

# **Villages at Waterview North**

## **Preliminary Plan**

### **Traffic Impact and Access Analysis**

Prepared for:  
CPR Entitlements, LLC  
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Colorado Springs, CO 80903

Contact: Mr. P. A. Koscielski, Manager

OCTOBER 27, 2022

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LSC #S224360



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DRAFT



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October 27, 2022

Mr. P. A. Koscielski, Manager  
CPR Entitlements, LLC  
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RE: Villages at Waterview North  
Preliminary Plan  
Traffic Impact and Access Analysis  
El Paso County, CO  
LSC #S224360

Dear Mr. Koscielski,

In response to your request, LSC Transportation Consultants, Inc. has prepared this traffic impact and access (TIA) analysis for proposed Villages at Waterview North Preliminary Plan. As shown in Figure 1, the site is located northeast of the intersection of Powers Boulevard and Bradley Road in El Paso County, Colorado. The site is planned to be annexed into the City of Colorado Springs. This report contains the following:

## **REPORT CONTENTS**

This report has been prepared to address the project's traffic impact at the proposed access points and adjacent intersections.

This report contains the following:

- The proposed land-use zoning and site-access plan
- The existing street and traffic conditions in the site's vicinity including the street widths, lane geometries, traffic controls, and existing traffic counts at key area intersections;
- The projected future background traffic volumes, which include estimates of traffic from other area development projects and increases in through traffic on the adjacent arterial streets;
- The estimated average weekday and peak-hour trip generation;
- The estimated directional distribution of site-generated trips and the projected site-generated traffic volumes;
- Estimates of the resulting total traffic volumes on the adjacent streets and intersections; and
- The projected levels of service at the site access point and adjacent intersections.



## **PREVIOUS TRAFFIC REPORTS COMPLETED IN THE AREA**

A list of other traffic studies in the area of study completed within the past five years (that LSC is aware of) is attached for reference. This study accounts for the land use, trip generation and the roadway network included in these studies. Figure 2 shows the location of the other known developments in the area.

## **LAND USE AND ACCESS**

The site location is shown in Figure 1. Figure 2 presents a context map showing other area developments. The site plan for the Villages at Waterview North is shown in Figure 3.

### **Land Use**

Figure 3 shows the proposed site plan for 116-acre Villages at Waterview North development. About 39.94 acres is planned for high-density residential uses with a maximum of 1,000 dwelling units. About 21.6 acres are planned for medium-density residential uses with a maximum of 190 dwelling units. About 16.5 acres are planned for community commercial uses. This TIA assumes these parcels will be developed with about 125,000 square feet of general retail floor space. About 28.19 acres are planned for regional commercial uses. This TIS assumes these parcels will be developed with 325,000 square feet of industrial park floor space, 30,000 square feet of general office space and 22,000 square feet of medical office floor space. The remaining area is planned for drainage.

### **Access**

Access to Bradley Road is proposed at two locations. The primary access will be the north leg of the Bradley Road/Legacy Hill Drive intersection. Secondary access will be via a three-quarter-movement access (left-in/right-in/right-out-only) (Blackmere Street). The location will be 1,317 feet east of Legacy Hill Drive.

The site plan shows a full-movement access to Legacy Hill Drive for the future community commercial area 700 feet north of Bradley Road (measured centerline to centerline).

### **Sight Distance**

Figure 4 shows the sight distance analysis for the proposed access points to Legacy Hill Drive. Based on the criteria contained in the City of Colorado Springs Traffic Criteria Manual, the required intersection sight distance for an intersection with a Collector is 335 feet.

The required stopping sight distance from the *City of Colorado Springs Traffic Criteria Manual* for a Collector is 200 feet. As shown in Figure 4, the intersection sight-distance and stopping-sight-distance requirements can be met at all of the currently-proposed access points.

Any additional access points to Legacy Hill Drive should be evaluated for sight distance.

### **Pedestrian and Bicycle Access**

There are currently no schools located within two miles of the proposed development. There are no existing sidewalks on Bradley Road or Powers Boulevard. Sidewalks should be provided on all of the internal streets within the Villages at Waterview North including along Legacy Hill Drive. Sidewalks are also planned on Legacy Hill Drive south of Bradley Road.

## **STREET AND TRAFFIC CONDITIONS**

### **Area Streets**

The adjacent streets are shown in Figure 1 and are described below. Copies of the 2016 El Paso County *Major Transportation Corridors Plan (MTCP)* 2040 Roadway Plan and 2016 MTCP 2060 Corridor Preservation Plan with the site location identified on them have been attached to this report.

- **Powers Boulevard** (State Highway 21) is classified as a Freeway (FW). Powers Boulevard is one of the region's main north/south corridors. Powers Boulevard has a center median and a posted speed limit of 60 miles per hour (mph) north of Crestera Parkway. South of this point, the posted speed limit is 65 mph. Powers Boulevard is ultimately planned to be converted to a Freeway with grade-separated intersections.
- **Bradley Road** is shown with a Minor Arterial classification east of Grinnell Boulevard on the 2016 2040 El Paso County *Major Transportation Corridors Plan (MTCP)*. Adjacent to the site, Bradley Road is a four-lane roadway with a 50-mph posted speed limit and has an edge-of-asphalt median, left-turn lanes, and rural paved shoulders. There is a short existing section of raised median approaching Powers Boulevard. The 2040 MTCP includes the construction of Bradley Road between Grinnell Boulevard and Powers Boulevard in the 2040 roadway improvement B-list projects.
- **Marksheffel Road** extends north from the Link Road/C&S Road intersection in Fountain, Colorado to north of Woodmen Road. It has recently been upgraded north and south of Bradley Road with a PPRTA project and is shown as a four-lane Expressway on the MTCP. The posted speed limit on Marksheffel Road in the vicinity of Bradley Road is 55 mph.

### **Existing Traffic Volumes**

Figure 5 shows the traffic volumes at the intersections of Powers Boulevard/Bradley Road and Marksheffel Road/Bradley Road, based on the attached traffic counts conducted by LSC in March 2021. Figure 5 also shows the 2021 Colorado Department of Transportation (CDOT) Average Annual Daily Traffic Volumes (AADT) on Powers Boulevard and on Bradley Road.

## Existing Levels of Service

Level of service (LOS) is a quantitative measure of the level of congestion or delay at an intersection. Level of service is indicated on a scale from “A” to “F.” LOS A represents control delay of less than 10 seconds for unsignalized and signalized intersections. LOS F represents control delay of more than 50 seconds for unsignalized intersections and more than 80 seconds for signalized intersections. Table 1 shows the level of service delay ranges.

**Table 1: Intersection Levels of Service Delay Ranges**

| Level of Service   | Signalized Intersections                    | Unsignalized Intersections                                 |
|--|---|--|
|  | Average Control Delay (seconds per vehicle) | Average Control Delay (seconds per vehicle) <sup>(1)</sup> |
| A  | 10.0 sec or less                            | 10.0 sec or less   |
| B  | 10.1-20.0 sec                               | 10.1-15.0 sec  |
| C  | 20.1-35.0 sec                               | 15.1-25.0 sec  |
| D  | 35.1-55.0 sec                               | 25.1-35.0 sec  |
| E  | 55.1-80.0 sec                               | 35.1-50.0 sec  |
| F  | 80.1 sec or more                            | 50.1 sec or more   |
| (1) For unsignalized intersections if V/C ratio is greater than 1.0 the level of service is LOS F regardless of the projected average control delay per vehicle. |   |  |

The intersections of Powers/Bradley and Marksheffel/Bradley have been analyzed using Synchro. Figure 5 shows the level of service analysis results.

All movements at these intersections are currently operating at LOS D or better during the peak hours.

## BACKGROUND TRAFFIC

Background traffic is the traffic estimated to be on the adjacent roadways and at adjacent intersections without the proposed development’s trip generation of site-generated traffic volumes. Background traffic includes the through traffic and the traffic generated by nearby developments but assumes zero traffic generated by the site.

