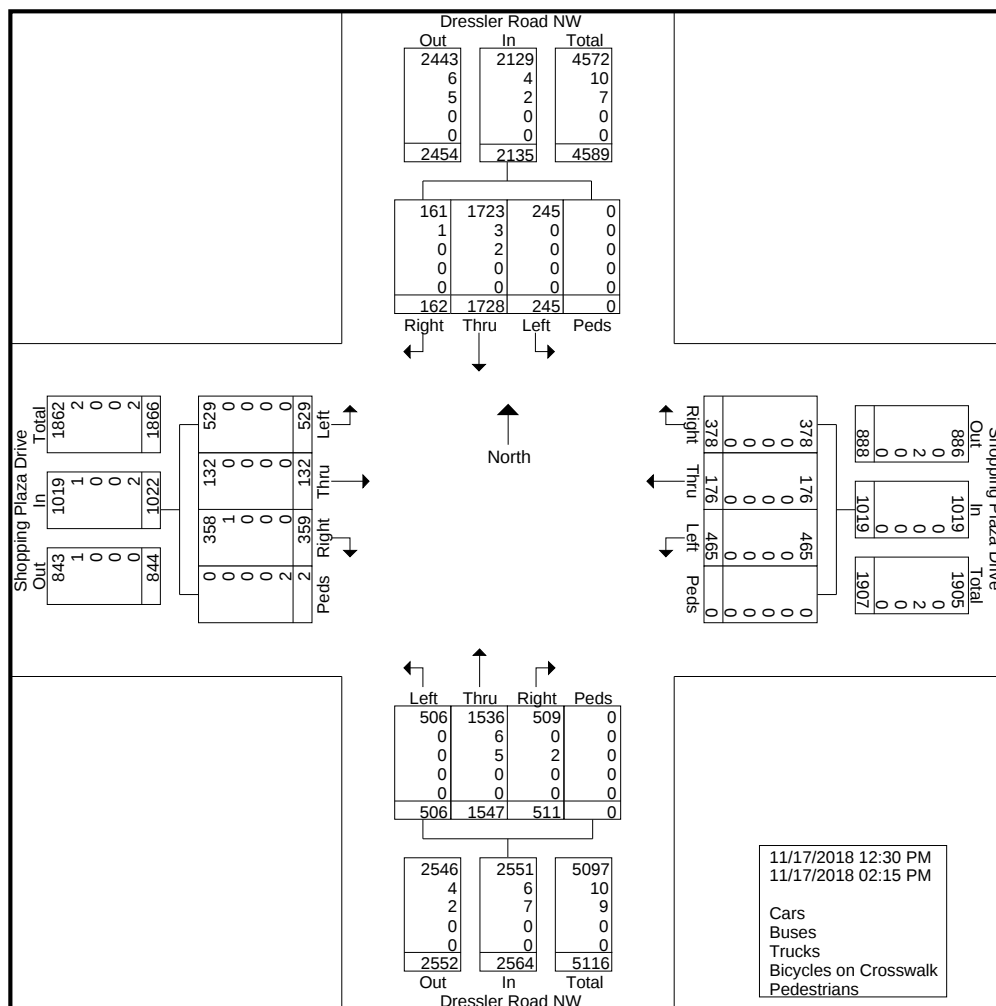
Dressler Road / Belden Park Crossing Intersection

File Name : Dressler_Road_NW_at_Shopping_Plaza_Drive_597343_11-17-2018

Site Code : Site 7 - Saturday

Start Date : 11/17/2018

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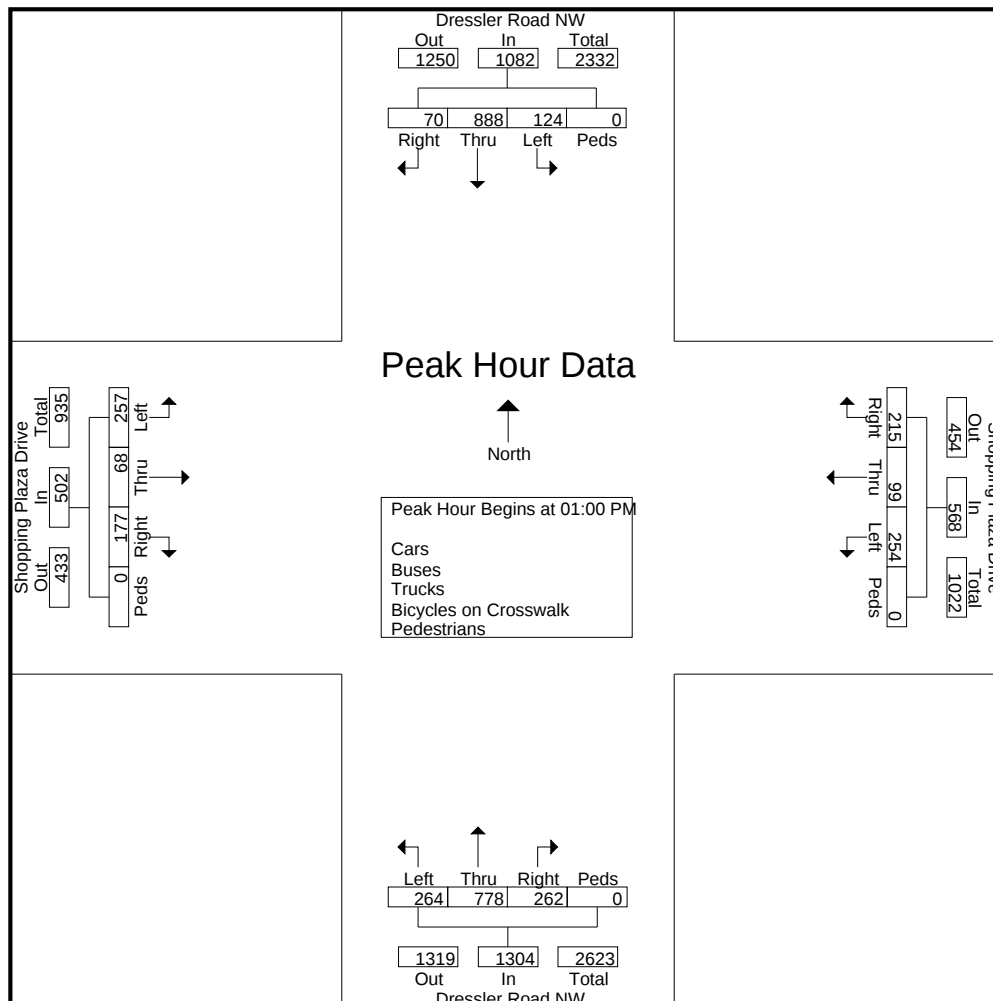
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Dressler Road / Belden Park Crossing Intersection

File Name : Dressler_Road_NW_at_Shopping_Plaza_Drive_597343_11-17-2018
Site Code : Site 7 - Saturday
Start Date : 11/17/2018
Page No : 3

	Shopping Plaza Drive Eastbound					Shopping Plaza Drive Westbound					Dressler Road NW Northbound					Dressler Road NW Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 01:00 PM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 01:00 PM																					
01:00 PM	60	18	39	0	117	54	18	42	0	114	68	214	70	0	352	36	238	13	0	287	870
01:15 PM	63	18	49	0	130	60	37	54	0	151	62	196	55	0	313	40	204	23	0	267	861
01:30 PM	60	16	42	0	118	70	21	57	0	148	73	194	71	0	338	23	235	18	0	276	880
01:45 PM	74	16	47	0	137	70	23	62	0	155	61	174	66	0	301	25	211	16	0	252	845
Total Volume	257	68	177	0	502	254	99	215	0	568	264	778	262	0	1304	124	888	70	0	1082	3456
% App. Total	51.2	13.5	35.3	0		44.7	17.4	37.9	0		20.2	59.7	20.1	0		11.5	82.1	6.5	0		
PHF	.868	.944	.903	.000	.916	.907	.669	.867	.000	.916	.904	.909	.923	.000	.926	.775	.933	.761	.000	.943	.982





File Name : Dressler_Road_North_West_at_Everhard_Road_North_West_591872_11-17-2018
Site Code : Site 1 - Saturday
Start Date : 11/17/2018
Page No : 1

Groups Printed- Cars - Buses - Trucks - Bicycles on Crosswalk - Pedestrians																					
	Everhard Road North West Eastbound					Everhard Road North West Westbound					Dressler Road North West Northbound					Dressler Road North West Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
11:00 AM	82	86	7	2	177	70	81	47	0	198	17	132	32	2	183	72	160	44	0	276	834
11:15 AM	72	110	9	0	191	73	91	65	0	229	11	169	26	0	206	59	211	41	0	311	937
11:30 AM	69	102	6	0	177	75	94	55	2	226	11	164	26	0	201	60	196	55	0	311	915
11:45 AM	70	103	7	0	180	76	94	56	0	226	6	157	32	1	196	77	202	48	0	327	929
Total	293	401	29	2	725	294	360	223	2	879	45	622	116	3	786	268	769	188	0	1225	3615
12:00 PM	74	116	9	0	199	70	105	82	0	257	9	153	31	0	193	62	197	39	0	298	947
12:15 PM	61	96	8	0	165	61	94	67	2	224	11	179	25	0	215	75	197	47	0	319	923
12:30 PM	62	124	13	0	199	83	131	79	0	293	5	168	25	0	198	58	182	33	0	273	963
12:45 PM	57	96	6	0	159	60	108	71	0	239	9	191	21	0	221	80	208	46	0	334	953
Total	254	432	36	0	722	274	438	299	2	1013	34	691	102	0	827	275	784	165	0	1224	3786
01:00 PM	80	105	6	0	191	88	111	56	0	255	4	176	22	0	202	61	206	45	0	312	960
01:15 PM	73	107	4	0	184	58	98	66	0	222	13	192	32	0	237	76	198	56	0	330	973
01:30 PM	74	122	7	0	203	73	98	85	0	256	6	157	31	0	194	66	206	54	0	326	979
01:45 PM	66	121	11	0	198	68	111	64	0	243	13	170	38	0	221	81	209	53	0	343	1005
Total	293	455	28	0	776	287	418	271	0	976	36	695	123	0	854	284	819	208	0	1311	3917
02:00 PM	77	102	6	0	185	71	104	80	0	255	13	147	32	0	192	67	192	40	0	299	931
02:15 PM	53	98	6	0	157	46	119	73	0	238	11	206	36	0	253	70	219	43	0	332	980
02:30 PM	81	115	8	0	204	80	136	81	0	297	4	155	31	0	190	67	189	33	0	289	980
02:45 PM	60	107	5	0	172	63	110	78	0	251	12	180	43	0	235	74	194	53	0	321	979
Total	271	422	25	0	718	260	469	312	0	1041	40	688	142	0	870	278	794	169	0	1241	3870
03:00 PM	77	106	4	0	187	58	106	73	0	237	9	172	23	0	204	68	142	38	0	248	876
03:15 PM	69	101	5	0	175	74	92	63	0	229	12	180	35	3	230	74	189	38	0	301	935
03:30 PM	64	102	9	0	175	59	96	81	0	236	3	170	31	0	204	69	174	29	0	272	887
03:45 PM	66	9																			



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Everhard Road NW / Dressler Road NW Intersection

File Name : Dressler_Road_North_West_at_Everhard_Road_North_West_591872_11-17-2018

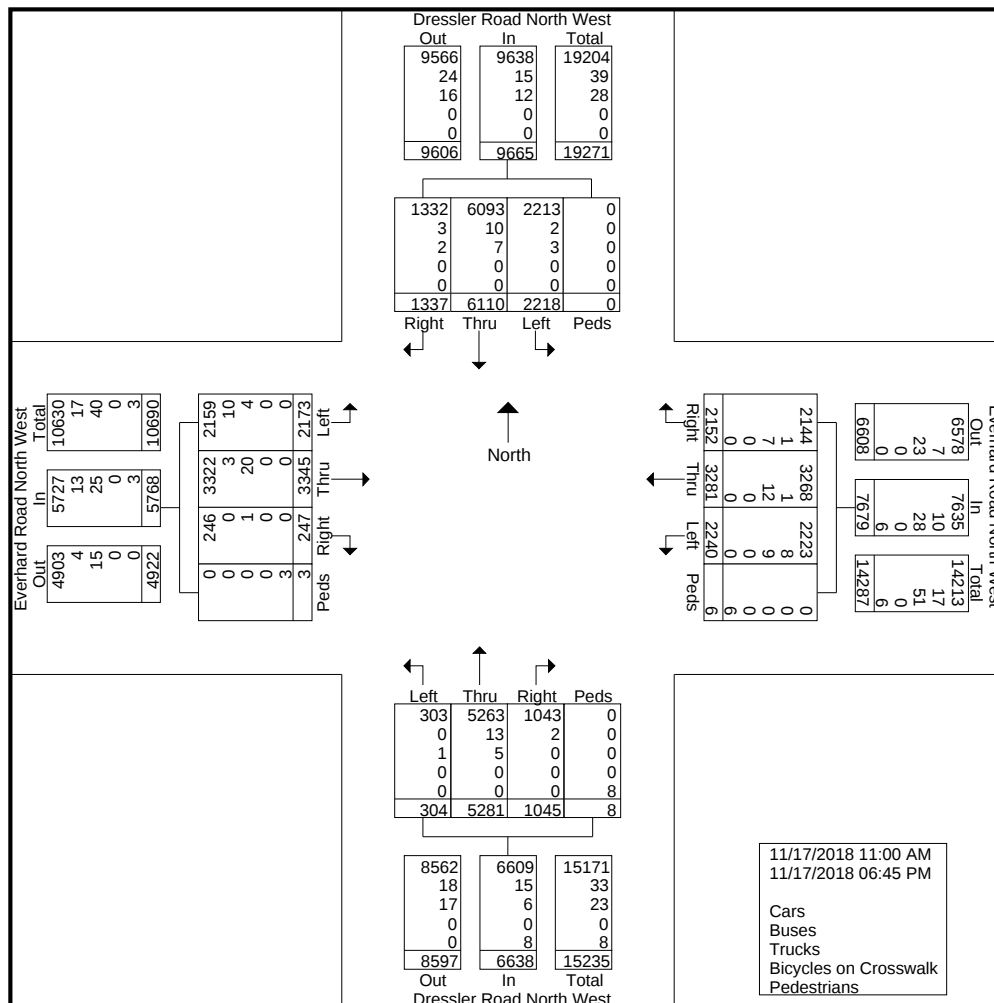
Site Code : Site 1 - Saturday

Start Date : 11/17/2018

Page No : 2

Groups Printed- Cars - Buses - Trucks - Bicycles on Crosswalk - Pedestrians

	Everhard Road North West Eastbound					Everhard Road North West Westbound					Dressler Road North West Northbound					Dressler Road North West Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Pedestrians	0	0	0	3	3	0	0	0	6	6	0	0	0	8	8	0	0	0	0	0	17
% Pedestrians	0	0	0	100	0.1	0	0	0	100	0.1	0	0	0	100	0.1	0	0	0	0	0	0.1





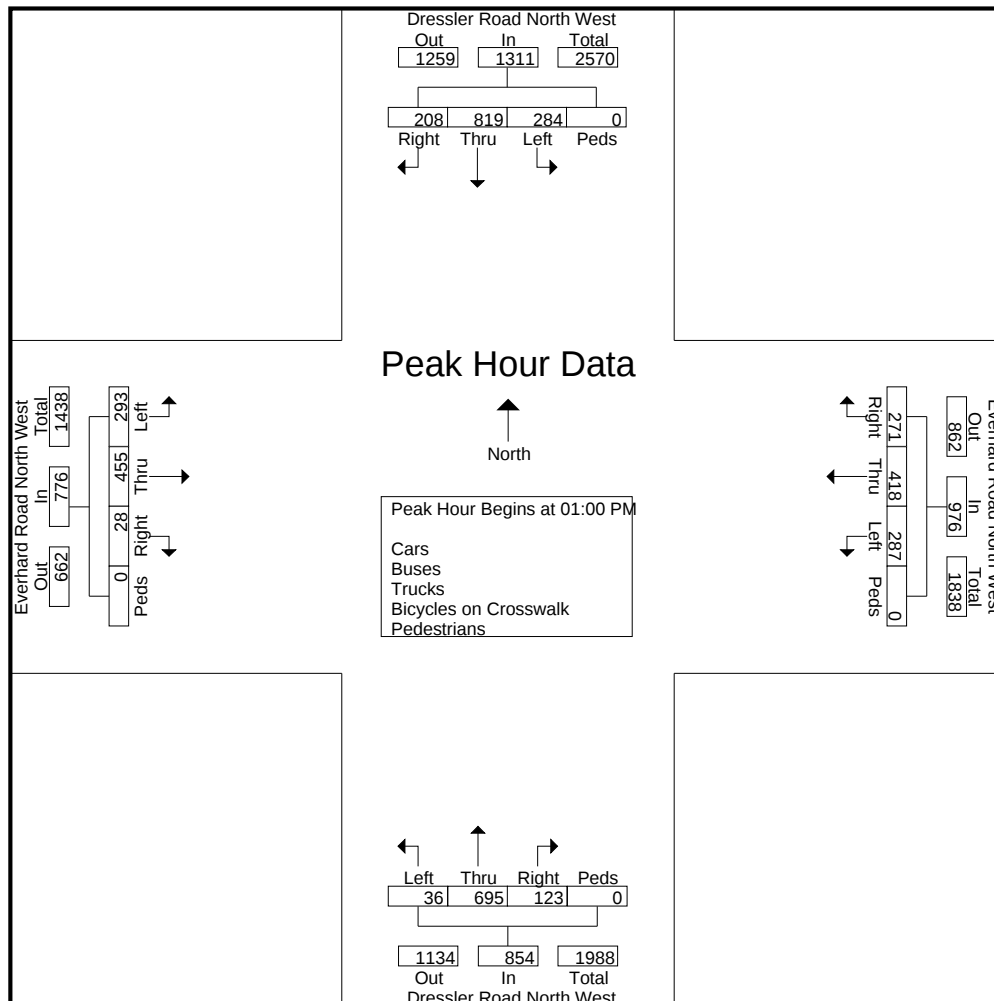
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Everhard Road NW / Dressler Road NW Intersection