Figure 6 shows the projected short-term (Year 2026) background traffic volumes. Historical counts showed that the morning peak-hour counts recorded in March 2021 were low. It has been noted that the COVID-19 pandemic continues to impact primarily morning counts. Based on historical count data, a 25 percent increase was applied to all the existing morning count data, while a 5-percent increase was applied to the existing afternoon counts. These increases were based on comparing data recorded in February 2020 and February 2021 at CDOT ATR 103648. These traffic volumes are based on the existing traffic volumes shown in Figure 5, assuming a growth rate of 1 percent per year. The short-term background traffic volumes also include additional traffic projected to be generated by development of

The Trails at Aspen Ridge Filing No. 1 and the Trails at Aspen Ridge PUD. The projected additional traffic volumes were taken from a traffic impact study prepared by LSC.

Figure 7 shows the projected 2040 background traffic volumes. The 2040 background traffic volumes were based on the *Waterview North Sketch Plan Master Traffic Study*, with some adjustments based on the traffic counts conducted in the vicinity of the site in March 2021. These volumes assume buildout of The Trails at Aspen Ridge Filing No. 1, the Trails at Aspen Ridge PUD, the Waterview North RM-12 rezone located on the southeast corner of Bradley/Legacy Hill (P-21), the future commercial parcel located on the southwest corner of Bradley/Legacy Hill (P-17), Peak Innovation Park, and Bradley Heights. The 2040 background traffic volumes do not include any traffic projected to be generated by the Villages at Waterview North. The long-term background volumes assume Bradley Road has been constructed between Goldfield Drive and Powers Boulevard.

## TRIP GENERATION

The site-generated vehicle trips were estimated using the nationally-published trip-generation rates from *Trip Generation, 11th Edition, 2021* by the Institute of Transportation Engineers (ITE). Table 2 shows the average weekday and peak-hour trip-generation estimates.

The total number of vehicle trips generated by the land uses has been reduced to account for the internal vehicle trips made within the site between land uses, without use of the external streets surrounding the site. Table 2 shows the number of internal trips assumed for each land use. The internal trip reduction for the commercial parcels is an estimate by LSC, based on *National Highway Cooperative Highway Research Program (NCHRP) Report 684 Enhancing Internal Trip Capture Estimation for Mixed-Use Developments*. The results of the spreadsheet model are attached.

The total number of vehicle trips generated has also been reduced to take into account the “pass-by” phenomena. A pass-by trip is made by a motorist who would already be on the adjacent roadways regardless of the proposed development, but who stops in at the site while passing by. The motorist would then continue on his or her way to a final destination in the original direction. The pass-by percentages shown in Table 2 are from the *Trip Generation Handbook - An ITE Proposed Recommended Practice, 3rd Edition, 2017* by ITE.

As there are limited existing mass-transit options in the vicinity of the site, no reductions were assumed to account for multimodal travel.

At buildout, the Villages at Waterview North is projected to generate about 15,659 new external vehicle trips on the average weekday, with about half entering and half exiting the site. During the morning peak hour, which generally occurs for one hour between 6:30 and 8:30 a.m., about 436 vehicles would enter and 505 vehicles would exit the site. During the afternoon peak hour, which generally occurs for one hour between 4:15 and 6:15 p.m., about 766 vehicles would enter and 737 vehicles would exit the site.

## TRIP DISTRIBUTION AND ASSIGNMENT

The directional distribution of the site-generated traffic volumes on the adjacent roadway system is one of the most important factors in determining the traffic impacts of the site. Figure 8 shows the short-term and long-term directional distributions of traffic projected to be generated by the residential uses. Figure 9 shows the short-term and long-term directional distributions of traffic projected to be generated by the non-residential uses.

The short-term directional-distribution estimates were based on the existing area roadway system and the traffic counts. The long-term directional-distribution estimates were based on the anticipated regional development and future roadway networks including the construction of Bradley Road between Grinnell Street and Powers Boulevard.

This distribution was estimated with a focus on peak-hour trip assignment, as the intersection analysis is based on peak-hour volumes.

- The distribution percentages to/from the east account for:
  - o Some longer trip lengths by commuters;
  - o The proximity of this development to Marksheffel Road;
  - o Anticipated use of Marksheffel Road north as a viable alternative to Powers to/from many destinations east of and within the Powers Boulevard corridor. Powers Boulevard intersections experience congestion during peak hours. Marksheffel has recently been upgraded north and south of Bradley with a PPRTA project, which has increased its attractiveness as a north/south travel route;
  - o Bradley to/from the east being the route to Schriever Air Force Base and the improved east gate of Peterson Air Force Base; and
  - o Development occurring in the Marksheffel corridor and, over time, the number of trip destinations continuing to increase.
- The distribution percentages to/from the Bradley Heights connection account for:
  - o Planned alternative street connections within Bradley Heights to Bradley Road and Marksheffel Road (south);
  - o Future trip destinations within Bradley Heights;
  - o The school and some potential future commercial within Lorson Ranch to the southeast;
  - o The long-term distribution split accounts for a north-south road connection between Bradley Heights and Fontaine Boulevard, as shown on the Banning Lewis Master Plan and the City of Colorado Springs Intermodal Transportation Plan. This includes trips oriented to the south and southeast.
- The percentages to/from the south on Powers account for trips from the south and southwest, paired with destinations primarily in Fountain and Fort Carson as well as the south connection to Interstate 25.
- The percentages to/from the north on Powers primarily account for trips using Milton Proby Parkway and the Powers Boulevard corridor for travel.

When the distribution percentages (from Figures 8 and 9) are applied to the trip-generation estimates (from Table 2), the resulting site-generated traffic volumes can be determined. Figures 10 and 11 show the projected short-term site-generated traffic volume, due to residential portion of the Villages at Waterview North. Figures 12 and 13 show the projected long-term site-generated traffic volumes, due to development of the non-residential portion of the Villages at Waterview North.

## **BUILDOUT TOTAL TRAFFIC**

Figure 14 shows the projected short-term total traffic volumes. The short-term total traffic volumes are the sum of the short-term background traffic volumes (from Figure 6) plus the short-term site-generated traffic volumes, due to development of the residential portion of Waterview North (from Figure 10), and the short-term site-generated traffic volumes, due to the non-residential portion of the Villages at Waterview North (from Figure 11).

Figure 15 shows the projected 2040 total traffic volumes. The 2040 total traffic volumes are the sum of the 2040 background traffic volumes (from Figure 7) plus the long-term site-generated traffic volumes, due to development of the residential portion of Waterview North (from Figure 12), and the long-term site-generated traffic volumes, due to the non-residential portion of the Villages at Waterview North (from Figure 13).

## **PROJECTED LEVELS OF SERVICE**

The key area intersections have been analyzed to determine the projected levels of service for the short-term and 2040 background and short-term and 2040 total traffic volumes. The signalized intersections of Powers/Bradley, Legacy Hill/Bradley, and Marksheffel/Bradley were analyzed using Synchro. The three-quarter-movement access to Bradley Road (Blackmer Street) and the Legacy Hill access points were analyzed based on the unsignalized method of analysis from the *Highway Capacity Manual, 6th Edition* by the Transportation Research Board. Figures 6, 7, 14 and 15 show the results of the level of service analysis. The level of service reports are attached.

### **Powers/Bradley**

The intersection of Powers/Bradley is currently signalized and is operating at a satisfactory level of service. All movements at this intersection are projected to operate at LOS D or better during the peak hours, based on the short-term total traffic volumes. The short-term analysis assumes the addition of a second southbound left-turn lane. By 2040, it was assumed that the section of Bradley Road between Goldfield Drive and Powers Boulevard would be constructed. Based on the 2040 total traffic volumes shown and the lane geometry shown in Figure 15, the intersection is projected to operate at an overall LOS D during the peak hours. However, some of the minor movements are projected to operate at LOS E or F during the peak hours. It is common for left-turn and side-street through movements to have projected delays in the LOS E or F range, as signal-coordination timing plans generally give priority to moving through traffic. This often results in higher delay for left-turn

and side-street movements and can result in movement/approach delays in the E or F range even though they are projected to have sufficient capacity for the projected traffic volumes. Note: This intersection is planned to be converted to a grade-separated interchange in the long-term future.

#### **Legacy Hill/Bradley**

The intersection of Bradley Road/Legacy Hill Drive is projected to operate at LOS D or better during the peak hours for all movements as a signal-controlled intersection, based on the projected short-term total traffic volumes. By 2040, some of the minor movements are projected to operate at LOS E during the peak hours.

#### **Blackmer/Bradley**

All movements at the proposed three-quarter-movement intersection of Bradley Road (Blackmer Street) are projected to operate at LOS C or better during the peak hours, based on the projected short-term and 2040 total traffic volumes.

#### **Marksheffel/Bradley**

The intersection of Marksheffel/Bradley is currently signalized and is operating at a satisfactory level of service. All movements are projected to continue to operate at an acceptable level of service (LOS D or better), based on the projected short-term total traffic volumes. By 2040, the eastbound left-turn movement is projected to operate at LOS E during the peak hours, even with the addition of dual eastbound left-turn lanes and protected phasing.

#### **Legacy Hill Access Points**

All of the proposed access points to Legacy Hill Drive are projected to operate at an acceptable level of service (LOS D or better for all movements) as stop-sign-controlled intersections.

### **QUEUING ANALYSIS**

A queuing analysis was performed using Synchro/SimTraffic to determine the storage length needed to accommodate the projected left-turn queue on Bradley Road, based on the 2040 total traffic volumes. The 2040 total morning and afternoon peak-hour traffic volumes were entered into the Synchro model. The simulation was run five times. The queuing reports are attached. Based on the projected 2040 total traffic, the projected maximum eastbound left-turn queue on Bradley Road approaching Legacy Hill Drive is about 215 feet during the morning peak hour and 330 feet during the afternoon peak hour.

The projected maximum westbound left-turn queue on Bradley Road approaching Powers Boulevard is about 604 feet during the morning peak hour and 340 feet during the afternoon peak hour.

The projected maximum southbound left-turn queue on Legacy Hill Drive approaching Bradley Road is about 134 feet during the morning peak hour and 185 feet in the afternoon peak hour. The projected maximum northbound left-turn queue on Legacy Hill Drive approaching the south commercial access is about 51 feet during the morning peak hour and 160 feet during the afternoon peak hour. Based on the queueing analysis, any future full-movement access for the commercial parcel located west of Legacy Hill Drive should be located no closer than 700 feet north of Bradley Road (measured centerline-to-centerline).

### **TRAFFIC-SIGNAL WARRANT ANALYSIS**

The intersection of Bradley Road and Legacy Hill Drive was analyzed to determine when either an Eight-Hour or a Four-Hour Vehicular-Volume Traffic-Signal Warrant would be met or be close to being met, based on traffic projected to be generated by the Waterview North development only. As discussed in the *Trails at Aspen Ridge Filing No. 1 Updated Traffic Impact and Access Analysis* by LSC dated December 12, 2019, a Four-Hour Vehicular-Volume Traffic-Signal Warrant is projected to be met, once about 242 of the planned 786 lots for single-family homes within the Trails at Aspen Ridge Filing No. 1 are developed. This analysis assumes none of the homes in the Trails at Aspen Ridge have been developed.

Table 3 shows that Four-Hour and Eight-Hour Vehicular-Volume Traffic-Signal Warrants are projected to be met with full buildout of either the residential portion or full-buildout of the non-residential portions of the Villages at Waterview North site. The satisfaction of warrants does not indicate that a signal must be installed. The decision to require a signal to be installed at this location rests with the County.

### **Details of the Analysis**

The lower threshold volume for an Eight-Hour Vehicular-Volume Traffic-Signal Warrant for Condition B - Interruption of Continuous Traffic for a major street with two or more lanes and a posted speed limit greater than 40 mph, and a minor street approach with one lane, is 53 vehicles per hour. This lower threshold is applicable when the major street volumes (eastbound and westbound left, through, and right movements) exceed 630 vehicles per hour. The lower threshold volume for a Four-Hour Vehicular-Volume Traffic-Signal Warrant for a major street with two or more lanes and a posted speed limit greater than 40 mph, and a minor street approach with one lane, is 60 vehicles per hour. This lower threshold is applicable when the major street volumes (eastbound and westbound left, through, and right movements) exceed 1,000 vehicles per hour. The existing through volumes on Bradley Road adjacent to the site currently exceed 1,000 vehicles per hour, during both the morning and afternoon peak hours.

Detailed analyses are presented in Table 3. The off-peak through volumes on Bradley Road were estimated, based on 24-hour counts conducted by CDOT on Powers Boulevard just south of Bradley Road. The off-peak volumes on Legacy Hill Drive were based on the short-term



site-generated traffic volumes and hourly variation data published by the Institute of Transportation Engineers in 2021.

#### **FUTURE SH 21A (POWERS BOULEVARD)/BRADLEY ROAD INTERCHANGE ESCROW**

CDOT has indicated in comments dated August 3, 2020 (for an adjacent project), escrow funds will be required as a term and condition of access permit for a portion of the future SH 21A (Powers Boulevard)/Bradley Road interchange, based on a pro-rata share. An escrow analysis will be part of the requirements of the access permit process.

#### **ROADWAY CLASSIFICATIONS**

Figure 16 shows the recommended street classifications for the streets within the Villages at Waterview North.

#### **ROADWAY IMPROVEMENTS**

A list of area roadway system improvements in the vicinity of the site is presented in Table 4. Figures 17 and 18 show the recommended short-term and long-term lane geometry on Bradley Road adjacent to the site, respectively. Figure 19 shows the recommended lane geometry for Legacy Hill Road north of Bradley Road. Figure 20 shows the CDOT required improvements at the intersection of Powers/Bradley.

\* \* \* \* \*

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Please contact me if you have any questions regarding this report.

Respectfully Submitted,

LSC TRANSPORTATION CONSULTANTS, INC.

By Jeffrey C. Hodsdon, P.E.  
Principal

JCH/KDF:jas

Enclosures: Tables 2-4  
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Traffic Count Reports  
Level of Service Reports  
Queuing Reports  
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NCHRP Report 684 Internal Trip Capture Estimation Tool  
MTCP Maps

## Tables 2-4

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**Table 3**  
**Villages at Waterview North**  
**Traffic Signal Warrant Analysis of Legacy Hill Drive/Bradley Road**  
**Based on the Projected Volumes for the North Leg (Villages at Waterview North Access) Only**