File Name : Dressler_Road_North_West_at_Everhard_Road_North_West_591872_11-17-2018
Site Code : Site 1 - Saturday
Start Date : 11/17/2018
Page No : 3

	Everhard Road North West Eastbound					Everhard Road North West Westbound					Dressler Road North West Northbound					Dressler Road North West Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 01:00 PM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 01:00 PM																					
01:00 PM	80	105	6	0	191	88	111	56	0	255	4	176	22	0	202	61	206	45	0	312	960
01:15 PM	73	107	4	0	184	58	98	66	0	222	13	192	32	0	237	76	198	56	0	330	973
01:30 PM	74	122	7	0	203	73	98	85	0	256	6	157	31	0	194	66	206	54	0	326	979
01:45 PM	66	121	11	0	198	68	111	64	0	243	13	170	38	0	221	81	209	53	0	343	1005
Total Volume	293	455	28	0	776	287	418	271	0	976	36	695	123	0	854	284	819	208	0	1311	3917
% App. Total	37.8	58.6	3.6	0		29.4	42.8	27.8	0		4.2	81.4	14.4	0		21.7	62.5	15.9	0		
PHF	.916	.932	.636	.000	.956	.815	.941	.797	.000	.953	.692	.905	.809	.000	.901	.877	.980	.929	.000	.956	.974





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Dressler Road NW / West Mall Drive Intersection

55 Degrees and Sunny

File Name : Dressler_Road_NW_at_West_Mall_Drive_597336_11-17-2018
Site Code : Site 3 - Saturday
Start Date : 11/17/2018
Page No : 1

Groups Printed- Cars - Buses - Trucks - Bicycles on Crosswalk - Pedestrians

	West Mall Drive Westbound				Dressler Road NW Northbound					Dressler Road NW Southbound				
Start Time	Left	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Int. Total
12:30 PM	0	21	0	21	0	198	9	1	208	14	270	0	284	513
12:45 PM	0	25	0	25	0	188	10	0	198	11	266	0	277	500
Total	0	46	0	46	0	386	19	1	406	25	536	0	561	1013
01:00 PM	1	23	0	24	0	197	7	0	204	14	288	0	302	530
01:15 PM	1	17	0	18	0	211	16	0	227	9	251	0	260	505
01:30 PM	0	21	0	21	1	192	11	0	204	11	275	0	286	511
01:45 PM	0	6	0	6	0	205	7	0	212	13	277	0	290	508
Total	2	67	0	69	1	805	41	0	847	47	1091	0	1138	2054
02:00 PM	0	15	0	15	0	200	9	0	209	4	263	0	267	491
02:15 PM	0	22	0	22	0	219	13	0	232	14	253	0	267	521
Grand Total	2	150	0	152	1	1610	82	1	1694	90	2143	0	2233	4079
Apprch %	1.3	98.7	0		0.1	95	4.8	0.1		4	96	0		
Total %	0	3.7	0	3.7	0	39.5	2	0	41.5	2.2	52.5	0	54.7	
Cars	2	150	0	152	1	1606	82	0	1689	90	2135	0	2225	4066
% Cars	100	100	0	100	100	99.8	100	0	99.7	100	99.6	0	99.6	99.7
Buses	0	0	0	0	0	2	0	0	2	0	4	0	4	6
% Buses	0	0	0	0	0	0.1	0	0	0.1	0	0.2	0	0.2	0.1
Trucks	0	0	0	0	0	2	0	0	2	0	4	0	4	6
% Trucks	0	0	0	0	0	0.1	0	0	0.1	0	0.2	0	0.2	0.1
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	0	0	0	0	1	1	0	0	0	0	1
% Pedestrians	0	0	0	0	0	0	0	100	0.1	0	0	0	0	0



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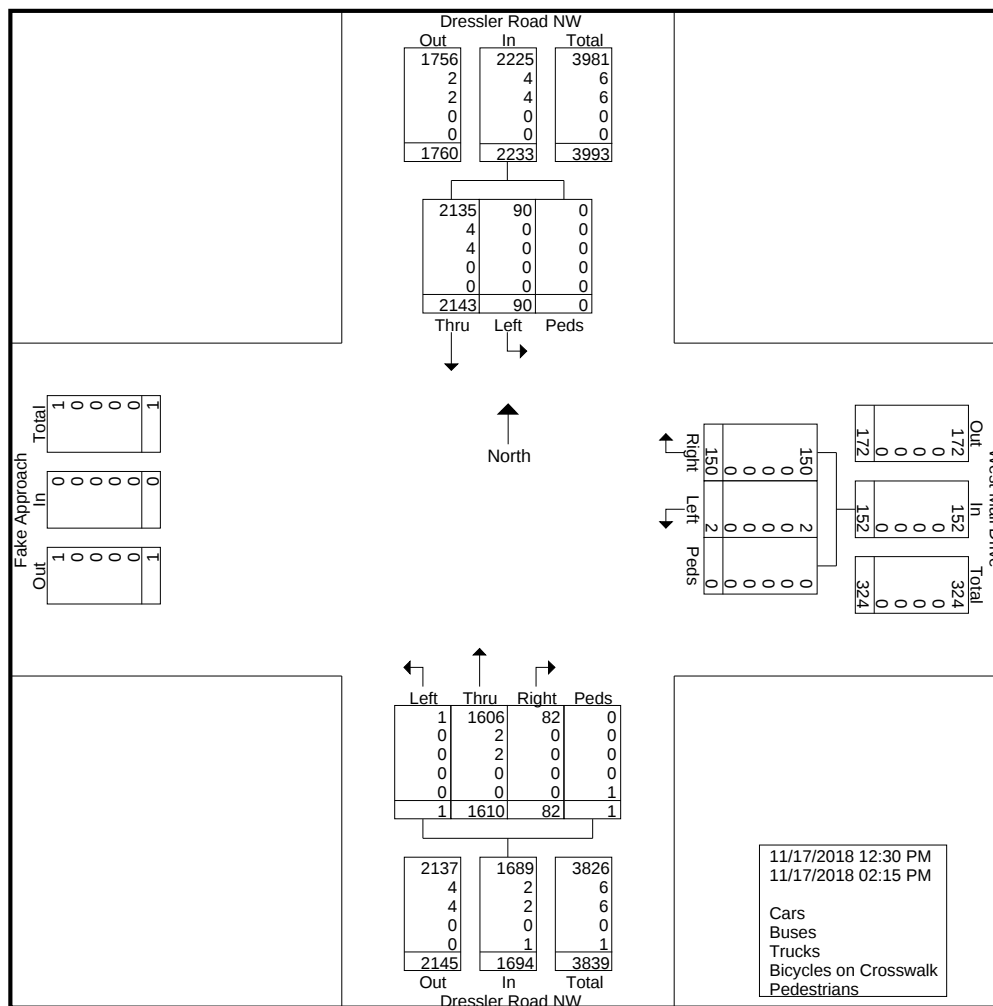
Dressler Road NW / West Mall Drive Intersection

File Name : Dressler_Road_NW_at_West_Mall_Drive_597336_11-17-2018

Site Code : Site 3 - Saturday

Start Date : 11/17/2018

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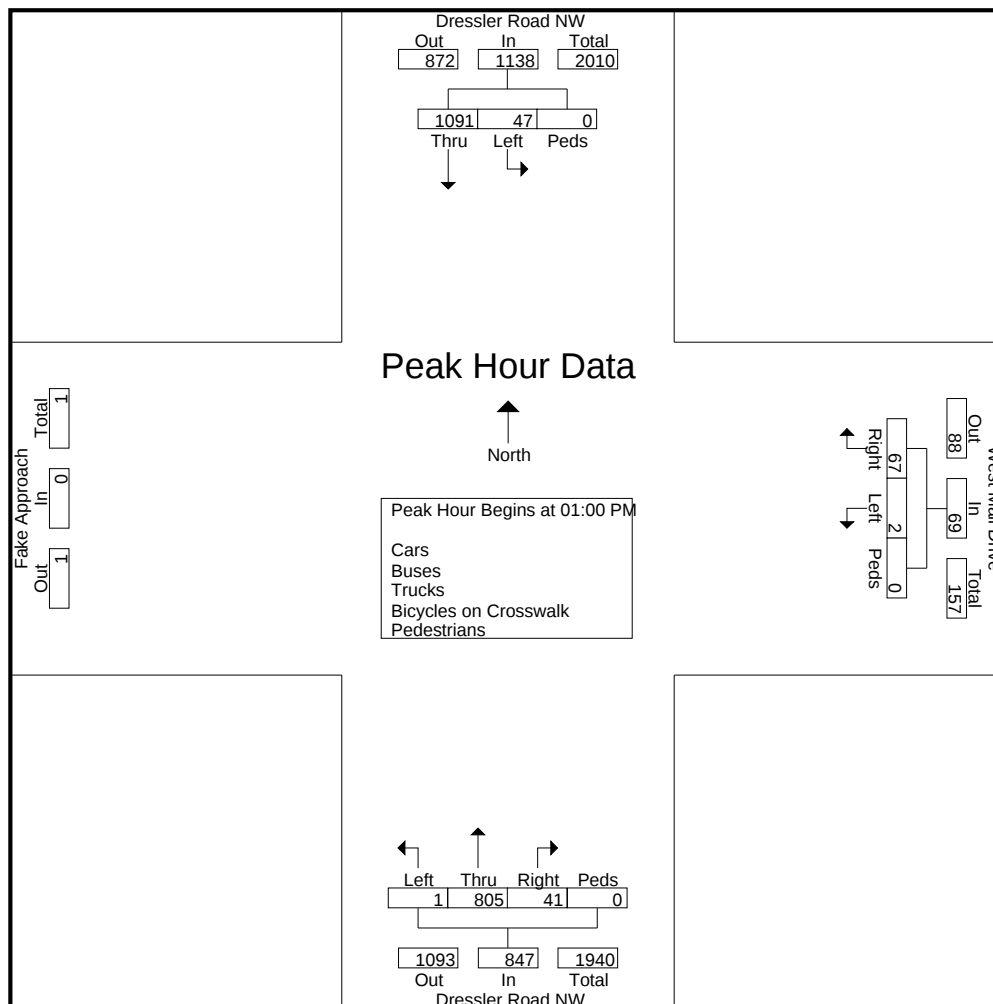
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Dressler Road NW / West Mall Drive Intersection

File Name : Dressler_Road_NW_at_West_Mall_Drive_597336_11-17-2018
Site Code : Site 3 - Saturday
Start Date : 11/17/2018
Page No : 3

	West Mall Drive Westbound				Dressler Road NW Northbound					Dressler Road NW Southbound				
Start Time	Left	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Int. Total
Peak Hour Analysis From 01:00 PM to 01:45 PM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 01:00 PM														
01:00 PM	1	23	0	24	0	197	7	0	204	14	288	0	302	530
01:15 PM	1	17	0	18	0	211	16	0	227	9	251	0	260	505
01:30 PM	0	21	0	21	1	192	11	0	204	11	275	0	286	511
01:45 PM	0	6	0	6	0	205	7	0	212	13	277	0	290	508
Total Volume	2	67	0	69	1	805	41	0	847	47	1091	0	1138	2054
% App. Total	2.9	97.1	0		0.1	95	4.8	0		4.1	95.9	0		
PHF	.500	.728	.000	.719	.250	.954	.641	.000	.933	.839	.947	.000	.942	.969





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Belden Village Street NW / Dressler Road NW Intersection

File Name : Belden_Village_Street_North_West_at_Dressler_Road_North_West_591954_11-17-2018

Site Code : Site 8 - Saturday

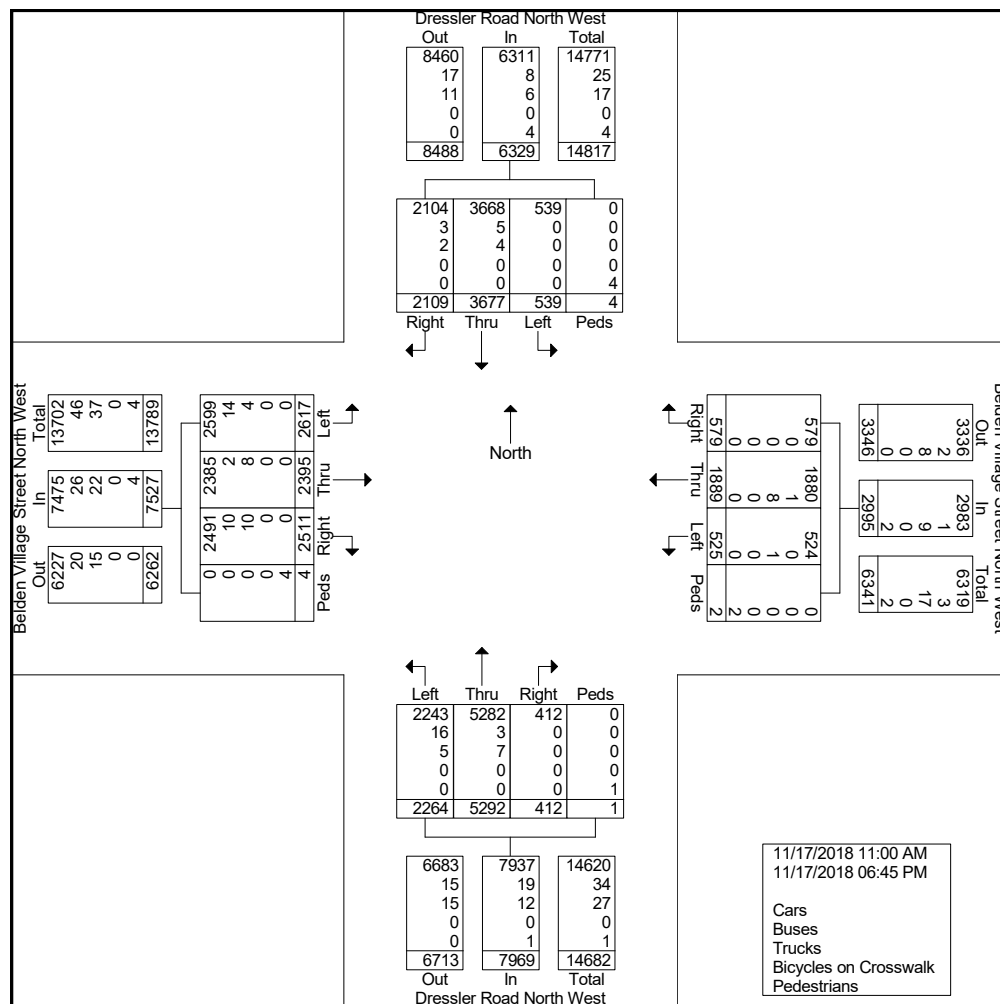
Start Date : 11/17/2018

Page No : 1

Sunny - 70 Degrees

Groups Printed- Cars - Buses - Trucks - Bicycles on Crosswalk - Pedestrians

	Belden Village Street North West Eastbound					Belden Village Street North West Westbound					Dressler Road North West Northbound					Dressler Road North West Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
11:00 AM	76	58	64	0	198	19	66	14	2	101	56	147	10	1	214	12	104	55	0	171	684
11:15 AM	74	55	87	0	216	13	60	21	0	94	83	159	14	0	256	9	100	39	0	148	714
11:30 AM	87	72	84	0	243	22	45	13	0	80	64	171	13	0	248	20	107	37	0	164	735
11:45 AM	83	67	90	1	241	18	63	12	0	93	70	176	16	0	262	18	113	71	2	204	800
Total	320	252	325	1	898	72	234	60	2	368	273	653	53	1	980	59	424	202	2	687	2933
12:00 PM	90	80	84	0	254	14	59	22	0	95	66	177	10	0	253	21	91	54	0	166	768
12:15 PM	75	75	77	2	229	11	53	21	0	85	81	180	11	0	272	24	111	51	0	186	772
12:30 PM	88	58	102	1	249	22	59	17	0	98	73	173	8	0	254	15	102	58	0	175	776
12:45 PM	67	76	76	0	219	16	73	19	0	108	76	173	17	0	266	23	101	65	1	190	783
Total	320	289	339	3	951	63	244	79	0	386	296	703	46	0	1045	83	405	228	1	717	3099
01:00 PM	84	75	91	0	250	22	84	16	0	122	79	177	12	0	268	23	94	71	0	188	828
01:15 PM	75	79	85	0	239	12	67	16	0	95	72	176	12	0	260	20	135	71	0	226	820
01:30 PM	94	105	79	0	278	10	73	22	0	105	68	165	13	0	246	18	117	72	0	207	836
01:45 PM	75	78	77	0	230	20	74	20	0	114	71	206	9	0	286	21	122	70	0	213	843
Total	328	337	332	0	997	64	298	74	0	436	290	724	46	0	1060	82	468	284	0	834	3327
02:00 PM	84	91	88	0	263	21	69	21	0	111	61	168	16	0	245	17	127	72	1	217	836
02:15 PM	77	55	82	0	214	13	57	11	0	81	77	160	19	0	256	22	134	61	0	217	768
02:30 PM	78	72	75	0	225	16	82	19	0	117	72	160	10	0	242	21	110	71	0	202	786
02:45 PM	65	68	80	0	213	15	55	15	0	85	72	169	16	0	257	24	125	92	0	241	796
Total	304	286	325	0	915	65	263	66	0	394	282	657	61	0	1000	84	496	296	1	877	3186
03:00 PM	77	77	83	0	237	17	58	17	0	92	65	110	5	0	180	25	111	75	0	211	720
03:15 PM	81	73	64	0	218	25	61	10	0	96	72	162	15	0	249	10	123	74	0	207	770
03:30 PM	100	78	84	0	262	12	51	15	0	78	84	128	10	0	222	9	107	47	0	163	725
03:45 PM	86	83	84	0	253	13	49	13	0	75	76	164	17	0	257	13	112	72	0	197	782
Total	344	311	315	0	970	67	219	55	0	341	297	564	47	0	908	57	453	268	0	778	2997
04:00 PM	90	76	78	0	244	23	66	23	0	112	80	156	13	0	249	17	92	71	0	180	785
04:15 PM	85	56	69	0	210	19	55	19	0	93	74	178	12	0	264	16	145	81	0	242	809
04:30 PM	85	84	73	0	242	9	56	20	0	85	73	150	7	0	230	19	115	63	0	197	754
04:45 PM	78	68	72	0	218	14	47	21	0	82	70	175	15	0	260	19	107	62	0	188	748
Total	338	284	292	0	914	65	224	83	0	372	297	659	47	0	1003	71	459	277	0	807	3096
05:00 PM	103	96	68	0	267	9	54	16	0	79	79	148	16	0	243	11	97	72	0	180	769
05:15 PM	95	96	60	0	251	18	47	23	0	88	60	173	12	0	245	13	125	52	0	190	774
05:30 PM	74	73	87	0	234	14	47	17	0	78	60	135	22	0	217	10	109	80	0	199	728
05:45 PM	80	87	67	0	234	22	52	26	0	100	72	179	13	0	264	19	112	62	0	193	791
Total	352	352	282	0	986	63	200	82	0	345	271	635	63	0	969	53	443	266	0	762	3062
06:00 PM	74	84	59	0	217	16	60	22	0	98	63	179	11	0	253	14	137	71	0	222	790
06:15 PM	85	85	70	0	240	29	48	25	0	102	63	158	7	0	228	13	123	60	0	196	766
06:30 PM	77	61	94	0	232	16	50	25	0	91	68	198	19	0	285	17	119	78	0	214	822
06:45 PM	75	54	78	0	207	5	49	8	0	62	64	162	12	0	238	6	150	79	0	235	742
Total	311	284	301	0	896	66	207	80	0	353	258	697	49	0	1004	50	529	288	0	867	3120
Grand Total	2617	2395	2511	4	7527	525	1889	579	2	2995	2264	5292	412	1	7969	539	3677	2109	4	6329	24820
Apprch %	34.8	31.8	33.4	0.1		17.5	63.1	19.3	0.1		28.4	66.4	5.2	0		8.5	58.1	33.3	0.1		
Total %	10.5	9.6	10.1	0	30.3	2.1	7.6	2.3	0	12.1	9.1	21.3	1.7	0	32.1	2.2	14.8	8.5	0	25.5	
Cars	2599	2385	2491	0	7475	524	1880	579	0	2983	2243	5282	412	0	7937	539	3668	2104	0	6311	24706
% Cars	99.3	99.6	99.2	0	99.3	99.8	99.5	100	0	99.6	99.1	99.8	100	0	99.6	100	99.8	99.8	0	99.7	99.5
Buses	14	2	10	0	26	0	1	0	0	1	16	3	0	0	19	0	5	3	0	8	54
% Buses	0.5	0.1	0.4	0	0.3	0	0.1	0	0	0	0.7	0.1	0	0	0.2	0	0.1	0.1	0	0.1	0.2
Trucks	4	8	10	0	22	1	8	0	0	9	5	7	0	0	12	0	4	2	0	6	49
% Trucks	0.2	0.3	0.4	0	0.3	0.2	0.4	0	0	0.3	0.2	0.1	0	0	0.2	0	0.1	0.1	0	0.1	0.2





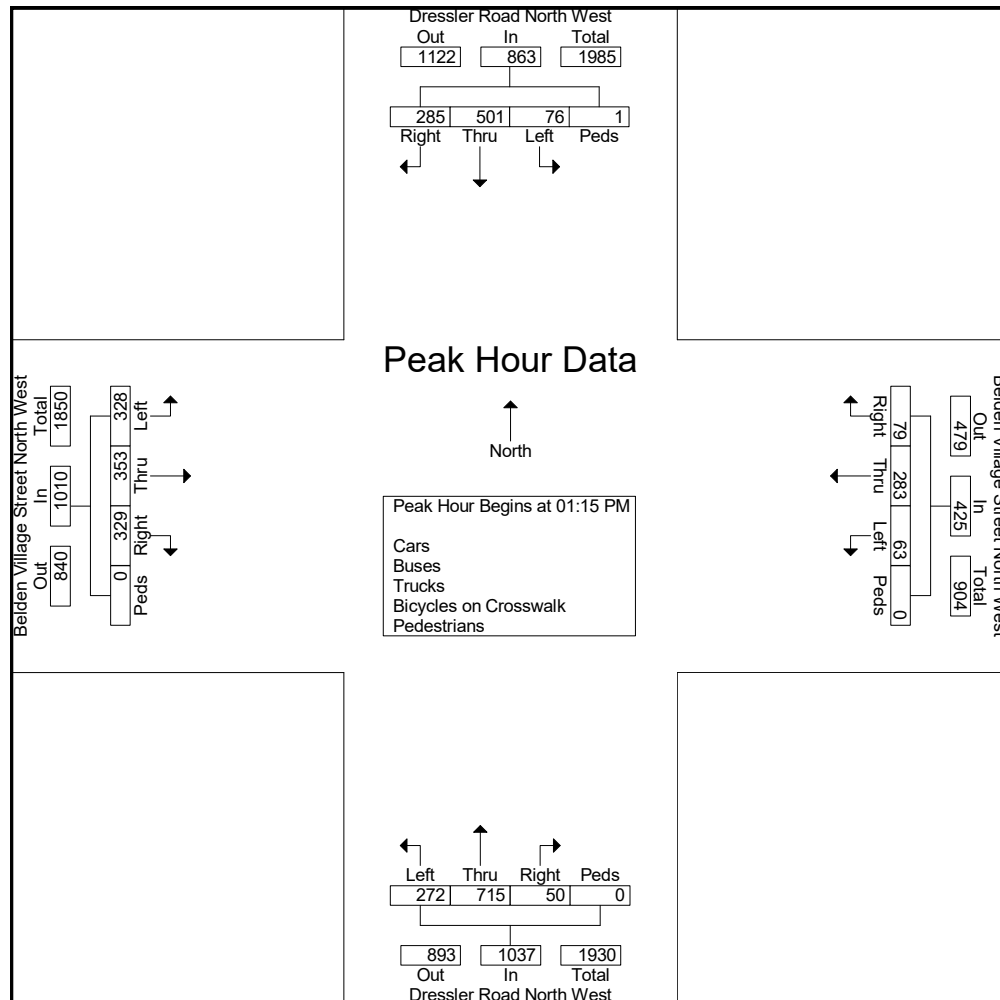
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Belden Village Street NW / Dressler Road NW Intersection

File Name : Belden_Village_Street_North_West_at_Dressler_Road_North_West_591954_11-17-2018
Site Code : Site 8 - Saturday
Start Date : 11/17/2018
Page No : 3

	Belden Village Street North West Eastbound					Belden Village Street North West Westbound					Dressler Road North West Northbound					Dressler Road North West Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 01:15 PM to 02:00 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 01:15 PM																					
01:15 PM	75	79	85	0	239	12	67	16	0	95	72	176	12	0	260	20	135	71	0	226	820
01:30 PM	94	105	79	0	278	10	73	22	0	105	68	165	13	0	246	18	117	72	0	207	836
01:45 PM	75	78	77	0	230	20	74	20	0	114	71	206	9	0	286	21	122	70	0	213	843
02:00 PM	84	91	88	0	263	21	69	21	0	111	61	168	16	0	245	17	127	72	1	217	836
Total Volume	328	353	329	0	1010	63	283	79	0	425	272	715	50	0	1037	76	501	285	1	863	3335
% App. Total	32.5	35	32.6	0		14.8	66.6	18.6	0		26.2	68.9	4.8	0		8.8	58.1	33	0.1		
PHF	.872	.840	.935	.000	.908	.750	.956	.898	.000	.932	.944	.868	.781	.000	.906	.905	.928	.990	.250	.955	.989





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Belden Village Street / Everhard Road NW Intersection

Sunny - 70 Degrees

File Name : Everhard_Road_North_West_at_Belden_Village_Street_North_West_591939_11-17-2018
Site Code : Site 7 - Saturday
Start Date : 11/17/2018
Page No : 1

Groups Printed- Cars - Buses - Trucks - Bicycles on Crosswalk - Pedestrians

	Eastbound Approach Eastbound					Belden Village Street North West Westbound					Everhard Road North West Northbound					Everhard Road North West Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
11:00 AM	2	3	2	0	7	52	2	15	0	69	0	178	80	0	258	7	131	4	0	142	476
11:15 AM	1	1	2	0	4	51	0	7	0	58	2	172	69	0	243	10	131	1	0	142	447
11:30 AM	4	1	2	0	7	70	1	19	0	90	2	181	74	0	257	18	164	4	0	186	540
11:45 AM	1	3	2	0	6	77	0	24	0	101	5	175	85	0	265	15	156	1	0	172	544
Total	8	8	8	0	24	250	3	65	0	318	9	706	308	0	1023	50	582	10	0	642	2007
12:00 PM	3	0	4	0	7	77	3	36	0	116	4	200	66	0	270	23	141	2	0	166	559
12:15 PM	3	0	7	0	10	67	2	27	0	96	0	168	65	0	233	17	173	1	0	191	530
12:30 PM	3	1	3	0	7	60	1	20	0	81	1	204	59	0	264	30	192	2	0	224	576
12:45 PM	4	2	1	0	7	89	0	21	0	110	2	168	81	0	251	22	170	3	0	195	563
Total	13	3	15	0	31	293	6	104	0	403	7	740	271	0	1018	92	676	8	0	776	2228
01:00 PM	4	2	5	0	11	67	1	28	0	96	1	182	72	0	255	23	171	2	0	196	558
01:15 PM	2	2	2	0	6	81	1	20	0	102	2	182	67	0	251	14	200	0	0	214	573
01:30 PM	3	0	4	0	7	83	4	20	0	107	1	185	68	0	254	18	166	0	0	184	552
01:45 PM	2	2	0	0	4	82	0	19	0	101	1	180	64	0	245	27	181	5	0	213	563
Total	11	6	11	0	28	313	6	87	0	406	5	729	271	0	1005	82	718	7	0	807	2246
02:00 PM	1	1	4	0	6	75	0	21	0	96	2	160	77	0	239	9	154	2	0	165	506
02:15 PM	2	0	5	0	7	61	1	24	0	86	2	177	59	0	238	22	185	1	0	208	539
02:30 PM	1	1	4	0	6	67	0	21	0	88	2	163	76	0	241	24	173	2	0	199	534
02:45 PM	0	2	2	0	4	60	1	22	0	83	1	160	62	0	223	14	190	2	0	206	516
Total	4	4	15	0	23	263	2	88	0	353	7	660	274	0	941	69	702	7	0	778	2095
03:00 PM	1	1	6	0	8	64	2	22	0	88	1	163	56	0	220	12	171	1	0	184	500
03:15 PM	2	1	1	0	4	72	0	24	0	96	0	182	61	0	243	15	148	1	0	164	507
03:30 PM	0	0	0	1	1	53	0	16	0	69	0	151	60	0	211	8	149	0	0	157	438
03:45 PM	3	0	1	0	4	84	0	19	0	103	1	159	61	0	221	15	168	1	0	184	512
Total	6	2	8	1	17	273	2	81	0	356	2	655	238	0	895	50	636	3	0	689	1957
04:00 PM	3	0	2	0	5	61	1	12	0	74	2	173	55	0	230	18	173	2	0	193	502
04:15 PM	3	0	1	0	4	63	1	15	0	79	4	163	75	0	242	17	146	0	0	163	488
04:30 PM	1	0	1	0	2	73	1	13	0	87	0	181	62	0	243	11	182	1	0	194	526
04:45 PM	3	0	1	0	4	62	0	12	0	74	1	162	62	0	225	13	167	0	0	180	483
Total	10	0	5	0	15	259	3	52	0	314	7	679	254	0	940	59	668	3	0	730	1999
05:00 PM	7	1	2	0	10	58	1	20	0	79	3	169	56	0	228	20	163	1	0	184	501
05:15 PM	1	0	0	0	1	90	2	14	0	106	2	176	58	0	236	9	158	0	0	167	510
05:30 PM	2	0	1	1	4	54	0	15	0	69	1	180	59	0	240	13	161	0	0	174	487
05:45 PM	1	1	0	0	2	75	0	13	0	88	0	159	57	0	216	19	163	2	0	184	490
Total	11	2	3	1	17	277	3	62	0	342	6	684	230	0	920	61	645	3	0	709	1988
06:00 PM	1	1	1	0	3	72	0	20	0	92	0	171	63	0	234	15	135	1	0	151	480
06:15 PM	0	1	0	0	1	78	0	10	0	88	0	151	66	0	217	13	137	0	0	150	456
06:30 PM	0	0	2	0	2	81	0	18	0	99	1	142	55	0	198	14	129	2	0	145	444
06:45 PM	4	0	0	0	4	56	0	14	0	70	1	141	45	0	187	7	110	2	0	119	380
Total	5	2	3	0	10	287	0	62	0	349	2	605	229	0	836	49	511	5	0	565	1760
Grand Total	68	27	68	2	165	2215	25	601	0	2841	45	5458	2075	0	7578	512	5138	46	0	5696	16280
Apprch %	41.2	16.4	41.2	1.2		78	0.9	21.2	0		0.6	72	27.4	0		9	90.2	0.8	0		
Total %	0.4	0.2	0.4	0	1	13.6	0.2	3.7	0	17.5	0.3	33.5	12.7	0	46.5	3.1	31.6	0.3	0	35	
Cars	67	27	65	0	159	2207	25	600	0	2832	45	5426	2068	0	7539	509	5118	44	0	5671	16201
% Cars	98.5	100	95.6	0	96.4	99.6	100	99.8	0	99.7	100	99.4	99.7	0	99.5	99.4	99.6	95.7	0	99.6	99.5
Buses	1	0	1	0	2	2	0	0	0	2	0	12	1	0	13	1	3	2	0	6	23
% Buses	1.5	0	1.5	0	1.2	0.1	0	0	0	0.1	0	0.2	0	0	0.2	0.2	0.1	4.3	0	0.1	0.1
Trucks	0	0	2	0	2	6	0	1	0	7	0	20	6	0	26	2	17	0	0	19	54
% Trucks	0	0	2.9	0	1.2	0.3	0	0.2	0	0.2	0	0.4	0.3	0	0.3	0.4	0.3	0	0	0.3	0.3



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Belden Village Street / Everhard Road NW Intersection

File Name : Everhard_Road_North_West_at_Belden_Village_Street_North_West_591939_11-17-2018

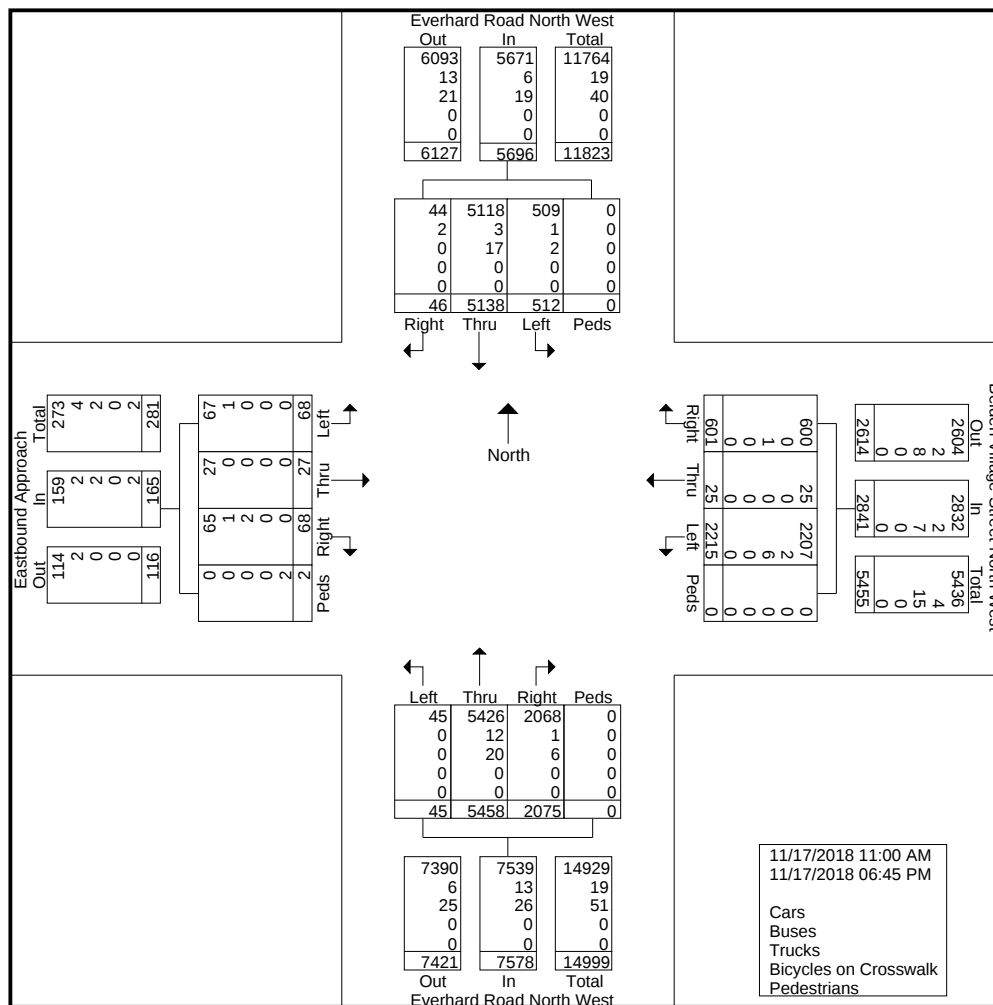
Site Code : Site 7 - Saturday

Start Date : 11/17/2018

Page No : 2

Groups Printed- Cars - Buses - Trucks - Bicycles on Crosswalk - Pedestrians

	Eastbound Approach Eastbound					Belden Village Street North West Westbound					Everhard Road North West Northbound					Everhard Road North West Southbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
% Pedestrians	0	0	0	100	1.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0