| Period     | 2 or More Lanes on Major Approach & 1 Lane on Minor Approach |                      |                           |       |                               |       |                             |       |                                 |       |   |     |                 |    |                        |       |                            |       |  |      |                            |      |
|------------|--|----------------------|---------------------------|-------|-------------------------------|-------|-----------------------------|-------|---------------------------------|-------|---|-----|-----------------|----|------------------------|-------|----------------------------|-------|--|------|----------------------------|------|
|            | Traffic Volumes  |                      |                           |       |                               |       |                             |       |                                 |       | Warrant 1, Eight Hour Vehicular Volume Evaluation |     |                 |    |                        |       |                            |       | Warrant 2, Four Hour Vehicular Volume Evaluation |      |                            |      |
|            |  |                      |                           |       |                               |       |                             |       |                                 |       | Warrant Threshold Met?                            |     |                 |    |                        |       |                            |       |  |      |                            |      |
|            | Existing <sup>(1)</sup>                                      |                      | Added by Residential Uses |       | Added by Non-Residential Uses |       | Existing + Residential Uses |       | Existing + Non-Residential Uses |       | Warrant Thresholds                                |     |                 |    | Existing + Residential |       | Existing + Non-Residential |       | Existing + Residential                           |      | Existing + Non-Residential |      |
| Hour       | Major <sup>(2)</sup>   | Minor <sup>(3)</sup> | Major                     | Minor | Major                         | Minor | Major                       | Minor | Major                           | Minor | Condition A 70%                                   |     | Condition B 70% |    | A 70%                  | B 70% | A 70%                      | B 70% | Minor Street Minimum                             | Met? | Minor Street Minimum       | Met? |
| 6:00 AM    | 897  | 0                    | 124                       | 69    | 46                            | 8     | 1021                        | 69    | 943                             | 8     | 420   | 105 | 630             | 53 | No                     | Yes   | No                         | No    | 60   | Yes  | 63                         | No   |
| 7:00 AM    | 1107   | 0                    | 197                       | 111   | 103                           | 22    | 1304                        | 111   | 1210                            | 22    | 420   | 105 | 630             | 53 | Yes                    | Yes   | No                         | No    | 60   | Yes  | 60                         | No   |
| 8:00 AM    | 982  | 0                    | 224                       | 89    | 156                           | 32    | 1206                        | 89    | 1138                            | 32    | 420   | 105 | 630             | 53 | No                     | Yes   | No                         | No    | 60   | Yes  | 60                         | No   |
| 9:00 AM    | 775  | 0                    | 177                       | 54    | 264                           | 56    | 952                         | 54    | 1039                            | 56    | 420   | 105 | 630             | 53 | No                     | Yes   | No                         | Yes   | 62   | No   | 60                         | No   |
| 10:00 AM   | 791  | 0                    | 169                       | 53    | 383                           | 93    | 960                         | 53    | 1174                            | 93    | 420   | 105 | 630             | 53 | No                     | Yes   | No                         | Yes   | 62   | No   | 60                         | Yes  |
| 11:00 AM   | 930  | 0                    | 229                       | 51    | 256                           | 78    | 1159                        | 51    | 1186                            | 78    | 420   | 105 | 630             | 53 | No                     | No    | No                         | Yes   | 60   | No   | 60                         | Yes  |
| 12:00 Noon | 845  | 0                    | 183                       | 41    | 318                           | 95    | 1028                        | 41    | 1163                            | 95    | 420   | 105 | 630             | 53 | No                     | No    | No                         | Yes   | 60   | No   | 60                         | Yes  |
| 1:00 PM    | 809  | 0                    | 177                       | 44    | 410                           | 106   | 986                         | 44    | 1219                            | 106   | 420   | 105 | 630             | 53 | No                     | No    | Yes                        | Yes   | 61   | No   | 60                         | Yes  |
| 2:00 PM    | 812  | 0                    | 225                       | 47    | 389                           | 92    | 1037                        | 47    | 1201                            | 92    | 420   | 105 | 630             | 53 | No                     | No    | No                         | Yes   | 60   | No   | 60                         | Yes  |
| 3:00 PM    | 973  | 0                    | 270                       | 50    | 344                           | 90    | 1243                        | 50    | 1317                            | 90    | 420   | 105 | 630             | 53 | No                     | No    | No                         | Yes   | 60   | No   | 60                         | Yes  |
| 4:00 PM    | 1195   | 0                    | 359                       | 55    | 351                           | 93    | 1554                        | 55    | 1546                            | 93    | 420   | 105 | 630             | 53 | No                     | Yes   | No                         | Yes   | 60   | No   | 60                         | Yes  |
| 5:00 PM    | 1253   | 0                    | 395                       | 68    | 414                           | 95    | 1648                        | 68    | 1667                            | 95    | 420   | 105 | 630             | 53 | No                     | Yes   | No                         | Yes   | 60   | Yes  | 60                         | Yes  |
| 6:00 PM    | 1020   | 0                    | 338                       | 58    | 437                           | 84    | 1358                        | 58    | 1457                            | 84    | 420   | 105 | 630             | 53 | No                     | Yes   | No                         | Yes   | 60   | No   | 60                         | Yes  |
|            |  |                      |                           |       |                               |       |                             |       |                                 |       |   |     |                 |    |                        | 1     | 8                          | 1     | 10   |      |                            | 9    |
|            |  |                      |                           |       |                               |       |                             |       |                                 |       |   |     |                 |    |                        | No    | Yes                        | No    | Yes  |      |                            | Yes  |

Notes:

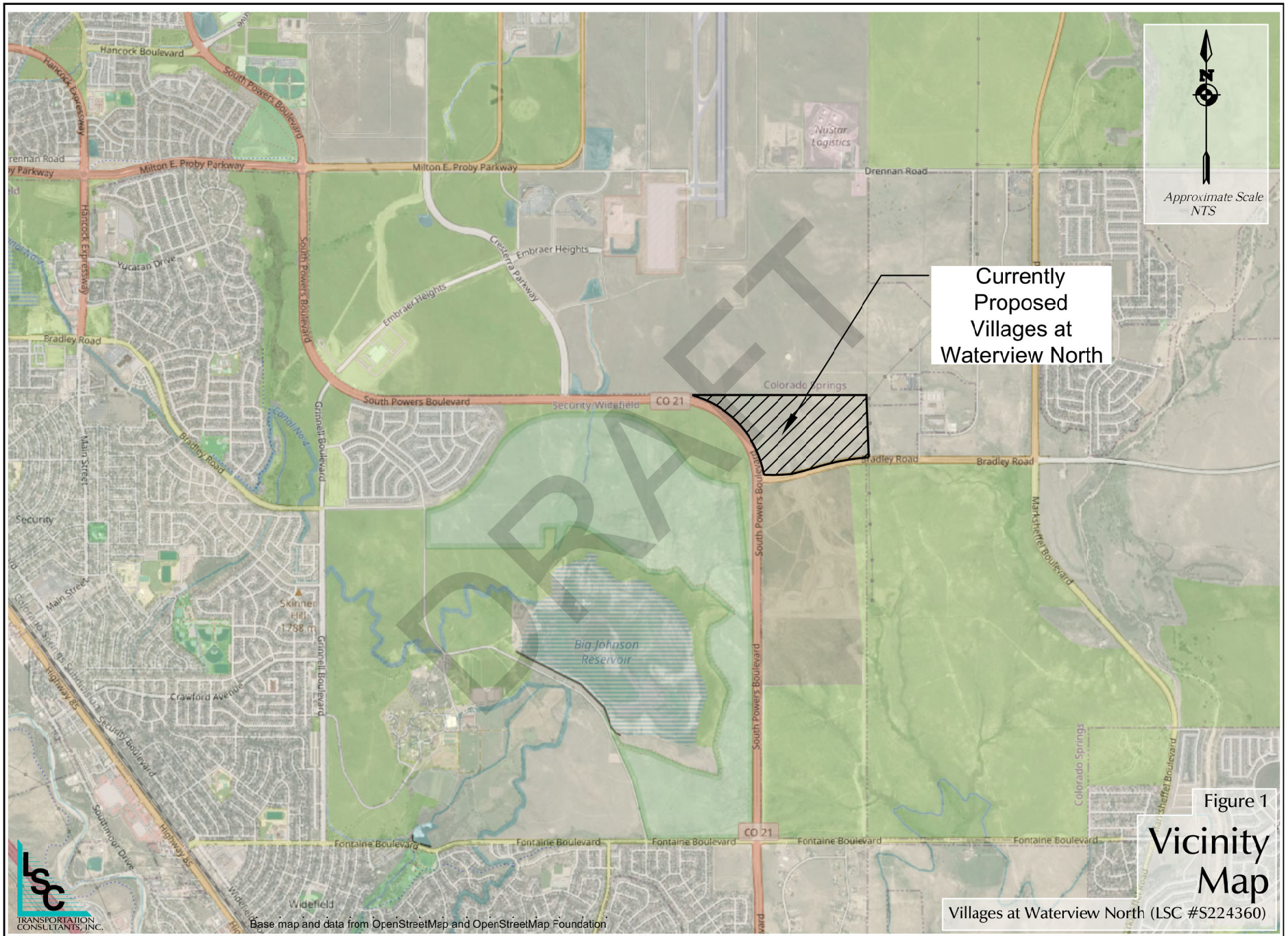
- (1) Hourly variation based on traffic counts on Powers Boulevard south of Bradley Road
- (2) The major street volumes include all (left/through/right) movements on Bradley Rd
- (3) The minor street volumes includes only the southbound left movement on Legacy Hills Drive
- (4) DU = Dwelling Unit

Source: LSC Transportation Consultants, Inc.