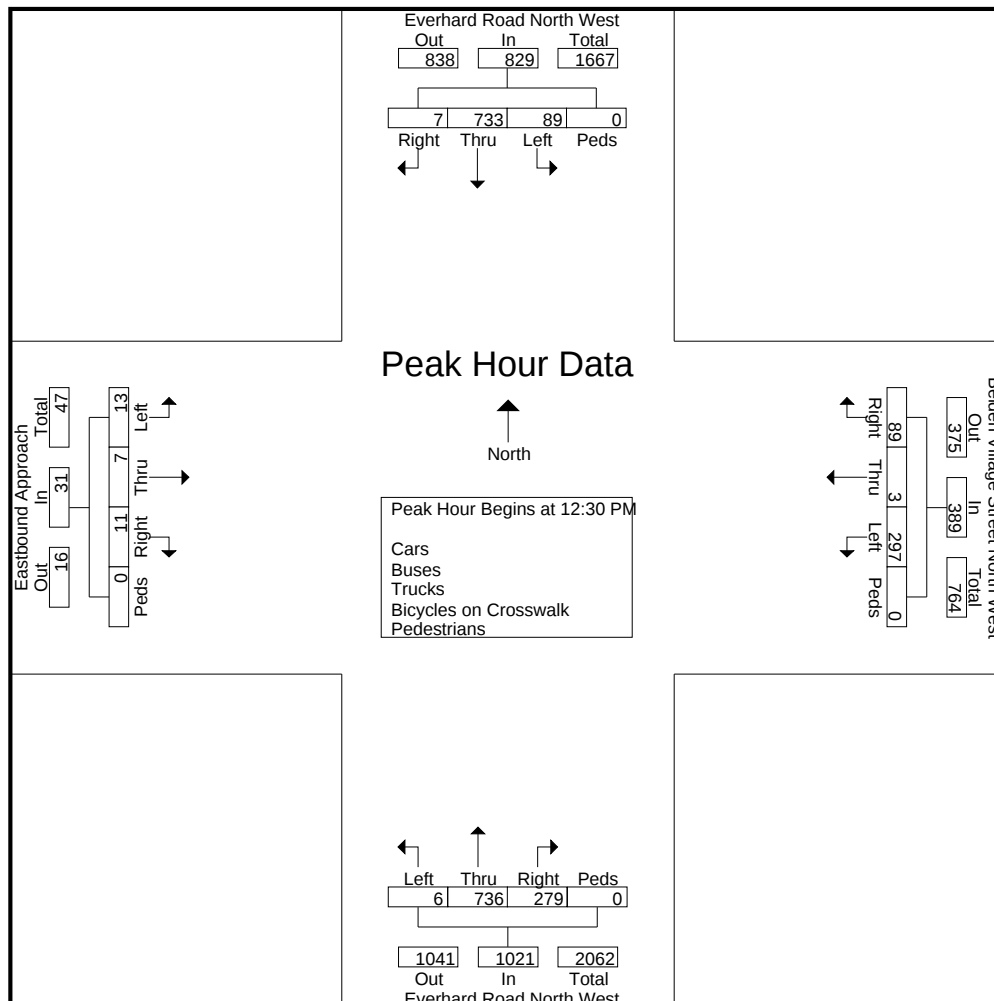
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Belden Village Street / Everhard Road NW Intersection

File Name : Everhard_Road_North_West_at_Belden_Village_Street_North_West_591939_11-17-2018
Site Code : Site 7 - Saturday
Start Date : 11/17/2018
Page No : 3

	Eastbound Approach Eastbound					Belden Village Street North West Westbound					Everhard Road North West Northbound					Everhard Road North West Southbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:30 PM to 01:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:30 PM																					
12:30 PM	3	1	3	0	7	60	1	20	0	81	1	204	59	0	264	30	192	2	0	224	576
12:45 PM	4	2	1	0	7	89	0	21	0	110	2	168	81	0	251	22	170	3	0	195	563
01:00 PM	4	2	5	0	11	67	1	28	0	96	1	182	72	0	255	23	171	2	0	196	558
01:15 PM	2	2	2	0	6	81	1	20	0	102	2	182	67	0	251	14	200	0	0	214	573
Total Volume	13	7	11	0	31	297	3	89	0	389	6	736	279	0	1021	89	733	7	0	829	2270
% App. Total	41.9	22.6	35.5	0		76.3	0.8	22.9	0		0.6	72.1	27.3	0		10.7	88.4	0.8	0		
PHF	.813	.875	.550	.000	.705	.834	.750	.795	.000	.884	.750	.902	.861	.000	.967	.742	.916	.583	.000	.925	.985





55 Degrees and Sunny

File Name : Everhard_Road_NW_at_Red_Roof_Inn_Drive_597340_11-17-2018
Site Code : Site 5 - Saturday
Start Date : 11/17/2018
Page No : 1

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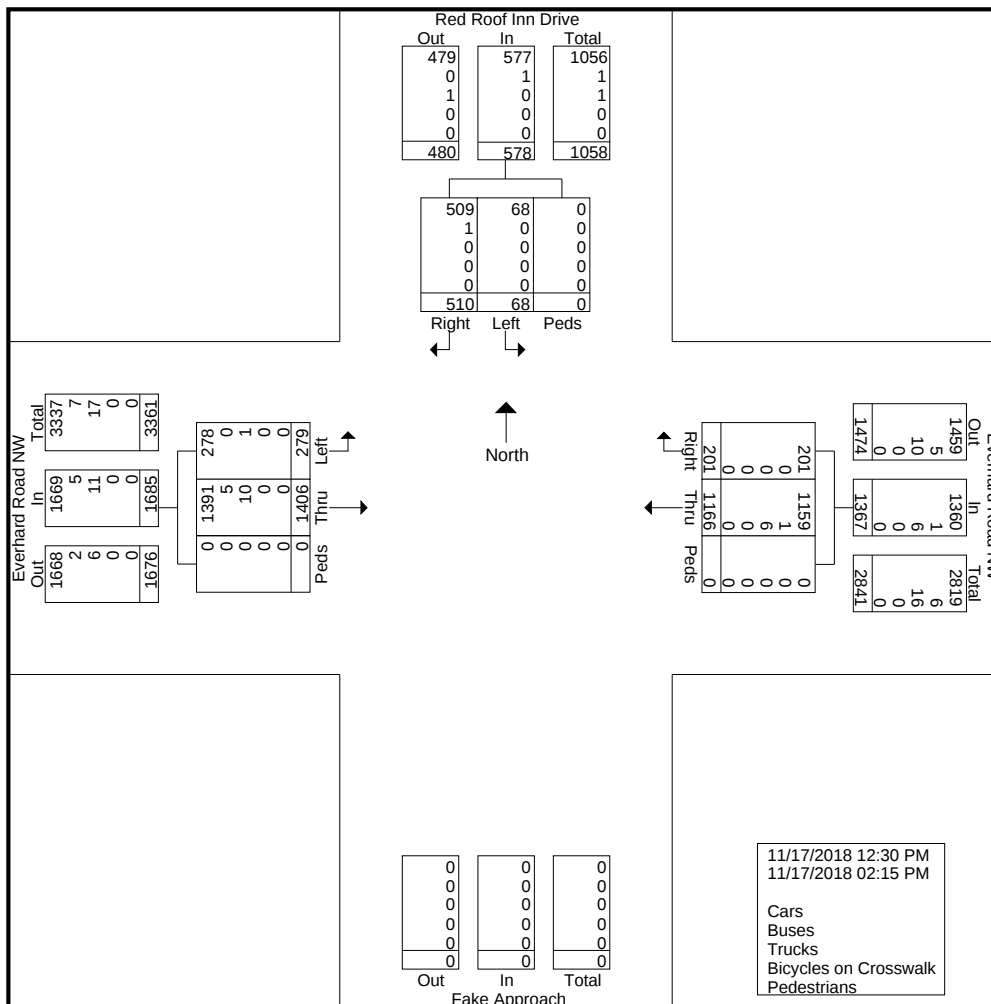
Everhard Road NW / Red Roof Inn Drive Intersection

File Name : Everhard_Road_NW_at_Red_Roof_Inn_Drive_597340_11-17-2018

Site Code : Site 5 - Saturday

Start Date : 11/17/2018

Page No : 2





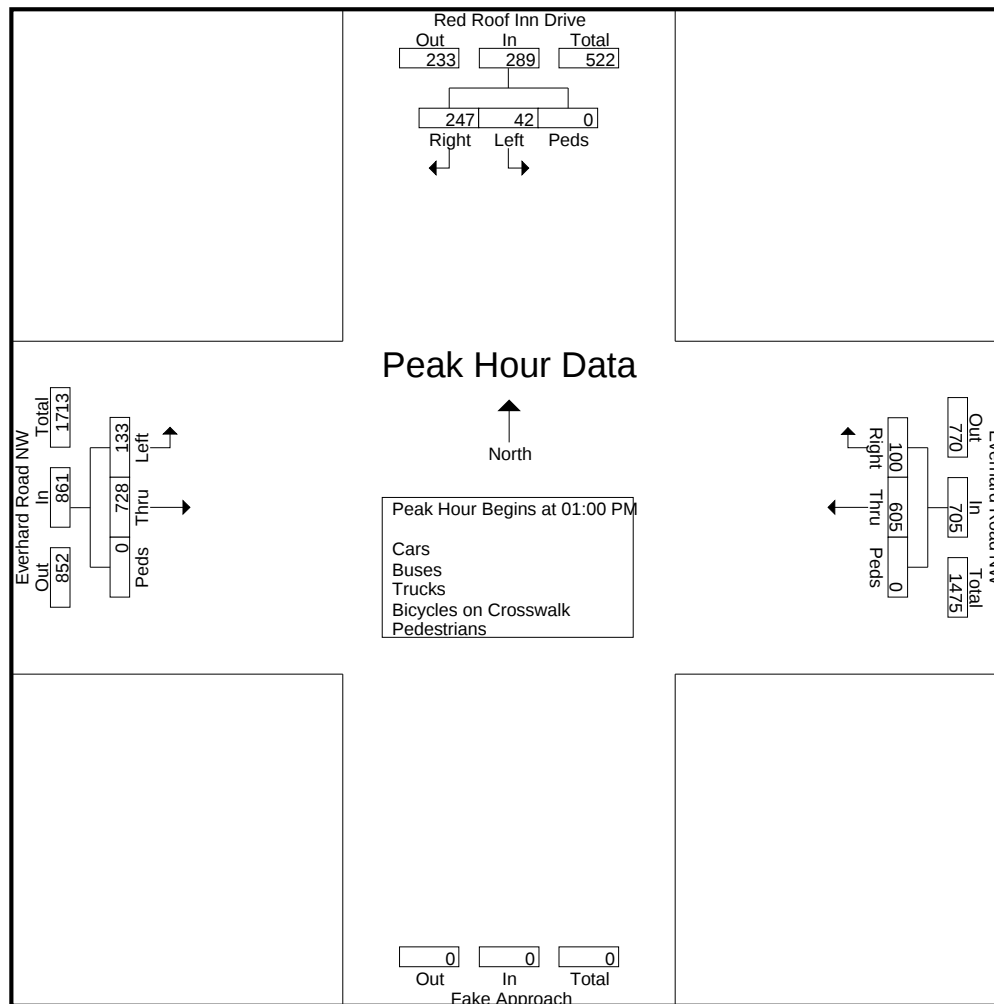
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Everhard Road NW / Red Roof Inn Drive Intersection

File Name : Everhard_Road_NW_at_Red_Roof_Inn_Drive_597340_11-17-2018
Site Code : Site 5 - Saturday
Start Date : 11/17/2018
Page No : 3

	Everhard Road NW Eastbound				Everhard Road NW Westbound				Red Roof Inn Drive Southbound				
Start Time	Left	Thru	Peds	App. Total	Thru	Right	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 01:00 PM to 01:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 01:00 PM													
01:00 PM	41	176	0	217	151	22	0	173	8	63	0	71	461
01:15 PM	35	177	0	212	153	28	0	181	11	70	0	81	474
01:30 PM	31	185	0	216	148	21	0	169	10	45	0	55	440
01:45 PM	26	190	0	216	153	29	0	182	13	69	0	82	480
Total Volume	133	728	0	861	605	100	0	705	42	247	0	289	1855
% App. Total	15.4	84.6	0		85.8	14.2	0		14.5	85.5	0		
PHF	.811	.958	.000	.992	.989	.862	.000	.968	.808	.882	.000	.881	.966





55 Degrees and Sunny

File Name : Everhard_Road_NW_at_North_Mall_Drive__597334_11-17-2018
Site Code : Site 2 - Saturday
Start Date : 11/17/2018
Page No : 1

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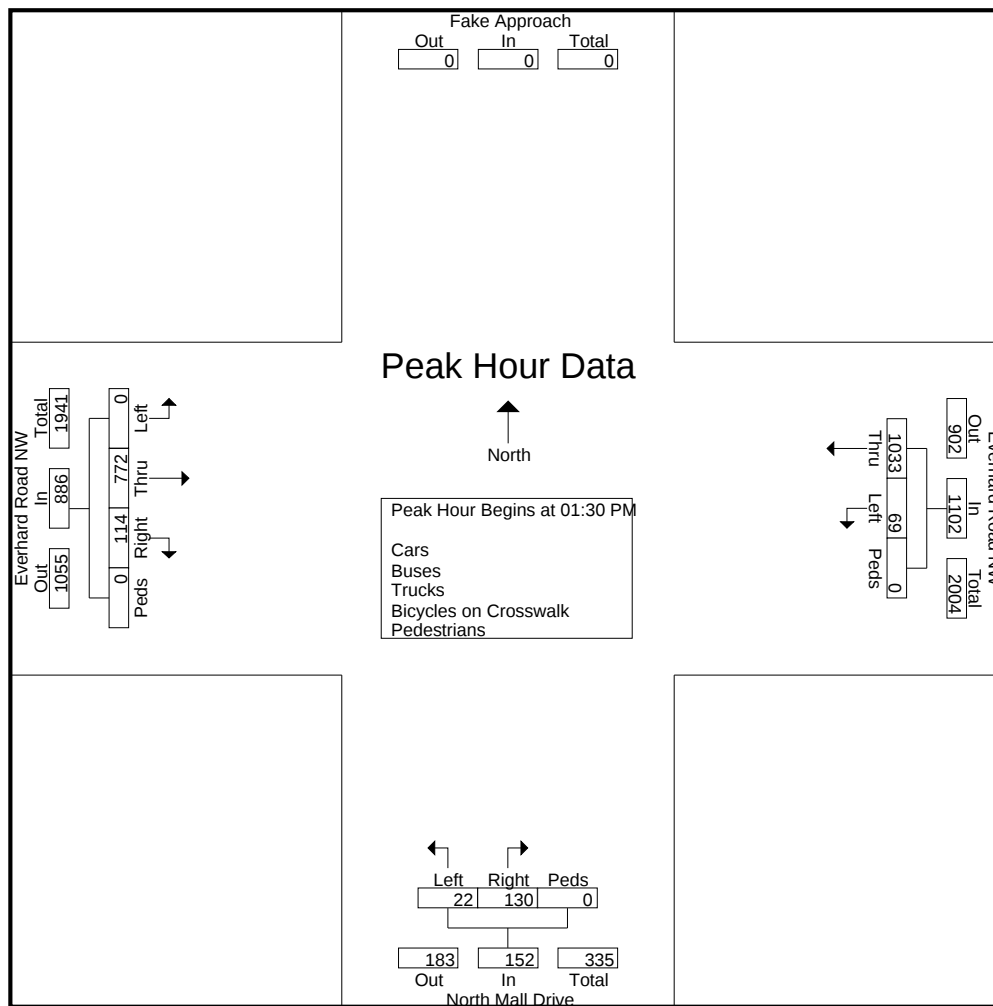
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Everhard Road NW / North Mall Drive Intersection

File Name : Everhard_Road_NW_at_North_Mall_Drive__597334_11-17-2018
Site Code : Site 2 - Saturday
Start Date : 11/17/2018
Page No : 3

	Everhard Road NW Eastbound					Everhard Road NW Westbound				North Mall Drive Northbound				
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 01:30 PM to 02:15 PM - Peak 1 of 1														
Peak Hour for Entire Intersection Begins at 01:30 PM														
01:30 PM	0	204	17	0	221	18	257	0	275	7	35	0	42	538
01:45 PM	0	215	32	0	247	21	276	0	297	6	35	0	41	585
02:00 PM	0	174	36	0	210	21	237	0	258	3	30	0	33	501
02:15 PM	0	179	29	0	208	9	263	0	272	6	30	0	36	516
Total Volume	0	772	114	0	886	69	1033	0	1102	22	130	0	152	2140
% App. Total	0	87.1	12.9	0		6.3	93.7	0		14.5	85.5	0		
PHF	.000	.898	.792	.000	.897	.821	.936	.000	.928	.786	.929	.000	.905	.915





Saturday - 55 Degrees and Sunny

File Name : Belden_Village_Street_at_South_Mall_Entrance_597330_11-17-2018
Site Code : Site 1 - Saturday
Start Date : 11/17/2018
Page No : 1

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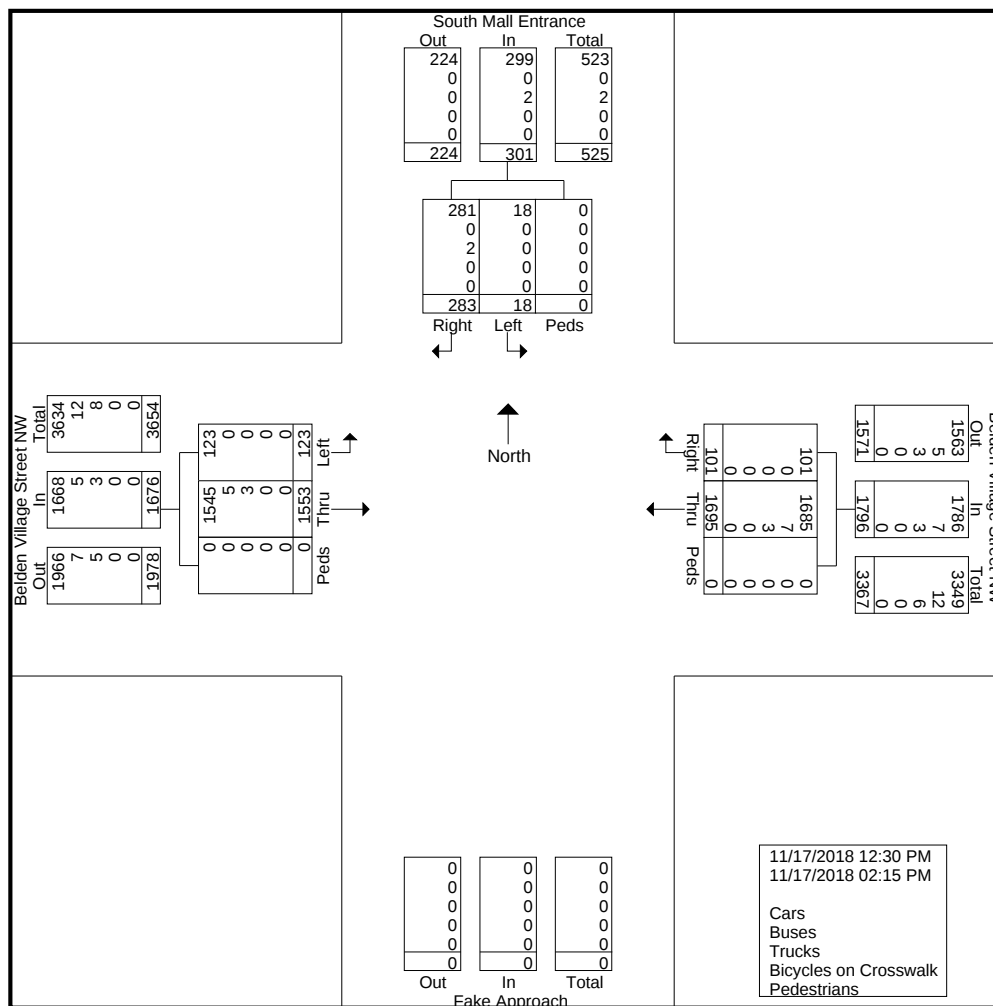
Belden Village Street NW / South Mall Drive Intersection

File Name : Belden_Village_Street_at_South_Mall_Entrance_597330_11-17-2018

Site Code : Site 1 - Saturday

Start Date : 11/17/2018

Page No : 2





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Belden Village Street NW / South Mall Drive Intersection

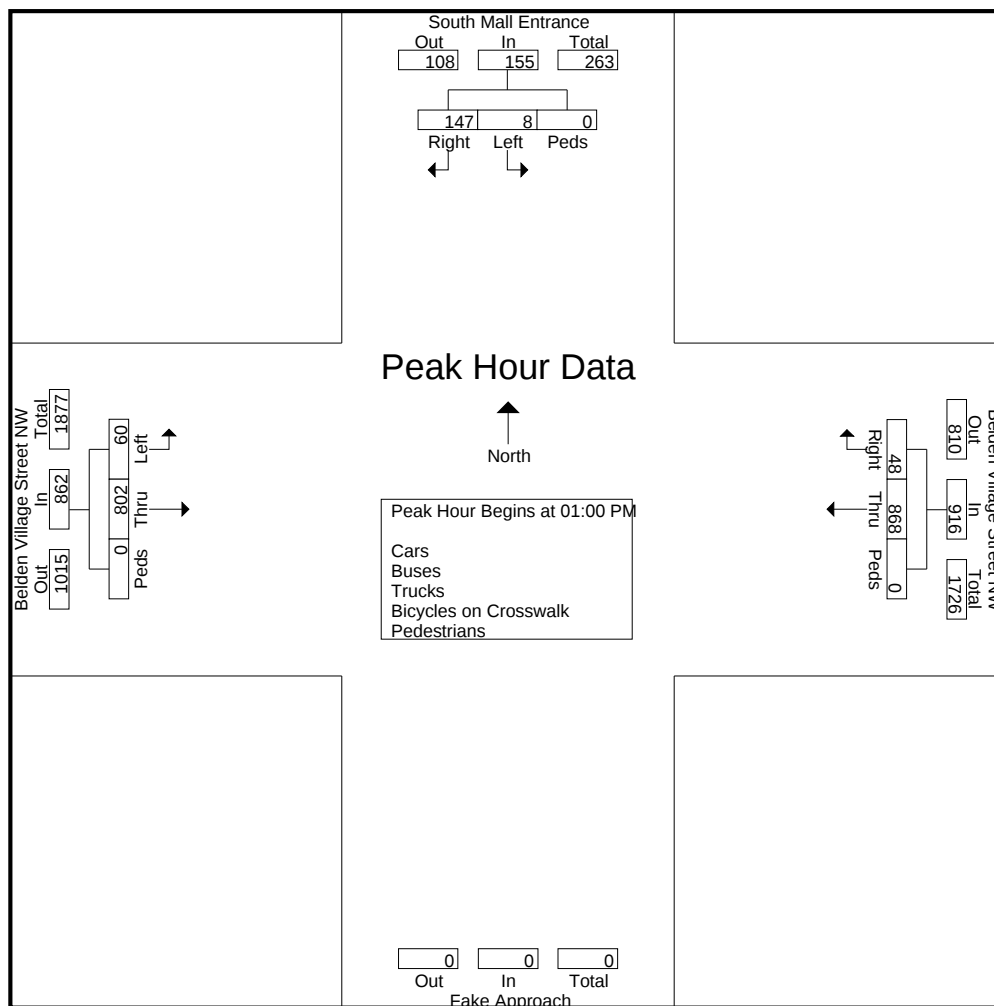
File Name : Belden_Village_Street_at_South_Mall_Entrance_597330_11-17-2018

Site Code : Site 1 - Saturday

Start Date : 11/17/2018

Page No : 3

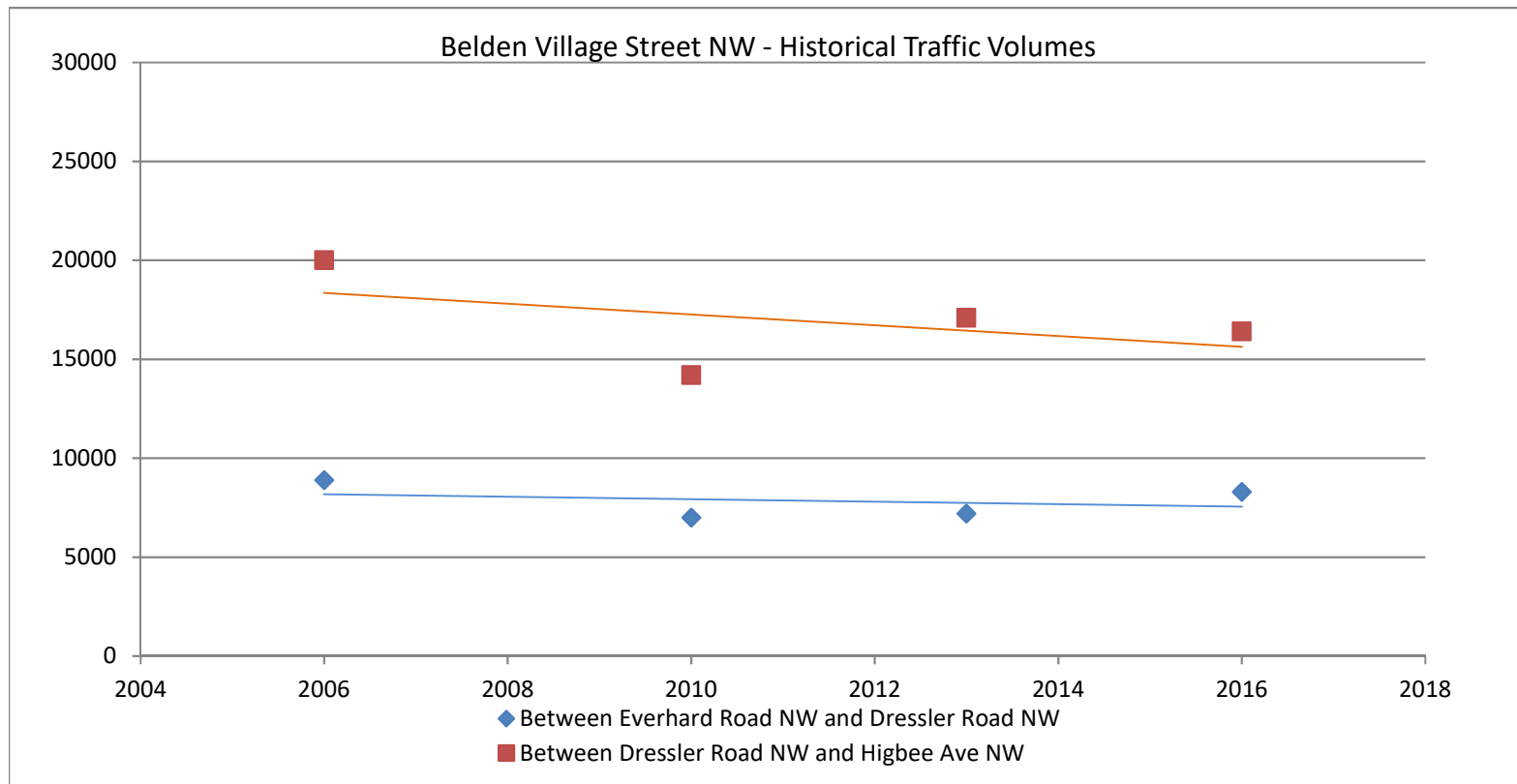
	Belden Village Street NW Eastbound				Belden Village Street NW Westbound				South Mall Entrance Southbound				
Start Time	Left	Thru	Peds	App. Total	Thru	Right	Peds	App. Total	Left	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 01:00 PM to 02:00 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 01:00 PM													
01:00 PM	29	202	0	231	216	7	0	223	2	39	0	41	495
01:15 PM	6	207	0	213	220	10	0	230	2	28	0	30	473
01:30 PM	11	196	0	207	212	17	0	229	2	53	0	55	491
01:45 PM	14	197	0	211	220	14	0	234	2	27	0	29	474
Total Volume	60	802	0	862	868	48	0	916	8	147	0	155	1933
% App. Total	7	93	0		94.8	5.2	0		5.2	94.8	0		
PHF	.517	.969	.000	.933	.986	.706	.000	.979	1.00	.693	.000	.705	.976



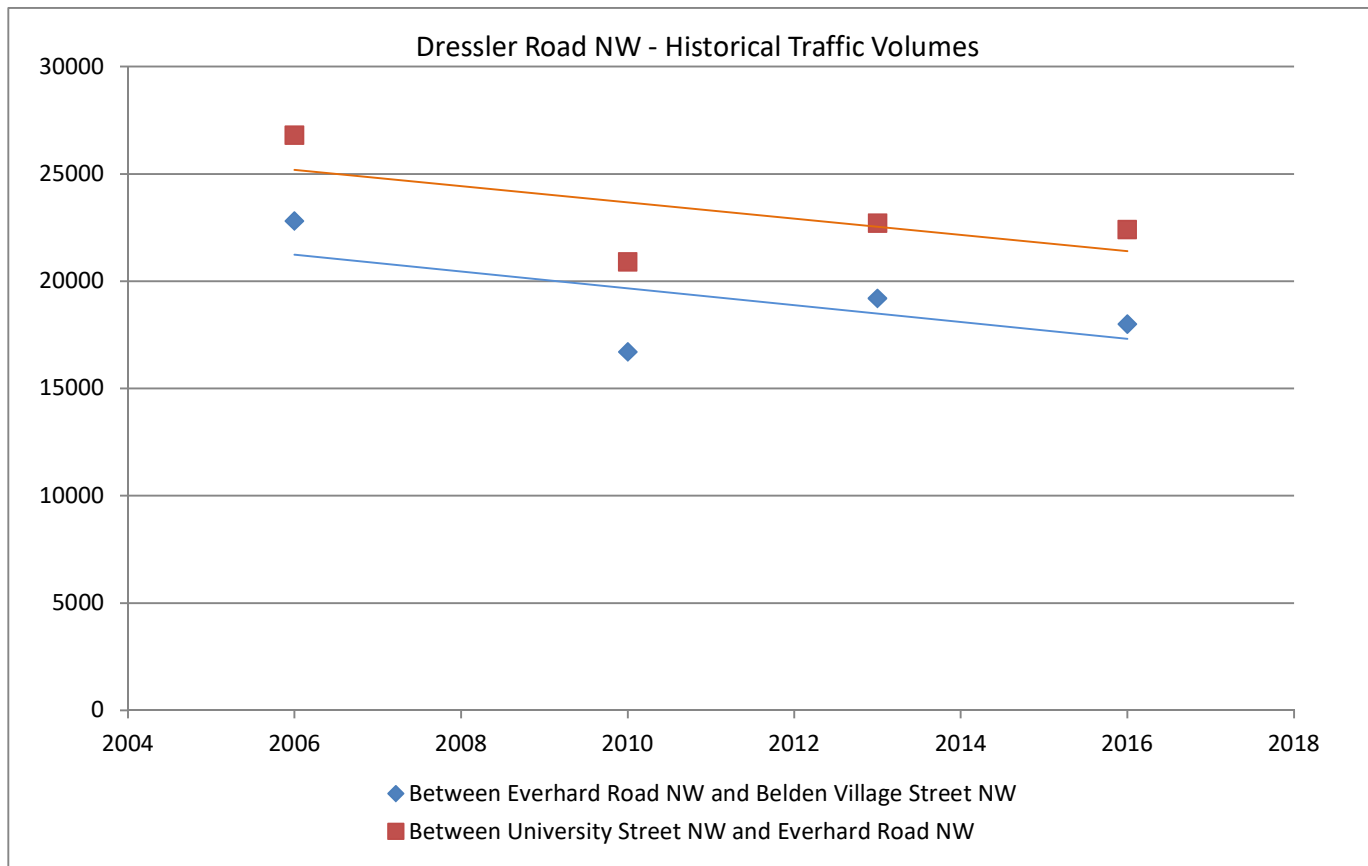
APPENDIX B

GROWTH RATE CALCULATIONS

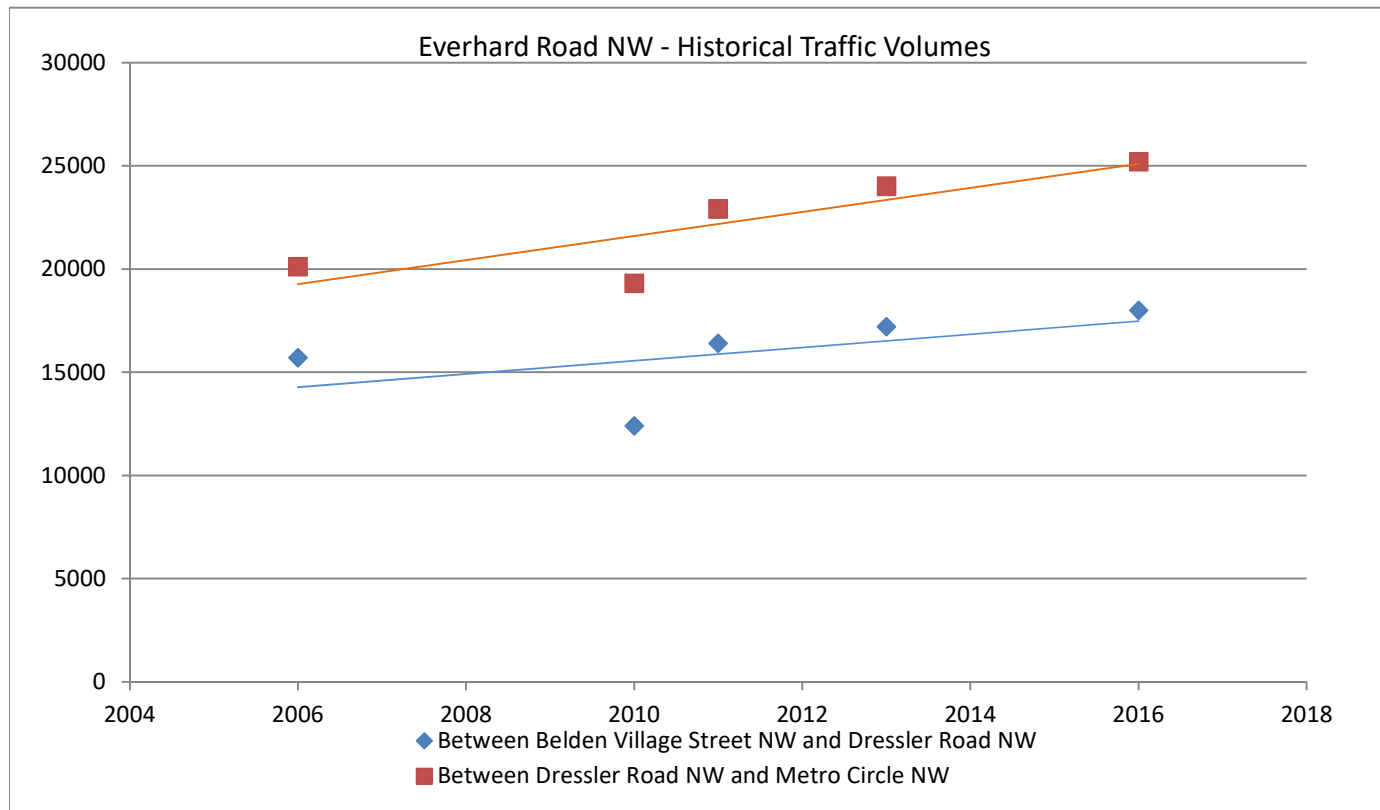
Roadway Section	Belden Village Street NW - Historical Traffic Volumes				Growth Rate
	2006	2010	2013	2016	
Between Everhard Road NW and Dressler Road NW	8900	7000	7200	8300	
<i>Trendline</i>	<i>8181</i>	<i>7929</i>	<i>7740</i>	<i>7551</i>	<i>-0.83%</i>
Between Dressler Road NW and Higbee Ave NW	20000	14200	17100	16400	
<i>Trendline</i>	<i>18356</i>	<i>17266</i>	<i>16448</i>	<i>15630</i>	<i>-1.74%</i>