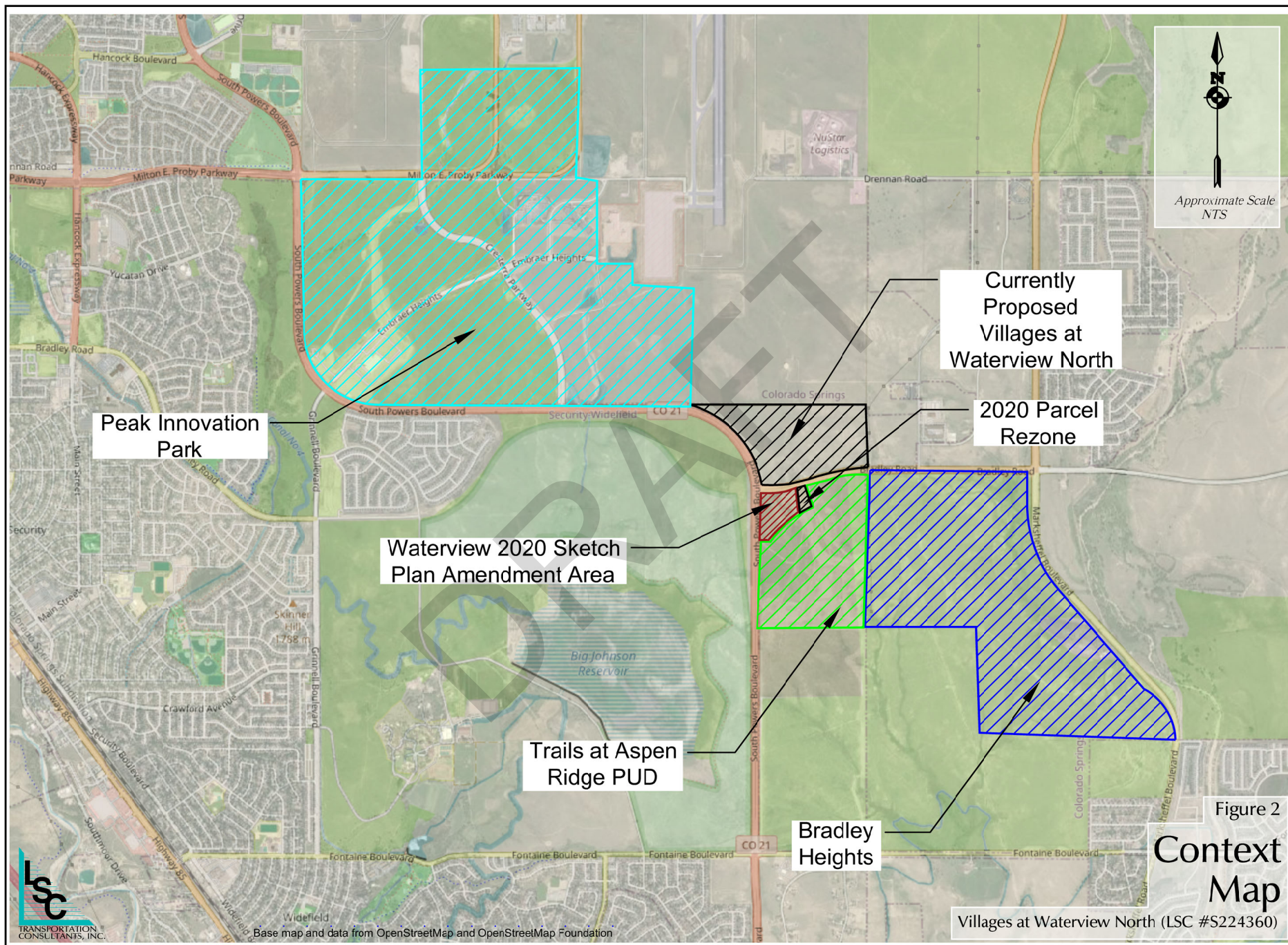
Oct-22

| Table 4<br>Improvements Table<br>Villages at Waterview North   |   |  |  |   |
|--|---|--|--|---|
| Improvement  | Timing /"Trigger Point(s)"  | Required Length  | Proposed Length  | Responsibility <sup>(1)</sup>   |
| Access Points to Bradley Road (Future Public Street Intersections)   |   |  |  |   |
| Full-movement access to the north side of Bradley Road 1,030 feet east of Powers Boulevard (aligning with Legacy Hill Drive on the south side)   | With this development   | ---  | ---  | Applicant   |
| Three-quarter movement access 1,317 feet east of Legacy Hill Drive (Blackmer Street)   | With this development   | ---  | ---  | Applicant   |
| Traffic Signals  |   |  |  |   |
| Traffic Signal Installation - Installation of the traffic signal at Legacy Hill Drive/Bradley Road.  | As determined by the City of Colorado Springs - typically this is when traffic signal warrants are met, however traffic signal warrants are guidelines and the actual timing of installation is at the discretion of the City. An Eight-Hour Vehicular Volume Traffic Signal Warrant is projected to be met once any of the following levels of development are reached:<br>31% of the Trails at Aspen Ridge (242 DU)s<br>23% of the commercial portion of Springs at Waterview East<br>57% of the non-residential portion of the Villages at Waterview North<br>100% of the residential portion of the Villages at Waterview North<br>A warrant may be met sooner if the residential and non-residential portions of either Villages at Waterview North or the Trails at Aspen Ridge and Springs at Waterview East are developed concurrently. These trigger points/timing estimates and the need for the signal are subject to change and would be evaluated with each final plat application. City approval is required for signal installation. | ---  | ---  | This intersection is considered an eligible improvement under the El Paso County Road Impact Fee Program (Please refer to the attached draft minutes of the County Fee Program Advisory Committee dated April 23, 2020 regarding this intersection.)<br>However, City annexation agreements may now govern this development's required participation toward this improvement. |
| Auxiliary Turn Lanes   |   |  |  |   |
| Powers/Bradley   |   |  |  |   |
| Reconstruct the Powers Boulevard median north of Bradley Road to provide dual southbound left-turn lanes. The existing mast arm will need to be lengthened for the second left turn.   | With this development if not completed by other development(s) as part of the CDOT access permit process.   | ---  | ---  | Applicant and other area developments; also, this could potentially be considered a "regional improvement (potentially eligible for credit within the fee program) ." To be evaluated with each final plat if not completed sooner by another development   |
| Northbound right-turn deceleration and acceleration lane improvements as noted in a memo from CDOT dated July 2, 2021 regarding Trails at Aspen Ridge - Access Submittal Planning Comments <sup>(1)</sup>                              | With this development if not completed by other development(s) as part of the CDOT access permit process.   | ---  | ---  | Applicant and other area developments; also, this could potentially be considered a "regional improvement (potentially eligible for credit within the fee program) ." To be evaluated with each final plat if not completed sooner by another development   |
| The CDOT comment letter dated July 2, 2021 regarding the Trails at Aspen Ridge indicates the following requirement: Easrow funds for a portion of the future SH21A(Powers Blvd.) / Bradley Rd. interchange                             | As part of the CDOT access permit process   | ---  | ---  | This has been identified by CDOT as a requirement for all area developments (presumably) which will impact Powers/Bradley.  |
| Bradley/Legacy Hill  |   |  |  |   |
| Eastbound dual left-turn lane on Bradley Road approaching Legacy Hill Drive (the dual left would be striped as a single left-turn lane until the intersection is signalized AND dual left-turn operation is operationally necessary)   | westbound left-turn volume of 25 vehicles per hour  | 435' plus 200' taper   | 250' lane plus 540' lane plus 200' taper                   | Applicant   |
| Westbound right-turn deceleration lane on Bradley Road approaching Legacy Hills Drive  | eastbound right-turn volume of 50 vehicles per hour.  | 235' plus 200' taper   | 235' plus 200' taper                                       | Applicant   |
| Southbound dual left-turn lanes on Legacy Hill Drive approaching Bradley Road (the dual left would be striped as a single left-turn lane until the intersection is signalized AND dual left-turn operation is operationally necessary) | southbound left-turn volume of 25 vehicles per hour   | 295' plus 160' taper   | 250' plus 175' taper                                       | Applicant   |
| Southbound right-turn deceleration lane on Legacy Hill Drive approaching Bradley Road  | southbound right-turn volume of 50 vehicles per hour  | 155' plus 160' taper   | 155' plus 160' taper                                       | Applicant   |
| Commercial Access/Legacy Hill  |   |  |  |   |
| Northbound left-turn lane on Legacy Hill Drive approaching the future south full-movement access for the commercial parcel west of Legacy Hill Drive   | northbound left-turn volume of 25 vehicles per hour   | 455' plus 160' taper   | 200' plus 75' taper  | Applicant   |
| E-W Collector/Legacy Hill  |   |  |  |   |
| Southbound left-turn lane on Legacy Hill Drive approaching the E-W Collector   | southbound left-turn volume of 25 vehicles per hour   | Not required however, the Non Residential Collector cross section includes a center, painted left turn median. | 100' plus 60' reverse curve taper                          | Applicant   |
| Northbound left-turn lane on Legacy Hill Drive approaching the E-W Collector   | northbound-turn volume of 25 vehicles per hour  | 230' plus 160' taper   | 230' plus 160' taper                                       | Applicant   |
| Northbound right-turn lane on Legacy Hill Drive approaching the E-W Collector  | northbound-turn volume of 50 vehicles per hour  | 155' plus 160' taper   | continuous lane between Bradley Road and the E-W Collector | Applicant   |
| Bradley/Blackmer   |   |  |  |   |
| Westbound right-turn deceleration lane on Bradley Road approaching Blackmer Street   | eastbound right-turn volume of 50 vehicles per hour.  | 235' plus 200' taper   | 235' plus 200' taper                                       | Applicant   |
| Eastbound left-turn lane on Bradley Road approaching Blackmer Street   | eastbound left-turn volume of 10 vehicles per hour.   | 300' plus 200' taper   | 235' plus 200' taper                                       | Applicant   |
| Bradley/Marksheffel  |   |  |  |   |
| Potential (if required) fair-share contribution or reconstruction to provide dual eastbound left-turn lanes on Bradley Road approaching Marksheffel Road   | The timing of this improvement could be evaluated with each final plat.   | ---  | ---  | Applicant and potentially other area developments; also, this could potentially be considered a "regional improvement (potentially eligible for credit within the fee program) ."   |
| Notes:<br>(1) A copy of this memorandum has been attached<br>Source: LSC Transportation Consultants, Inc.  |   |  |  |   |
|  |   |  |  | Oct-23  |

DRAFT







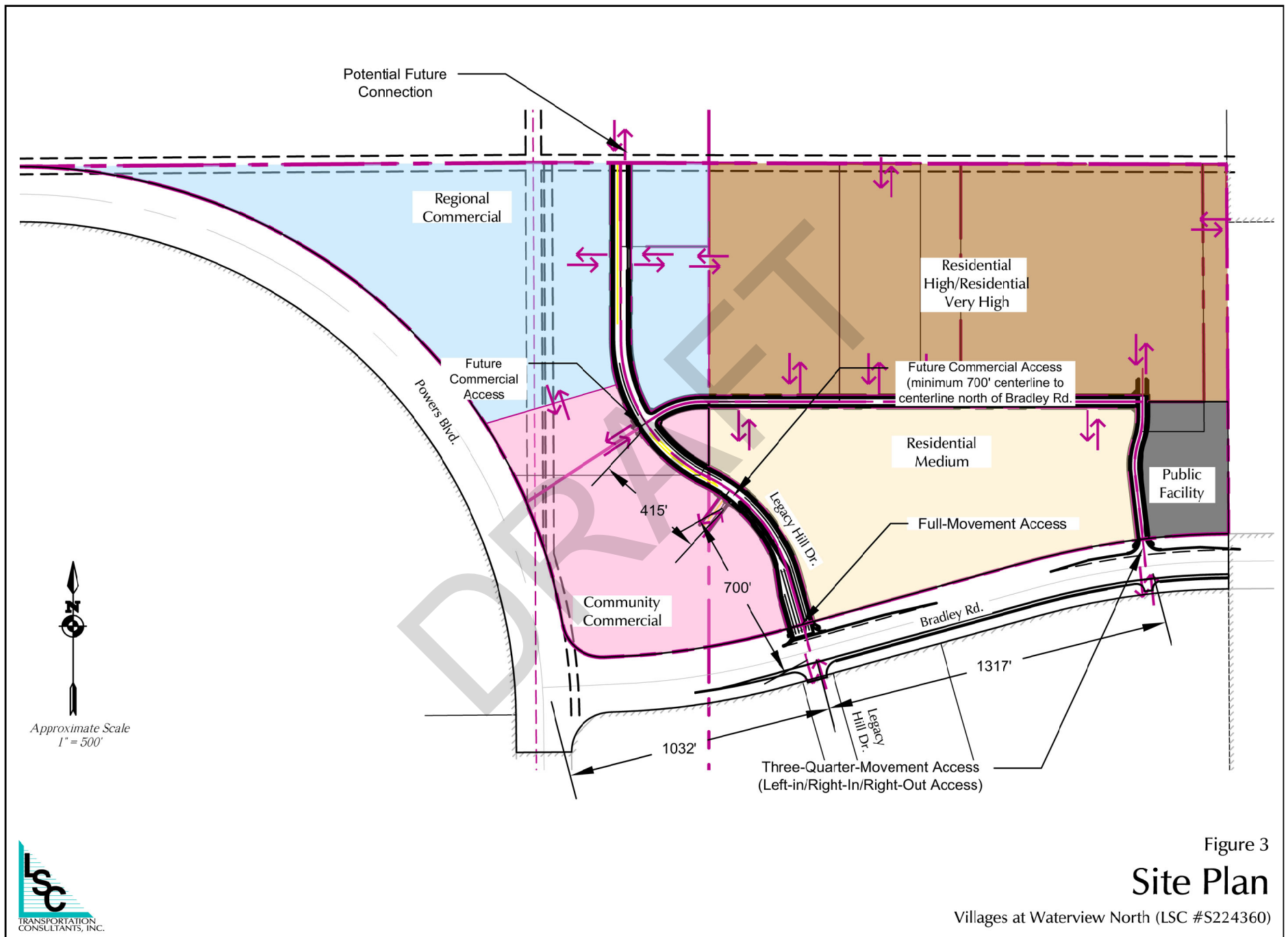
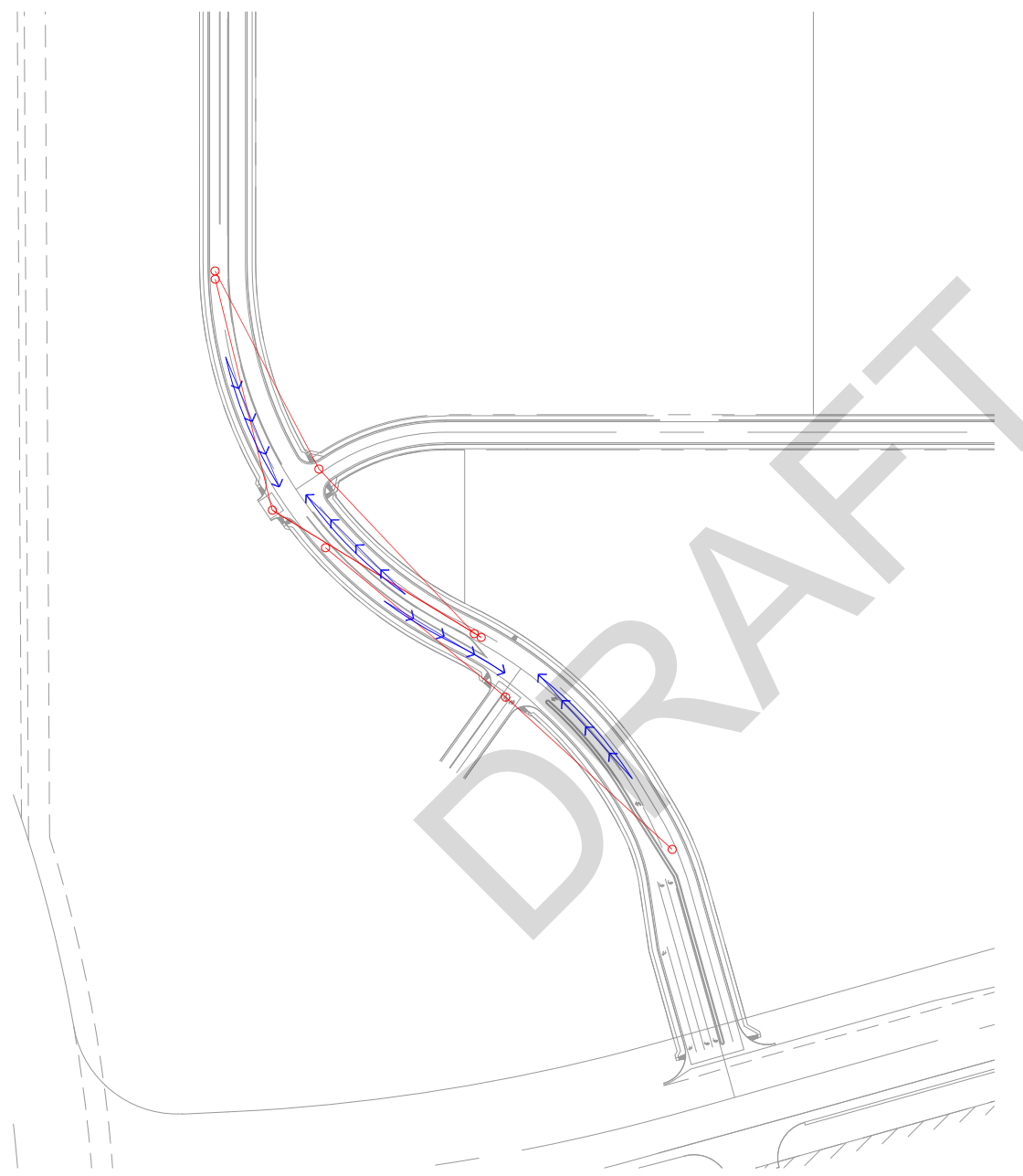
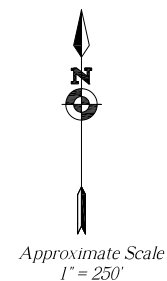