Roadway Section	Dressler Road NW - Historical Traffic Volumes				Growth Rate
	2006	2010	2013	2016	
Between Everhard Road NW and Belden Village Street NW	22800	16700	19200	18000	
<i>Trendline</i>	<i>21234</i>	<i>19665</i>	<i>18489</i>	<i>17312</i>	<i>-2.27%</i>
Between University Street NW and Everhard Road NW	26800	20900	22700	22400	
<i>Trendline</i>	<i>25185</i>	<i>23673</i>	<i>22538</i>	<i>21404</i>	<i>-1.77%</i>



Roadway Section	Everhard Road NW - Historical Traffic Volumes					Growth Rate
	2006	2010	2011	2013	2016	
Between Belden Village Street NW and Dressler Road NW	15700	12400	16400	17200	18000	
<i>Trendline</i>	14274	15555	15876	16517	17478	2.24%
Between Dressler Road NW and Metro Circle NW	20100	19300	22900	24000	25200	
<i>Trendline</i>	19273	21601	22184	23348	25094	3.02%



APPENDIX C
ITE TRIP GENERATION CALCULATIONS

ITE Trip Generation Procedure

Land Use 310 (Hotel)

Trip Generations Per Rooms

Weekday Trip Generation and Trip Distribution

Trip Generation Formula: $T = 11.29 (X) - 426.97$
where: T = Number of Trips Generated
X = Number of Rooms

Proposed Number of Rooms: 184

Total Trip Ends in an Average Weekday: 1,651

Distribution Percentages of Entering and Exiting Trips, From ITE Trip Generation Manual, 10th Edition

Entering Trip Percentage: 50%
Exiting Trip Percentage: 50%
Number of Entering Trips: 826
Number of Exiting Trips: 825

AM Peak Trip Generation and Trip Distribution (Peak Hour of Adjacent Street)

Average Trip Generation Rate (AM Peak): 0.47
Total Trip Ends in the AM Peak Hour: 87

Distribution Percentages of Entering and Exiting Trips, From ITE Trip Generation Manual, 10th Edition

Entering Trip Percentage: 59%
Exiting Trip Percentage: 41%
Number of Entering Trips: 51
Number of Exiting Trips: 36

PM Peak Trip Generation and Trip Distribution (Peak Hour of Adjacent Street)

Average Trip Generation Rate (PM Peak): 0.60
Total Trip Ends in the PM Peak Hour: 111

Distribution Percentages of Entering and Exiting Trips, From ITE Trip Generation Manual, 10th Edition

Entering Trip Percentage: 51%
Exiting Trip Percentage: 49%
Number of Entering Trips: 57
Number of Exiting Trips: 54

ITE Trip Generation Procedure

Land Use 710 (General Office Building)

Trip Generations per 1000 Sq. Feet Gross Floor Area

Setting / Location: General Urban / Suburban

Weekday Trip Generation and Trip Distribution

Fitted Curve Trip Generation Formula: $\ln(T) = 0.97 * \ln(X) + 2.50$
where: T = Number of Trips Generated
X = 1000 Sq. Feet Gross Floor Area

Gross Floor Area: 13,780

Total Trip Ends in the Average Weekday: 155

Distribution Percentages of Entering and Exiting Trips, From ITE Trip Generation Manual, 10th Edition

Entering Trip Percentage: 50%
Exiting Trip Percentage: 50%

Number of Entering Trips: 78
Number of Exiting Trips: 77

AM Peak Trip Generation and Trip Distribution (Peak Hour of Adjacent Street)

Fitted Curve Trip Generation Formula: $T = 0.94 * (X) + 26.49$
Total Trip Ends in the AM Peak Hour: 40

Distribution Percentages of Entering and Exiting Trips, From ITE Trip Generation Manual, 10th Edition

Entering Trip Percentage: 86%
Exiting Trip Percentage: 14%

Entering Primary Trips: 34
Exiting Primary Trips: 6

PM Peak Trip Generation and Trip Distribution (Peak Hour of Adjacent Street)

Fitted Curve Trip Generation Formula: $\ln(T) = 0.95 * \ln(X) + 0.36$
Total Trip Ends in the PM Peak Hour: 17

Distribution Percentages of Entering and Exiting Trips, From ITE Trip Generation Manual, 10th Edition

Entering Trip Percentage: 16%
Exiting Trip Percentage: 84%

Entering Primary Trips: 3
Exiting Primary Trips: 14

ITE Trip Generation Procedure

Land Use 710 (General Office Building)

Trip Generations per 1000 Sq. Feet Gross Floor Area

Setting / Location: General Urban / Suburban

Weekday Trip Generation and Trip Distribution

Fitted Curve Trip Generation Formula: $\ln(T) = 0.97 * \ln(X) + 2.50$

where: T = Number of Trips Generated

X = 1000 Sq. Feet Gross Floor Area

Gross Floor Area: 12,068

Total Trip Ends in the Average Weekday: 136

Distribution Percentages of Entering and Exiting Trips, From ITE Trip Generation Manual, 10th Edition

Entering Trip Percentage: 50%

Exiting Trip Percentage: 50%

Number of Entering Trips: 68

Number of Exiting Trips: 68

AM Peak Trip Generation and Trip Distribution (Peak Hour of Adjacent Street)

Fitted Curve Trip Generation Formula: $T = 0.94 * (X) + 26.49$

Total Trip Ends in the AM Peak Hour: 38

Distribution Percentages of Entering and Exiting Trips, From ITE Trip Generation Manual, 10th Edition

Entering Trip Percentage: 86%

Exiting Trip Percentage: 14%

Entering Primary Trips: 33

Exiting Primary Trips: 5

PM Peak Trip Generation and Trip Distribution (Peak Hour of Adjacent Street)

Fitted Curve Trip Generation Formula: $\ln(T) = 0.95 * \ln(X) + 0.36$

Total Trip Ends in the PM Peak Hour: 15

Distribution Percentages of Entering and Exiting Trips, From ITE Trip Generation Manual, 10th Edition

Entering Trip Percentage: 16%

Exiting Trip Percentage: 84%

Entering Primary Trips: 2

Exiting Primary Trips: 13

APPENDIX D
SYNCHRO MEASURES OF EFFECTIVENESS -
DESIGN YEAR 2043 'NO-BUILD' & 'BUILD' CONDITIONS

Network Totals

Number of Intersections	11
Total Delay / Veh (s/v)	24
Total Delay (hr)	197
Stops / Veh	0.45
Stops (#)	13619
Average Speed (mph)	14
Total Travel Time (hr)	338
Distance Traveled (mi)	4877
Performance Index	234.4

Network Totals

Number of Intersections	11
Total Delay / Veh (s/v)	19
Total Delay (hr)	163
Stops / Veh	0.46
Stops (#)	13696
Average Speed (mph)	16
Total Travel Time (hr)	304
Distance Traveled (mi)	4876
Performance Index	200.6

Network Totals

Number of Intersections	12
Total Delay / Veh (s/v)	18
Total Delay (hr)	159
Stops / Veh	0.42
Stops (#)	13798
Average Speed (mph)	16
Total Travel Time (hr)	300
Distance Traveled (mi)	4861
Performance Index	197.2

Network Totals

Number of Intersections	11
Total Delay / Veh (s/v)	18
Total Delay (hr)	165
Stops / Veh	0.47
Stops (#)	15139
Average Speed (mph)	16
Total Travel Time (hr)	311
Distance Traveled (mi)	5059
Performance Index	206.6

Network Totals

Number of Intersections	11
Total Delay / Veh (s/v)	19
Total Delay (hr)	169
Stops / Veh	0.42
Stops (#)	13583
Average Speed (mph)	16
Total Travel Time (hr)	320
Distance Traveled (mi)	5177
Performance Index	206.6

Network Totals

Number of Intersections	11
Total Delay / Veh (s/v)	19
Total Delay (hr)	165
Stops / Veh	0.44
Stops (#)	13920
Average Speed (mph)	16
Total Travel Time (hr)	314
Distance Traveled (mi)	5109
Performance Index	204.0

APPENDIX E
SIMTRAFFIC MEASURES OF EFFECTIVENESS -
DESIGN YEAR 2043 'NO-BUILD' & 'BUILD' CONDITIONS

Total Network Performance

Denied Delay (hr)	22.5
Denied Del/Veh (s)	10.0
Total Delay (hr)	303.1
Total Del/Veh (s)	129.8
Total Stops	14490
Stop/Veh	1.72
Travel Time (hr)	563.8
Avg Speed (mph)	14

Total Network Performance

Denied Delay (hr)	0.7
Denied Del/Veh (s)	0.3
Total Delay (hr)	221.5
Total Del/Veh (s)	96.3
Total Stops	14431
Stop/Veh	1.74
Travel Time (hr)	458.0
Avg Speed (mph)	16

Total Network Performance

Denied Delay (hr)	3.0
Denied Del/Veh (s)	1.4
Total Delay (hr)	198.5
Total Del/Veh (s)	85.4
Total Stops	13248
Stop/Veh	1.58
Travel Time (hr)	439.2
Avg Speed (mph)	17

Total Network Performance

Denied Delay (hr)	4.7
Denied Del/Veh (s)	2.2
Total Delay (hr)	206.4
Total Del/Veh (s)	90.8
Total Stops	13784
Stop/Veh	1.68
Travel Time (hr)	449.8
Avg Speed (mph)	17

Total Network Performance

Denied Delay (hr)	0.9
Denied Del/Veh (s)	0.4
Total Delay (hr)	227.0
Total Del/Veh (s)	97.1
Total Stops	12907
Stop/Veh	1.53
Travel Time (hr)	480.8
Avg Speed (mph)	16

Total Network Performance

Denied Delay (hr)	95.7
Denied Del/Veh (s)	42.9
Total Delay (hr)	291.9
Total Del/Veh (s)	127.9
Total Stops	14710
Stop/Veh	1.79
Travel Time (hr)	634.3
Avg Speed (mph)	14

APPENDIX F
HCM INTERSECTION CAPACITY ANALYSIS -
DESIGN YEAR 2043 'NO-BUILD' &
'BUILD ALTERNATIVE 2' CONDITIONS

DESIGN YEAR 2043 'NO-BUILD' CONDITIONS

Dressler Road Alternatives Study
1: Dressler Road & Belden Village Street

Design Year 2043 'No-Build' - Saturday

08/14/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	320	90	360	370	350	90	530	330	290	830	50
Future Volume (veh/h)	60	320	90	360	370	350	90	530	330	290	830	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	348	98	391	402	380	98	576	359	315	902	54
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	159	498	138	340	465	415	377	828	516	381	1604	96
Arrive On Green	0.04	0.18	0.18	0.13	0.26	0.26	0.05	0.39	0.39	0.25	0.94	0.94
Sat Flow, veh/h	1781	2747	763	1781	1777	1585	1781	2102	1310	1781	3407	204
Grp Volume(v), veh/h	65	223	223	391	402	380	98	487	448	315	470	486
Grp Sat Flow(s),veh/h/ln	1781	1777	1733	1781	1777	1585	1781	1777	1635	1781	1777	1834
Q Serve(g_s), s	3.5	14.1	14.5	15.0	25.9	27.9	3.9	27.5	27.5	13.1	3.9	3.9
Cycle Q Clear(g_c), s	3.5	14.1	14.5	15.0	25.9	27.9	3.9	27.5	27.5	13.1	3.9	3.9
Prop In Lane	1.00		0.44	1.00		1.00	1.00		0.80	1.00		0.11
Lane Grp Cap(c), veh/h	159	322	314	340	465	415	377	700	644	381	836	863
V/C Ratio(X)	0.41	0.69	0.71	1.15	0.86	0.92	0.26	0.70	0.70	0.83	0.56	0.56
Avail Cap(c_a), veh/h	229	511	498	340	585	522	514	700	644	381	836	863
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	0.94	0.94	0.94	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.9	46.0	46.2	38.9	42.2	43.0	19.8	30.4	30.4	19.3	2.0	2.0
Incr Delay (d2), s/veh	1.2	1.9	2.1	96.4	10.0	17.5	0.3	5.7	6.1	13.5	2.7	2.6
Initial Q 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	0.0
%ile BackOfQ(50%),veh/ln	1.6	6.3	6.4	11.9	12.5	12.8	1.6	12.6	11.6	5.4	1.4	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.1	47.9	48.2	135.3	52.3	60.5	20.0	36.0	36.5	32.8	4.7	4.6
LnGrp LOS	D	D	D	F	D	E	C	D	D	C	A	A
Approach Vol, veh/h		511			1173			1033			1271	
Approach Delay, s/veh		47.1			82.6			34.7			11.6	
Approach LOS		D			F			C			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	20.0	52.8	20.0	27.2	10.8	62.0	10.3	36.9				
Change Period (Y+Rc), s	5.0	5.5	5.0	5.5	5.0	5.5	5.0	5.5				
Max Green Setting (Gmax), s	15.0	34.5	15.0	34.5	15.0	34.5	10.0	39.5				
Max Q Clear Time (g_c+I1), s	15.1	29.5	17.0	16.5	5.9	5.9	5.5	29.9				
Green Ext Time (p_c), s	0.0	1.3	0.0	0.9	0.1	2.1	0.0	1.5				
Intersection Summary												
HCM 6th Ctrl Delay			43.0									
HCM 6th LOS			D									

Dressler Road Alternatives Study
2: Dressler Road & Everhard Road

Design Year 2043 'No-Build' - Saturday

08/14/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	320	520	30	310	500	310	40	790	140	300	880	230
Future Volume (veh/h)	320	520	30	310	500	310	40	790	140	300	880	230
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	348	565	33	337	543	337	43	859	152	326	957	250
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	347	748	44	350	779	545	140	998	177	342	1388	362
Arrive On Green	0.13	0.22	0.22	0.13	0.22	0.22	0.66	0.66	0.66	0.04	0.16	0.16
Sat Flow, veh/h	1781	3412	199	1781	3554	1585	463	3017	534	1781	2790	727
Grp Volume(v), veh/h	348	294	304	337	543	337	43	506	505	326	609	598
Grp Sat Flow(s),veh/h/ln	1781	1777	1835	1781	1777	1585	463	1777	1774	1781	1777	1740
Q Serve(g_s), s	16.0	18.6	18.6	16.0	16.9	21.3	8.9	26.8	26.8	13.8	38.7	38.9
Cycle Q Clear(g_c), s	16.0	18.6	18.6	16.0	16.9	21.3	27.9	26.8	26.8	13.8	38.7	38.9
Prop In Lane	1.00		0.11	1.00		1.00	1.00		0.30	1.00		0.42
Lane Grp Cap(c), veh/h	347	389	402	350	779	545	140	588	587	342	884	866
V/C Ratio(X)	1.00	0.75	0.76	0.96	0.70	0.62	0.31	0.86	0.86	0.95	0.69	0.69
Avail Cap(c_a), veh/h	347	496	512	350	992	641	140	588	587	342	884	866
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	0.33	0.33	0.33
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.44	0.44	0.44
Uniform Delay (d), s/veh	35.9	43.8	43.9	35.2	43.2	32.8	25.9	18.1	18.1	30.0	41.4	41.5
Incr Delay (d2), s/veh	49.2	5.4	5.3	38.4	1.7	1.6	5.6	15.2	15.2	21.4	2.0	2.0
Initial Q 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	0.0
%ile BackOfQ(50%),veh/ln	7.3	8.7	9.0	11.4	7.5	8.3	1.0	8.4	8.4	8.5	18.9	18.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	85.0	49.2	49.2	73.7	44.9	34.4	31.5	33.3	33.3	51.4	43.3	43.5
LnGrp LOS	F	D	D	E	D	C	C	C	C	D	D	D
Approach Vol, veh/h		946			1217			1054			1533	
Approach Delay, s/veh		62.4			50.0			33.2			45.1	
Approach LOS		E			D			C			D	
Timer - Assigned Phs	1	2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s	20.0	46.2	21.0	32.8		66.2	21.0	32.8				
Change Period (Y+Rc), s	5.0	6.5	5.0	6.5		6.5	5.0	6.5				
Max Green Setting (Gmax), s	15.0	32.5	16.0	33.5		52.5	16.0	33.5				
Max Q Clear Time (g_c+I1), s	15.8	29.9	18.0	20.6		40.9	18.0	23.3				
Green Ext Time (p_c), s	0.0	1.2	0.0	2.0		3.5	0.0	3.0				
Intersection Summary												
HCM 6th Ctrl Delay			47.2									
HCM 6th LOS			D									

Dressler Road Alternatives Study
3: Dressler Road & Belden Park Crossing

Design Year 2043 'No-Build' - Saturday

08/14/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	280	70	190	270	110	230	280	860	280	130	950	70
Future Volume (veh/h)	280	70	190	270	110	230	280	860	280	130	950	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	304	76	207	293	120	250	304	935	304	141	1033	76
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	216	96	262	276	117	244	334	1234	399	227	1417	104
Arrive On Green	0.09	0.22	0.22	0.09	0.22	0.22	0.04	0.15	0.15	0.06	0.42	0.42
Sat Flow, veh/h	1781	444	1209	1781	541	1127	1781	2639	854	1781	3356	247
Grp Volume(v), veh/h	304	0	283	293	0	370	304	628	611	141	547	562
Grp Sat Flow(s),veh/h/ln	1781	0	1653	1781	0	1668	1781	1777	1717	1781	1777	1826
Q Serve(g_s), s	10.5	0.0	19.4	10.5	0.0	26.0	10.7	40.6	40.9	5.3	30.8	30.8
Cycle Q Clear(g_c), s	10.5	0.0	19.4	10.5	0.0	26.0	10.7	40.6	40.9	5.3	30.8	30.8
Prop In Lane	1.00		0.73	1.00		0.68	1.00		0.50	1.00		0.14
Lane Grp Cap(c), veh/h	216	0	358	276	0	361	334	831	802	227	750	771
V/C Ratio(X)	1.41	0.00	0.79	1.06	0.00	1.02	0.91	0.76	0.76	0.62	0.73	0.73
Avail Cap(c_a), veh/h	216	0	358	276	0	361	367	831	802	340	750	771
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.45	0.45	0.45	0.76	0.76	0.76
Uniform Delay (d), s/veh	37.4	0.0	44.4	41.6	0.0	47.0	25.8	44.2	44.3	25.0	28.9	28.9
Incr Delay (d2), s/veh	209.0	0.0	11.3	71.4	0.0	53.6	13.1	2.9	3.1	1.6	4.7	4.6
Initial Q 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	0.0
%ile BackOfQ(50%),veh/ln	17.6	0.0	9.1	8.7	0.0	16.2	6.1	20.0	19.5	2.3	13.7	14.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	246.5	0.0	55.8	113.1	0.0	100.6	38.8	47.1	47.4	26.6	33.7	33.5
LnGrp LOS	F	A	E	F	A	F	D	D	D	C	C	C
Approach Vol, veh/h		587			663			1543			1250	
Approach Delay, s/veh		154.5			106.1			45.6			32.8	
Approach LOS		F			F			D			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.4	61.6	15.0	31.0	17.8	56.2	15.0	31.0				
Change Period (Y+Rc), s	5.0	5.5	4.5	5.0	5.0	5.5	4.5	5.0				
Max Green Setting (Gmax), s	15.0	48.5	10.5	26.0	15.0	48.5	10.5	26.0				
Max Q Clear Time (g_c+I1), s	7.3	42.9	12.5	21.4	12.7	32.8	12.5	28.0				
Green Ext Time (p_c), s	0.1	2.4	0.0	0.4	0.2	3.4	0.0	0.0				
Intersection Summary												
HCM 6th Ctrl Delay			67.4									
HCM 6th LOS			E									