Figure 3  
**Site Plan**

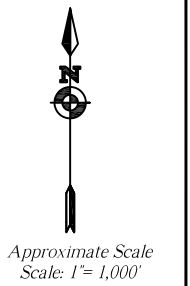
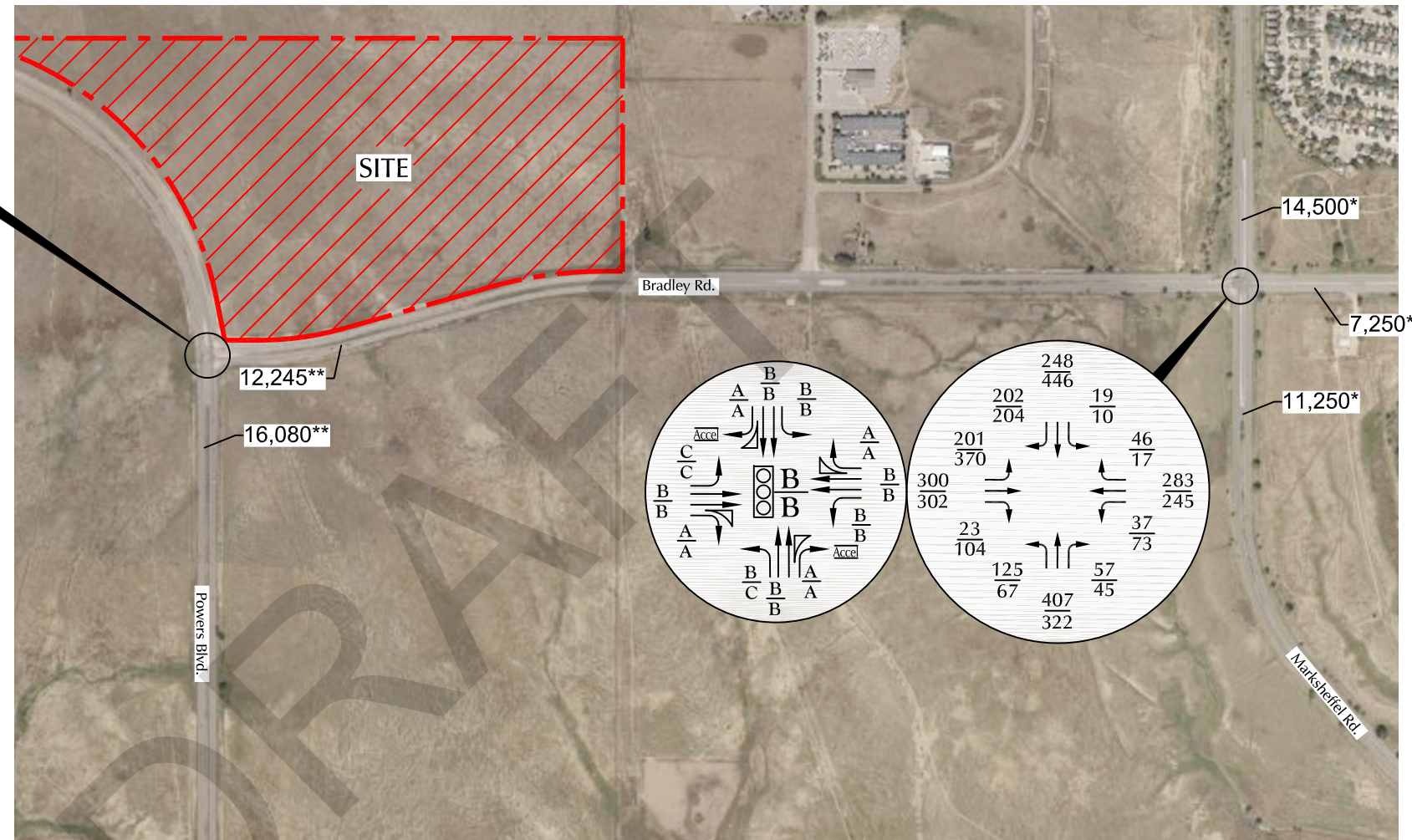
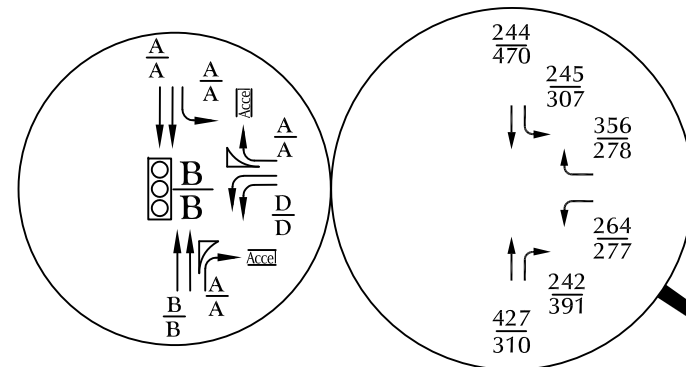
Villages at Waterview North (LSC #S224360)





- City of Colorado Springs Required intersection sight distance (335' from the *Colorado Springs Engineering Criteria Manual* Traffic Engineering Design Standards for Collectors)
- City of Colorado Springs required stopping sight distance (200' from the *Colorado Springs Engineering Criteria Manual* Traffic Engineering Design Standards for Collectors)

Figure 4  
**Sight  
Distance Analysis**  
Villages at Waterview North (LSC #S224360)



LEGEND:

 = Traffic Signal

$\frac{XX}{XX}$  =  $\frac{\text{AM Weekday Peak-Hour Traffic (vehicles per hour)}}{\text{PM Weekday Peak-Hour Traffic (vehicles per hour)}}$  Counts by LSC March 2021

$\frac{A}{B}$  =  $\frac{\text{AM Individual Movement Peak-Hour Level of Service}}{\text{PM Individual Movement Peak-Hour Level of Service}}$

$\frac{C}{C}$  =  $\frac{\text{AM Entire Intersection Peak-Hour Level of Service}}{\text{PM Entire Intersection Peak-Hour Level of Service}}$

X,XXX= Average Daily Traffic (vehicles per day)