Dressler Road Alternatives Study
4: Dressler Road & University Street/Petitti Drive

Design Year 2043 'No-Build' - Saturday

08/14/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	10	290	30	10	30	260	1220	40	20	1120	60
Future Volume (veh/h)	60	10	290	30	10	30	260	1220	40	20	1120	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	11	315	33	11	33	283	1326	43	22	1217	65
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	56	5	489	53	10	357	350	2415	78	285	1943	104
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.11	0.91	0.91	0.57	0.57	0.57
Sat Flow, veh/h	0	23	1585	0	46	1585	1781	3513	114	397	3431	183
Grp Volume(v), veh/h	76	0	315	44	0	33	283	670	699	22	630	652
Grp Sat Flow(s),veh/h/ln	23	0	1585	46	0	1585	1781	1777	1850	397	1777	1837
Q Serve(g_s), s	0.0	0.0	20.6	0.0	0.0	2.0	7.8	7.8	7.8	3.1	28.6	28.6
Cycle Q Clear(g_c), s	27.0	0.0	20.6	27.0	0.0	2.0	7.8	7.8	7.8	3.1	28.6	28.6
Prop In Lane	0.86		1.00	0.75		1.00	1.00		0.06	1.00		0.10
Lane Grp Cap(c), veh/h	61	0	489	63	0	357	350	1222	1272	285	1006	1041
V/C Ratio(X)	1.25	0.00	0.64	0.70	0.00	0.09	0.81	0.55	0.55	0.08	0.63	0.63
Avail Cap(c_a), veh/h	61	0	489	63	0	357	402	1222	1272	285	1006	1041
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	0.00	1.00	0.30	0.30	0.30	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.7	0.0	35.8	53.7	0.0	36.8	17.7	1.9	1.9	11.9	17.5	17.5
Incr Delay (d2), s/veh	195.9	0.0	2.9	29.0	0.0	0.1	3.2	0.5	0.5	0.5	2.9	2.9
Initial Q 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	0.0
%ile BackOfQ(50%),veh/ln	5.1	0.0	8.4	1.9	0.0	0.8	4.4	1.7	1.7	0.3	11.9	12.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	253.6	0.0	38.7	82.7	0.0	36.9	20.8	2.5	2.5	12.5	20.4	20.4
LnGrp LOS	F	A	D	F	A	D	C	A	A	B	C	C
Approach Vol, veh/h		391			77			1652			1304	
Approach Delay, s/veh		80.4			63.1			5.6			20.3	
Approach LOS		F			E			A			C	
Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		88.0		32.0	14.5	73.5		32.0				
Change Period (Y+Rc), s		5.5		5.0	4.5	5.5		5.0				
Max Green Setting (Gmax), s		82.5		27.0	13.5	64.5		27.0				
Max Q Clear Time (g_c+I1), s		9.8		29.0	9.8	30.6		29.0				
Green Ext Time (p_c), s		0.3		0.0	0.2	0.3		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			21.0									
HCM 6th LOS			C									

Dressler Road Alternatives Study
5: Everhard Road & Plaza Drive/Belden Village Street

Design Year 2043 'No-Build' - Saturday

08/14/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	30	10	370	20	120	10	820	330	110	810	10
Future Volume (veh/h)	20	30	10	370	20	120	10	820	330	110	810	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	22	33	11	277	197	130	11	891	359	120	880	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	38	57	19	395	233	154	291	1767	1140	229	1788	22
Arrive On Green	0.06	0.06	0.06	0.22	0.22	0.22	0.50	0.50	0.50	0.50	0.50	0.50
Sat Flow, veh/h	596	893	298	1781	1052	694	624	3554	1585	445	3594	45
Grp Volume(v), veh/h	66	0	0	277	0	327	11	891	359	120	435	456
Grp Sat Flow(s),veh/h/ln	1787	0	0	1781	0	1745	624	1777	1585	445	1777	1862
Q Serve(g_s), s	3.1	0.0	0.0	12.5	0.0	15.7	1.0	14.7	7.2	21.7	14.3	14.3
Cycle Q Clear(g_c), s	3.1	0.0	0.0	12.5	0.0	15.7	15.3	14.7	7.2	36.4	14.3	14.3
Prop In Lane	0.33		0.17	1.00		0.40	1.00		1.00	1.00		0.02
Lane Grp Cap(c), veh/h	114	0	0	395	0	387	291	1767	1140	229	884	926
V/C Ratio(X)	0.58	0.00	0.00	0.70	0.00	0.85	0.04	0.50	0.32	0.52	0.49	0.49
Avail Cap(c_a), veh/h	306	0	0	672	0	658	373	2233	1347	287	1117	1170
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.8	0.0	0.0	31.4	0.0	32.6	19.7	14.8	4.5	27.0	14.6	14.6
Incr Delay (d2), s/veh	1.7	0.0	0.0	2.3	0.0	5.1	0.1	0.3	0.2	2.2	0.5	0.5
Initial Q 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	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	0.0	5.4	0.0	6.9	0.1	5.3	4.2	2.3	5.4	5.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.5	0.0	0.0	33.7	0.0	37.7	19.8	15.0	4.7	29.2	15.2	15.1
LnGrp LOS	D	A	A	C	A	D	B	B	A	C	B	B
Approach Vol, veh/h		66			604			1261			1011	
Approach Delay, s/veh		41.5			35.9			12.1			16.8	
Approach LOS		D			D			B			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		50.5		11.6		50.5		25.4				
Change Period (Y+Rc), s		7.0		6.0		7.0		6.0				
Max Green Setting (Gmax), s		55.0		15.0		55.0		33.0				
Max Q Clear Time (g_c+I1), s		17.3		5.1		38.4		17.7				
Green Ext Time (p_c), s		7.0		0.0		5.1		1.7				
Intersection Summary												
HCM 6th Ctrl Delay				19.3								
HCM 6th LOS				B								
Notes												
User approved volume balancing among the lanes for turning movement.												

Dressler Road Alternatives Study
6: Holiday Inn Drive/Childrens Physicians Drive & Everhard Road

Design Year 2043 'No-Build' - Saturday

08/14/2019

Intersection												
Int Delay, s/veh	0.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱↰		↰	↱↰			↱↰			↱↰	
Traffic Vol, veh/h	10	940	10	10	910	10	10	0	10	10	0	10
Future Vol, veh/h	10	940	10	10	910	10	10	0	10	10	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	25	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	1022	11	11	989	11	11	0	11	11	0	11
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1000	0	0	1033	0	0	1567	2072	517	1550	2072	500
Stage 1	-	-	-	-	-	-	1050	1050	-	1017	1017	-
Stage 2	-	-	-	-	-	-	517	1022	-	533	1055	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	688	-	-	668	-	-	75	53	503	77	53	516
Stage 1	-	-	-	-	-	-	243	302	-	254	313	-
Stage 2	-	-	-	-	-	-	509	312	-	498	301	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	688	-	-	668	-	-	72	51	503	73	51	516
Mov Cap-2 Maneuver	-	-	-	-	-	-	72	51	-	73	51	-
Stage 1	-	-	-	-	-	-	239	297	-	250	308	-
Stage 2	-	-	-	-	-	-	490	307	-	479	296	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.1			39.4			38.8		
HCM LOS							E			E		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	126	688	-	-	668	-	-	128				
HCM Lane V/C Ratio	0.173	0.016	-	-	0.016	-	-	0.17				
HCM Control Delay (s)	39.4	10.3	-	-	10.5	-	-	38.8				
HCM Lane LOS	E	B	-	-	B	-	-	E				
HCM 95th %tile Q(veh)	0.6	0	-	-	0.1	-	-	0.6				

Intersection						
Int Delay, s/veh	5.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔↑↑↑	↑↑↔		↔	↔
Traffic Vol, veh/h	140	820	660	110	50	270
Future Vol, veh/h	140	820	660	110	50	270
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	25	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	152	891	717	120	54	293
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	837	0	-	0	1437	419
Stage 1	-	-	-	-	777	-
Stage 2	-	-	-	-	660	-
Critical Hdwy	4.14	-	-	-	6.29	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	6.04	-
Follow-up Hdwy	2.22	-	-	-	3.67	3.32
Pot Cap-1 Maneuver	793	-	-	-	152	583
Stage 1	-	-	-	-	403	-
Stage 2	-	-	-	-	445	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	793	-	-	-	94	583
Mov Cap-2 Maneuver	-	-	-	-	94	-
Stage 1	-	-	-	-	250	-
Stage 2	-	-	-	-	445	-
Approach	EB	WB		SB		
HCM Control Delay, s	2.3	0		28.1		
HCM LOS				D		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	793	-	-	-	94	583
HCM Lane V/C Ratio	0.192	-	-	-	0.578	0.503
HCM Control Delay (s)	10.6	0.9	-	-	86.1	17.3
HCM Lane LOS	B	A	-	-	F	C
HCM 95th %tile Q(veh)	0.7	-	-	-	2.7	2.8

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBT	WBT	WBR	SEL	SER
Lane Configurations						
Traffic Vol, veh/h	10	950	920	10	10	10
Future Vol, veh/h	10	950	920	10	10	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	25	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	1033	1000	11	11	11
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	1011	0	-	0	1545	506
Stage 1	-	-	-	-	1006	-
Stage 2	-	-	-	-	539	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	681	-	-	-	105	512
Stage 1	-	-	-	-	314	-
Stage 2	-	-	-	-	549	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	681	-	-	-	103	512
Mov Cap-2 Maneuver	-	-	-	-	223	-
Stage 1	-	-	-	-	309	-
Stage 2	-	-	-	-	549	-
Approach	EB	WB		SE		
HCM Control Delay, s	0.1	0		17.4		
HCM LOS				C		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SELn1	
Capacity (veh/h)	681	-	-	-	311	
HCM Lane V/C Ratio	0.016	-	-	-	0.07	
HCM Control Delay (s)	10.4	-	-	-	17.4	
HCM Lane LOS	B	-	-	-	C	
HCM 95th %tile Q(veh)	0	-	-	-	0.2	

Intersection						
Int Delay, s/veh	1.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↱		↱	↑↑↑	↱	↱
Traffic Vol, veh/h	840	120	70	1100	20	120
Future Vol, veh/h	840	120	70	1100	20	120
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	913	130	76	1196	22	130
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1043	0	1608	522
Stage 1	-	-	-	-	978	-
Stage 2	-	-	-	-	630	-
Critical Hdwy	-	-	4.14	-	6.29	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	6.04	-
Follow-up Hdwy	-	-	2.22	-	3.67	3.32
Pot Cap-1 Maneuver	-	-	663	-	120	499
Stage 1	-	-	-	-	317	-
Stage 2	-	-	-	-	462	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	663	-	106	499
Mov Cap-2 Maneuver	-	-	-	-	210	-
Stage 1	-	-	-	-	317	-
Stage 2	-	-	-	-	409	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.7		16	
HCM LOS					C	
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	210	499	-	-	663	-
HCM Lane V/C Ratio	0.104	0.261	-	-	0.115	-
HCM Control Delay (s)	24.1	14.7	-	-	11.1	-
HCM Lane LOS	C	B	-	-	B	-
HCM 95th %tile Q(veh)	0.3	1	-	-	0.4	-

Intersection

Int Delay, s/veh 0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕		↖	↕
Traffic Vol, veh/h	0	80	890	50	50	1170
Future Vol, veh/h	0	80	890	50	50	1170
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	25	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	87	967	54	54	1272

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	-	511	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	6.94	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	3.32	-
Pot Cap-1 Maneuver	0	508	-
Stage 1	0	-	-
Stage 2	0	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	508	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.5	0	0.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	508	675
HCM Lane V/C Ratio	-	-	0.171	0.081
HCM Control Delay (s)	-	-	13.5	10.8
HCM Lane LOS	-	-	B	B
HCM 95th %tile Q(veh)	-	-	0.6	0.3

Intersection						
Int Delay, s/veh	3.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔↔	↔↔↔		↔	↔
Traffic Vol, veh/h	60	880	920	50	10	160
Future Vol, veh/h	60	880	920	50	10	160
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	65	957	1000	54	11	174
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	1054	0	-	0	1636	527
Stage 1	-	-	-	-	1027	-
Stage 2	-	-	-	-	609	-
Critical Hdwy	5.34	-	-	-	6.29	7.14
Critical Hdwy Stg 1	-	-	-	-	6.64	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	3.12	-	-	-	3.67	3.92
Pot Cap-1 Maneuver	369	-	-	-	116	424
Stage 1	-	-	-	-	238	-
Stage 2	-	-	-	-	490	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	369	-	-	-	72	424
Mov Cap-2 Maneuver	-	-	-	-	125	-
Stage 1	-	-	-	-	149	-
Stage 2	-	-	-	-	490	-
Approach	EB	WB		SB		
HCM Control Delay, s	3.7	0		20.3		
HCM LOS	C					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	369	-	-	-	125	424
HCM Lane V/C Ratio	0.177	-	-	-	0.087	0.41
HCM Control Delay (s)	16.8	2.8	-	-	36.5	19.3
HCM Lane LOS	C	A	-	-	E	C
HCM 95th %tile Q(veh)	0.6	-	-	-	0.3	2

DESIGN YEAR 2043 'BUILD ALTERNATIVE 2' CONDITIONS

Dressler Road Alternatives Study
1: Dressler Road & Belden Village Street

Design Year 2043 'Build Alternative 2' - Saturday

08/14/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	320	90	360	390	350	90	530	330	290	830	50
Future Volume (veh/h)	60	320	90	360	390	350	90	530	330	290	830	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	348	98	391	424	380	98	576	359	315	902	54
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	213	578	161	391	516	460	261	631	393	341	1289	77
Arrive On Green	0.02	0.07	0.07	0.13	0.29	0.29	0.06	0.30	0.30	0.09	0.25	0.25
Sat Flow, veh/h	1781	2747	763	1781	1777	1585	1781	2102	1310	1781	3407	204
Grp Volume(v), veh/h	65	223	223	391	424	380	98	487	448	315	470	486
Grp Sat Flow(s),veh/h/ln	1781	1777	1733	1781	1777	1585	1781	1777	1635	1781	1777	1834
Q Serve(g_s), s	2.7	11.6	11.9	12.5	21.1	21.3	3.5	25.1	25.1	11.4	22.8	22.8
Cycle Q Clear(g_c), s	2.7	11.6	11.9	12.5	21.1	21.3	3.5	25.1	25.1	11.4	22.8	22.8
Prop In Lane	1.00		0.44	1.00		1.00	1.00		0.80	1.00		0.11
Lane Grp Cap(c), veh/h	213	374	365	391	516	460	261	533	490	341	672	694
V/C Ratio(X)	0.31	0.60	0.61	1.00	0.82	0.83	0.38	0.91	0.91	0.92	0.70	0.70
Avail Cap(c_a), veh/h	233	411	401	391	533	476	269	533	490	341	672	694
HCM Platoon Ratio	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00	0.67	0.67	0.67
Upstream Filter(I)	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.0	40.3	40.4	29.7	31.4	31.5	22.2	32.1	32.1	24.7	30.6	30.6
Incr Delay (d2), s/veh	0.6	1.6	1.8	45.5	9.5	10.8	0.7	22.6	24.0	29.9	6.0	5.8
Initial Q 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	0.0
%ile BackOfQ(50%),veh/ln	1.2	5.6	5.7	7.9	10.1	9.2	1.5	13.6	12.7	7.7	11.2	11.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.5	41.8	42.2	75.2	40.9	42.3	22.8	54.6	56.1	54.6	36.5	36.4
LnGrp LOS	C	D	D	E	D	D	C	D	E	D	D	D
Approach Vol, veh/h		511			1195			1033			1271	
Approach Delay, s/veh		40.5			52.5			52.2			40.9	
Approach LOS		D			D			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	18.0	34.0	17.5	25.5	10.5	41.5	9.9	33.1				
Change Period (Y+Rc), s	5.0	5.5	5.0	5.5	5.0	5.5	5.0	5.5				
Max Green Setting (Gmax), s	13.0	26.5	12.5	22.0	6.0	33.5	6.0	28.5				
Max Q Clear Time (g_c+I1), s	13.4	27.1	14.5	13.9	5.5	24.8	4.7	23.3				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.7	0.0	1.7	0.0	1.1				
Intersection Summary												
HCM 6th Ctrl Delay			47.2									
HCM 6th LOS			D									

Dressler Road Alternatives Study
2: Dressler Road & Everhard Road

Design Year 2043 'Build Alternative 2' - Saturday

08/14/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	320	520	30	310	500	310	0	810	140	350	830	230
Future Volume (veh/h)	320	520	30	310	500	310	0	810	140	350	830	230
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	0	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	348	565	33	337	543	337	0	880	152	380	902	250
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	0	2	2	2	2	2
Cap, veh/h	418	706	41	414	731	531	0	914	158	447	1330	368
Arrive On Green	0.24	0.41	0.41	0.12	0.21	0.21	0.00	0.60	0.60	0.26	0.97	0.97
Sat Flow, veh/h	3456	3412	199	3456	3554	1585	0	3123	523	3456	2749	761
Grp Volume(v), veh/h	348	294	304	337	543	337	0	516	516	380	582	570
Grp Sat Flow(s),veh/h/ln	1728	1777	1835	1728	1777	1585	0	1777	1776	1728	1777	1733
Q Serve(g_s), s	9.1	13.8	13.8	9.0	13.6	17.1	0.0	26.1	26.1	9.9	2.9	3.0
Cycle Q Clear(g_c), s	9.1	13.8	13.8	9.0	13.6	17.1	0.0	26.1	26.1	9.9	2.9	3.0
Prop In Lane	1.00		0.11	1.00		1.00	0.00		0.29	1.00		0.44
Lane Grp Cap(c), veh/h	418	368	380	414	731	531	0	536	536	447	860	839
V/C Ratio(X)	0.83	0.80	0.80	0.81	0.74	0.63	0.00	0.96	0.96	0.85	0.68	0.68
Avail Cap(c_a), veh/h	473	376	388	473	752	540	0	536	536	506	860	839
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.1	26.1	26.1	40.8	35.4	26.7	0.0	18.3	18.3	34.3	0.8	0.8
Incr Delay (d2), s/veh	12.3	11.7	11.5	10.2	4.0	2.6	0.0	30.6	30.6	12.3	4.3	4.4
Initial Q 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	0.0
%ile BackOfQ(50%),veh/ln	4.0	5.6	5.8	4.3	6.1	6.6	0.0	9.9	9.9	4.3	1.4	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.4	37.8	37.7	50.9	39.4	29.2	0.0	48.9	48.9	46.6	5.1	5.3
LnGrp LOS	D	D	D	D	D	C	A	D	D	D	A	A
Approach Vol, veh/h		946			1217			1032			1532	
Approach Delay, s/veh		41.3			39.8			48.9			15.5	
Approach LOS		D			D			D			B	
Timer - Assigned Phs	1	2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s	17.3	35.2	16.4	26.2		52.5	16.5	26.0				
Change Period (Y+Rc), s	5.0	6.5	5.0	6.5		6.5	5.0	6.5				
Max Green Setting (Gmax), s	13.9	25.0	13.0	20.1		43.9	13.0	20.1				
Max Q Clear Time (g_c+I1), s	11.9	28.1	11.0	15.8		5.0	11.1	19.1				
Green Ext Time (p_c), s	0.4	0.0	0.4	1.0		4.2	0.4	0.5				
Intersection Summary												
HCM 6th Ctrl Delay			34.2									
HCM 6th LOS			C									

Dressler Road Alternatives Study
3: Dressler Road & Belden Park Crossing

Design Year 2043 'Build Alternative 2' - Saturday

08/14/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	280	70	190	270	110	230	300	860	280	130	950	70
Future Volume (veh/h)	280	70	190	270	110	230	300	860	280	130	950	70
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	304	76	207	293	120	250	326	935	304	141	1033	76
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	365	324	478	394	312	379	367	1189	385	285	1324	97
Arrive On Green	0.10	0.17	0.17	0.09	0.17	0.17	0.17	0.60	0.60	0.07	0.39	0.39
Sat Flow, veh/h	1781	1870	1585	1781	1870	1585	1781	2639	854	1781	3356	247
Grp Volume(v), veh/h	304	76	207	293	120	250	326	628	611	141	547	562
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1781	1870	1585	1781	1777	1717	1781	1777	1826
Q Serve(g_s), s	9.5	3.3	10.0	8.9	5.4	13.5	10.0	25.4	25.7	4.4	25.6	25.6
Cycle Q Clear(g_c), s	9.5	3.3	10.0	8.9	5.4	13.5	10.0	25.4	25.7	4.4	25.6	25.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.50	1.00		0.14
Lane Grp Cap(c), veh/h	365	324	478	394	312	379	367	801	773	285	701	720
V/C Ratio(X)	0.83	0.23	0.43	0.74	0.38	0.66	0.89	0.78	0.79	0.50	0.78	0.78
Avail Cap(c_a), veh/h	365	366	513	394	354	414	402	801	773	288	701	720
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.68	0.68	0.68
Uniform Delay (d), s/veh	33.5	33.8	26.7	32.7	35.2	32.7	18.2	15.6	15.6	17.9	25.2	25.2
Incr Delay (d2), s/veh	15.0	0.4	0.6	7.4	0.8	3.4	19.2	7.6	8.1	0.7	5.8	5.7
Initial Q 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	0.0
%ile BackOfQ(50%),veh/ln	3.9	1.6	3.8	2.8	2.5	5.5	5.3	9.3	9.2	1.7	11.3	11.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.6	34.2	27.3	40.1	36.0	36.1	37.4	23.2	23.7	18.6	31.0	30.9
LnGrp LOS	D	C	C	D	D	D	D	C	C	B	C	C
Approach Vol, veh/h		587			663			1565			1250	
Approach Delay, s/veh		39.2			37.8			26.3			29.5	
Approach LOS		D			D			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	11.8	48.3	13.4	21.5	17.2	43.0	14.0	20.9				
Change Period (Y+Rc), s	5.0	5.5	4.5	5.0	5.0	5.5	4.5	5.0				
Max Green Setting (Gmax), s	7.0	40.5	8.9	18.6	14.0	33.5	9.5	18.0				
Max Q Clear Time (g_c+I1), s	6.4	27.7	10.9	12.0	12.0	27.6	11.5	15.5				
Green Ext Time (p_c), s	0.0	3.8	0.0	0.5	0.2	2.1	0.0	0.3				
Intersection Summary												
HCM 6th Ctrl Delay			31.0									
HCM 6th LOS			C									

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	60	10	290	30	10	30	260	1220	40	20	1120	60
Future Volume (veh/h)	60	10	290	30	10	30	260	1220	40	20	1120	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	65	11	315	33	11	33	283	1326	43	22	1217	65
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	70	7	527	66	13	367	359	2311	75	278	1748	93
Arrive On Green	0.23	0.23	0.23	0.23	0.23	0.23	0.20	1.00	1.00	0.51	0.51	0.51
Sat Flow, veh/h	0	29	1585	0	57	1585	1781	3513	114	397	3431	183
Grp Volume(v), veh/h	76	0	315	44	0	33	283	670	699	22	630	652
Grp Sat Flow(s),veh/h/ln	29	0	1585	57	0	1585	1781	1777	1850	397	1777	1837
Q Serve(g_s), s	0.0	0.0	15.7	0.0	0.0	1.6	7.2	0.0	0.0	2.7	25.6	25.6
Cycle Q Clear(g_c), s	22.0	0.0	15.7	22.0	0.0	1.6	7.2	0.0	0.0	2.7	25.6	25.6
Prop In Lane	0.86		1.00	0.75		1.00	1.00		0.06	1.00		0.10
Lane Grp Cap(c), veh/h	77	0	527	79	0	367	359	1169	1217	278	905	936
V/C Ratio(X)	0.99	0.00	0.60	0.55	0.00	0.09	0.79	0.57	0.57	0.08	0.70	0.70
Avail Cap(c_a), veh/h	77	0	527	79	0	367	488	1169	1217	278	905	936
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	1.00	1.00	0.00	1.00	0.59	0.59	0.59	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.6	0.0	26.4	41.0	0.0	28.6	14.6	0.0	0.0	12.1	17.7	17.7
Incr Delay (d2), s/veh	98.1	0.0	1.9	8.1	0.0	0.1	3.1	1.2	1.2	0.6	4.4	4.3
Initial Q 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	0.0
%ile BackOfQ(50%),veh/ln	3.8	0.0	6.1	1.2	0.0	0.6	3.1	0.4	0.4	0.3	10.7	11.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	143.7	0.0	28.3	49.2	0.0	28.7	17.8	1.2	1.2	12.7	22.1	22.0
LnGrp LOS	F	A	C	D	A	C	B	A	A	B	C	C
Approach Vol, veh/h		391			77			1652			1304	
Approach Delay, s/veh		50.7			40.4			4.0			21.9	
Approach LOS		D			D			A			C	
Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		68.0		27.0	14.1	53.9		27.0				
Change Period (Y+Rc), s		5.5		5.0	4.5	5.5		5.0				
Max Green Setting (Gmax), s		62.5		22.0	16.5	41.5		22.0				
Max Q Clear Time (g_c+l1), s		2.0		24.0	9.2	27.6		24.0				
Green Ext Time (p_c), s		0.3		0.0	0.4	0.3		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			17.0									
HCM 6th LOS			B									

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	30	10	390	20	120	10	820	330	110	790	10
Future Volume (veh/h)	20	30	10	390	20	120	10	820	330	110	790	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	22	33	11	288	212	130	11	891	359	120	859	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	36	54	18	391	238	146	310	1846	1172	235	1867	24
Arrive On Green	0.06	0.06	0.06	0.22	0.22	0.22	0.52	0.52	0.52	0.52	0.52	0.52
Sat Flow, veh/h	596	893	298	1781	1085	665	637	3554	1585	445	3593	46
Grp Volume(v), veh/h	66	0	0	288	0	342	11	891	359	120	425	445
Grp Sat Flow(s),veh/h/ln	1787	0	0	1781	0	1751	637	1777	1585	445	1777	1862
Q Serve(g_s), s	3.4	0.0	0.0	14.3	0.0	18.0	1.1	15.3	7.3	22.5	14.3	14.3
Cycle Q Clear(g_c), s	3.4	0.0	0.0	14.3	0.0	18.0	15.4	15.3	7.3	37.8	14.3	14.3
Prop In Lane	0.33		0.17	1.00		0.38	1.00		1.00	1.00		0.02
Lane Grp Cap(c), veh/h	109	0	0	391	0	385	310	1846	1172	235	923	967
V/C Ratio(X)	0.61	0.00	0.00	0.74	0.00	0.89	0.04	0.48	0.31	0.51	0.46	0.46
Avail Cap(c_a), veh/h	132	0	0	450	0	442	310	1846	1172	235	923	967
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.70	0.00	0.70	1.00	1.00	1.00	0.94	0.94	0.94
Uniform Delay (d), s/veh	43.5	0.0	0.0	34.5	0.0	35.9	19.3	14.6	4.2	26.8	14.4	14.4
Incr Delay (d2), s/veh	2.1	0.0	0.0	3.8	0.0	13.4	0.2	0.9	0.7	7.2	1.6	1.5
Initial Q 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	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	0.0	6.4	0.0	8.9	0.2	5.8	4.6	2.7	5.7	6.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.6	0.0	0.0	38.3	0.0	49.3	19.5	15.5	4.9	34.0	16.0	15.9
LnGrp LOS	D	A	A	D	A	D	B	B	A	C	B	B
Approach Vol, veh/h		66			630			1261			990	
Approach Delay, s/veh		45.6			44.3			12.5			18.1	
Approach LOS		D			D			B			B	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		56.4		11.8		56.4		26.9				
Change Period (Y+Rc), s		7.0		6.0		7.0		6.0				
Max Green Setting (Gmax), s		45.0		7.0		45.0		24.0				
Max Q Clear Time (g_c+I1), s		17.4		5.4		39.8		20.0				
Green Ext Time (p_c), s		6.7		0.0		2.4		0.9				
Intersection Summary												
HCM 6th Ctrl Delay				21.9								
HCM 6th LOS				C								
Notes												
User approved volume balancing among the lanes for turning movement.												

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	160	790	10	10	860	10	10	0	10	70	0	40
Future Volume (veh/h)	160	790	10	10	860	10	10	0	10	70	0	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	174	859	11	11	935	11	11	0	11	76	0	43
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	502	2846	36	580	2849	34	123	17	84	154	7	56
Arrive On Green	1.00	1.00	1.00	0.79	0.79	0.79	0.10	0.00	0.10	0.10	0.00	0.10
Sat Flow, veh/h	593	3593	46	637	3597	42	648	170	818	892	66	542
Grp Volume(v), veh/h	174	425	445	11	462	484	22	0	0	119	0	0
Grp Sat Flow(s),veh/h/ln	593	1777	1862	637	1777	1863	1635	0	0	1500	0	0
Q Serve(g_s), s	4.1	0.0	0.0	0.3	6.9	6.9	0.0	0.0	0.0	6.2	0.0	0.0
Cycle Q Clear(g_c), s	11.0	0.0	0.0	0.3	6.9	6.9	1.1	0.0	0.0	7.3	0.0	0.0
Prop In Lane	1.00		0.02	1.00		0.02	0.50		0.50	0.64		0.36
Lane Grp Cap(c), veh/h	502	1407	1475	580	1407	1475	225	0	0	216	0	0
V/C Ratio(X)	0.35	0.30	0.30	0.02	0.33	0.33	0.10	0.00	0.00	0.55	0.00	0.00
Avail Cap(c_a), veh/h	502	1407	1475	580	1407	1475	337	0	0	328	0	0
HCM Platoon Ratio	1.33	1.33	1.33	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.87	0.87	0.87	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.5	0.0	0.0	2.1	2.8	2.8	38.7	0.0	0.0	41.4	0.0	0.0
Incr Delay (d2), s/veh	1.6	0.5	0.5	0.1	0.6	0.6	0.2	0.0	0.0	2.2	0.0	0.0
Initial Q 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	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.2	0.2	0.0	1.7	1.8	0.5	0.0	0.0	2.8	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	2.2	0.5	0.5	2.2	3.4	3.4	38.9	0.0	0.0	43.6	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	D	A	A	D	A	A
Approach Vol, veh/h		1044			957			22			119	
Approach Delay, s/veh		0.8			3.4			38.9			43.6	
Approach LOS		A			A			D			D	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		14.8		80.2		14.8		80.2				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		17.0		68.0		17.0		68.0				
Max Q Clear Time (g_c+I1), s		3.1		13.0		9.3		8.9				
Green Ext Time (p_c), s		0.0		4.7		0.2		3.2				
Intersection Summary												
HCM 6th Ctrl Delay				4.7								
HCM 6th LOS				A								

Intersection						
Int Delay, s/veh	2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑	↑↑			↑
Traffic Vol, veh/h	0	870	640	90	0	240
Future Vol, veh/h	0	870	640	90	0	240
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	50	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	946	696	98	0	261

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	-	0	- 0 - 397
Stage 1	-	-	- - -
Stage 2	-	-	- - -
Critical Hdwy	-	-	- - 6.94
Critical Hdwy Stg 1	-	-	- - -
Critical Hdwy Stg 2	-	-	- - -
Follow-up Hdwy	-	-	- - 3.32
Pot Cap-1 Maneuver	0	-	- 0 602
Stage 1	0	-	- 0 -
Stage 2	0	-	- 0 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	- - 602
Mov Cap-2 Maneuver	-	-	- - -
Stage 1	-	-	- - -
Stage 2	-	-	- - -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	15.5
HCM LOS			C

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	602
HCM Lane V/C Ratio	-	-	-	0.433
HCM Control Delay (s)	-	-	-	15.5
HCM Lane LOS	-	-	-	C
HCM 95th %tile Q(veh)	-	-	-	2.2

Intersection

Int Delay, s/veh 0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑			↑
Traffic Vol, veh/h	0	870	870	10	0	10
Future Vol, veh/h	0	870	870	10	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	946	946	11	0	11

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	-	0	- 0 - 479
Stage 1	-	-	- - -
Stage 2	-	-	- - -
Critical Hdwy	-	-	- - 6.94
Critical Hdwy Stg 1	-	-	- - -
Critical Hdwy Stg 2	-	-	- - -
Follow-up Hdwy	-	-	- - 3.32
Pot Cap-1 Maneuver	0	-	- 0 533
Stage 1	0	-	- 0 -
Stage 2	0	-	- 0 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	- - 533
Mov Cap-2 Maneuver	-	-	- - -
Stage 1	-	-	- - -
Stage 2	-	-	- - -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	11.9
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	533
HCM Lane V/C Ratio	-	-	-	0.02
HCM Control Delay (s)	-	-	-	11.9
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.1

Intersection						
Int Delay, s/veh	1.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↘	↑↑↑	↘	↗
Traffic Vol, veh/h	840	170	70	1100	20	120
Future Vol, veh/h	840	170	70	1100	20	120
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	913	185	76	1196	22	130

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	1098
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.14
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.22
Pot Cap-1 Maneuver	-	-	631
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	631
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	16.6
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	205	480	-	-	631	-
HCM Lane V/C Ratio	0.106	0.272	-	-	0.121	-
HCM Control Delay (s)	24.6	15.3	-	-	11.5	-
HCM Lane LOS	C	C	-	-	B	-
HCM 95th %tile Q(veh)	0.4	1.1	-	-	0.4	-

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↕			↕
Traffic Vol, veh/h	0	60	890	50	0	1170
Future Vol, veh/h	0	60	890	50	0	1170
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	100	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	65	967	54	0	1272

Major/Minor	Minor1	Major1	Major2
Conflicting Flow All	-	511	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	6.94	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	3.32	-
Pot Cap-1 Maneuver	0	508	-
Stage 1	0	-	-
Stage 2	0	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	508	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.1	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	508
HCM Lane V/C Ratio	-	-	0.128
HCM Control Delay (s)	-	-	13.1
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0.4

Intersection						
Int Delay, s/veh	1.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑↑↷			↷↑
Traffic Vol, veh/h	0	940	920	50	0	180
Future Vol, veh/h	0	940	920	50	0	180
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1022	1000	54	0	196
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	-	0	-	0	-	527
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	0	-	-	-	0	424
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	424
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		20.6		
HCM LOS				C		
Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1		
Capacity (veh/h)	-	-	-	424		
HCM Lane V/C Ratio	-	-	-	0.461		
HCM Control Delay (s)	-	-	-	20.6		
HCM Lane LOS	-	-	-	C		
HCM 95th %tile Q(veh)	-	-	-	2.4		