\* Estimate by LSC

\*\* 2021 AADT CDOT

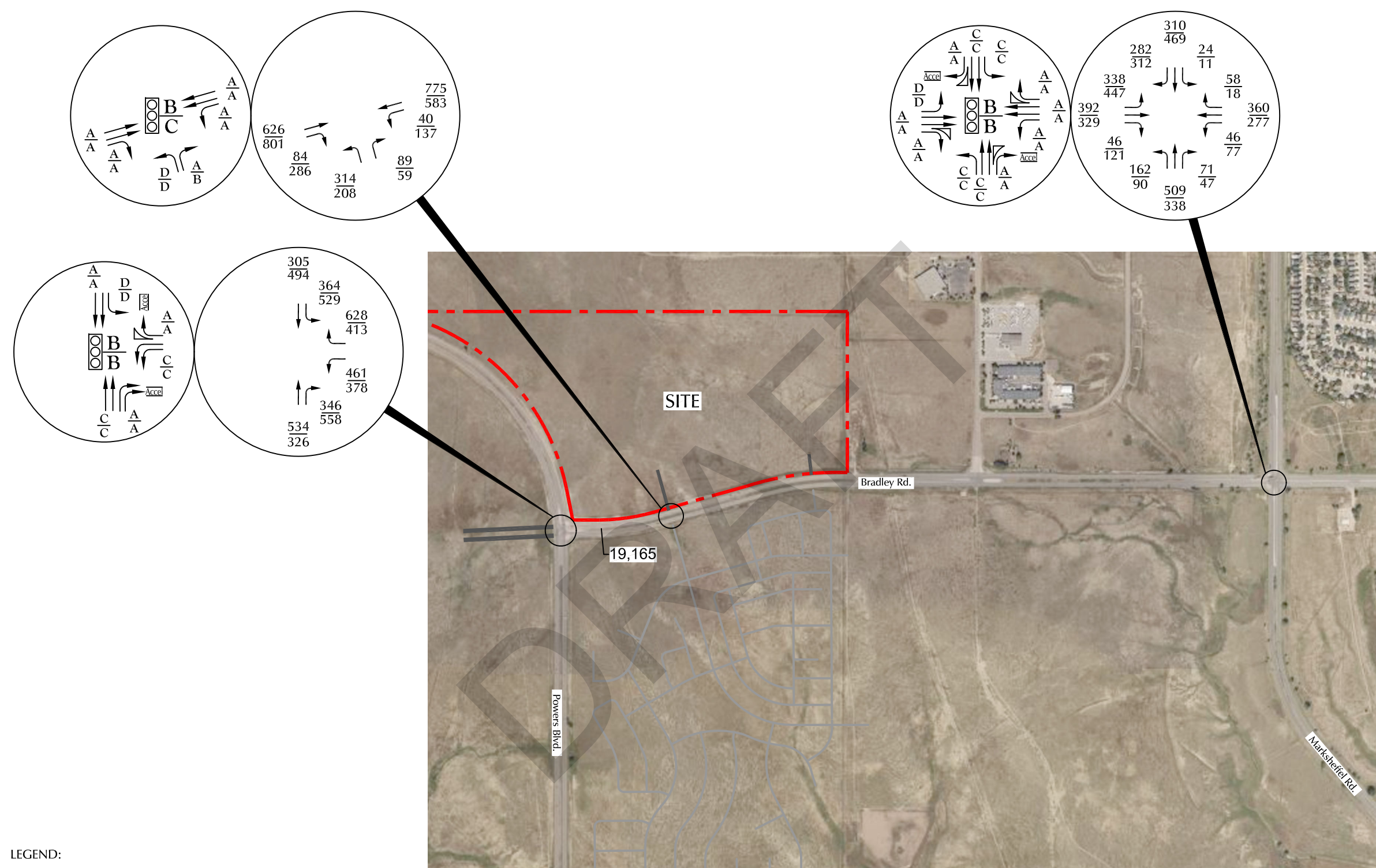


Figure 5

## Existing Traffic, Lane Geometry, Traffic Control and Level of Service

Villages at Waterview North (LSC #S224360)





Approximate Scale  
Scale: 1" = 1,000'

LEGEND:

⊥ = Stop Sign

⓪ = Traffic Signal

$\frac{XX}{XX}$  = AM Weekday Peak-Hour Traffic (vehicles per hour)  
PM Weekday Peak-Hour Traffic (vehicles per hour)

$\frac{A}{B}$  = AM Individual Movement Peak-Hour Level of Service  
PM Individual Movement Peak-Hour Level of Service

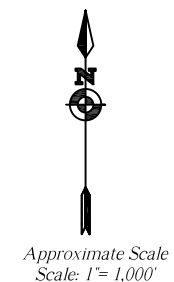
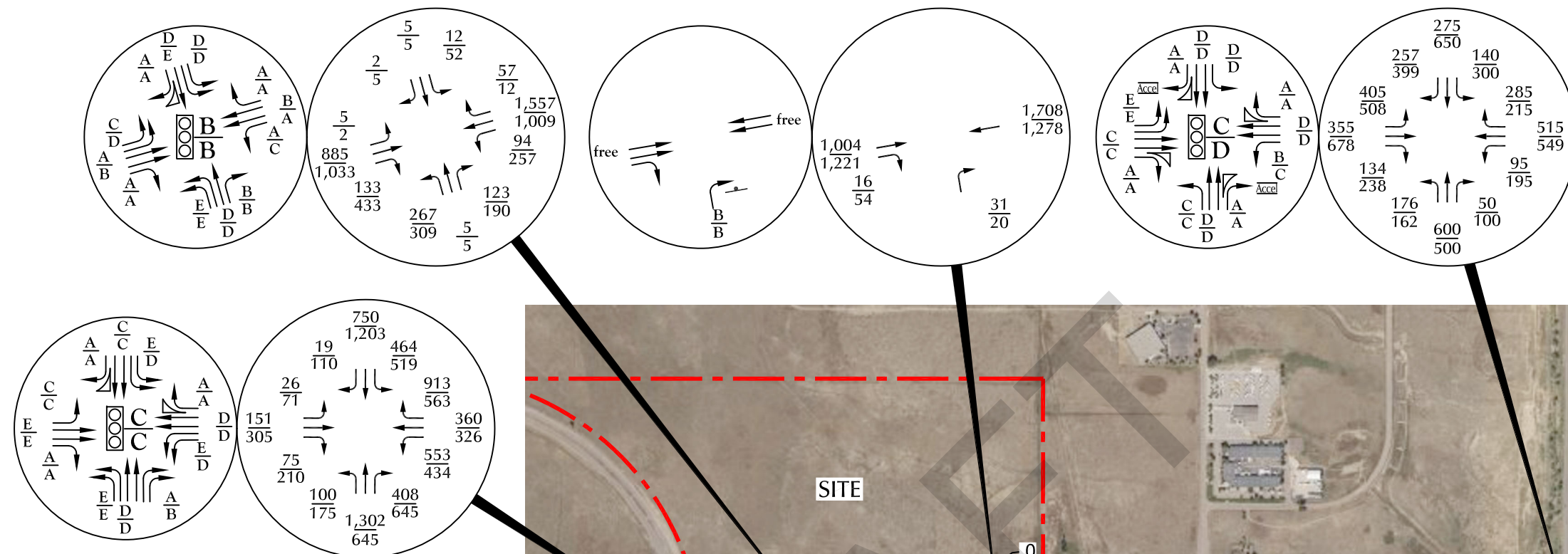
$\frac{C}{C}$  = AM Entire Intersection Peak-Hour Level of Service  
PM Entire Intersection Peak-Hour Level of Service

X,XXX = Average Daily Traffic (vehicles per day)



Figure 6  
**Short-Term Background Traffic, Lane Geometry, Traffic Control and Level of Service**  
Villages at Waterview North (LSC #S224360)





LEGEND:

⊥ = Stop Sign

⊞ = Traffic Signal

$\frac{XX}{XX}$  = AM Weekday Peak-Hour Traffic (vehicles per hour)

$\frac{XX}{XX}$  = PM Weekday Peak-Hour Traffic (vehicles per hour)

$\frac{A}{B}$  = AM Individual Movement Peak-Hour Level of Service

$\frac{A}{B}$  = PM Individual Movement Peak-Hour Level of Service

$\frac{C}{C}$  = AM Entire Intersection Peak-Hour Level of Service

$\frac{C}{C}$  = PM Entire Intersection Peak-Hour Level of Service

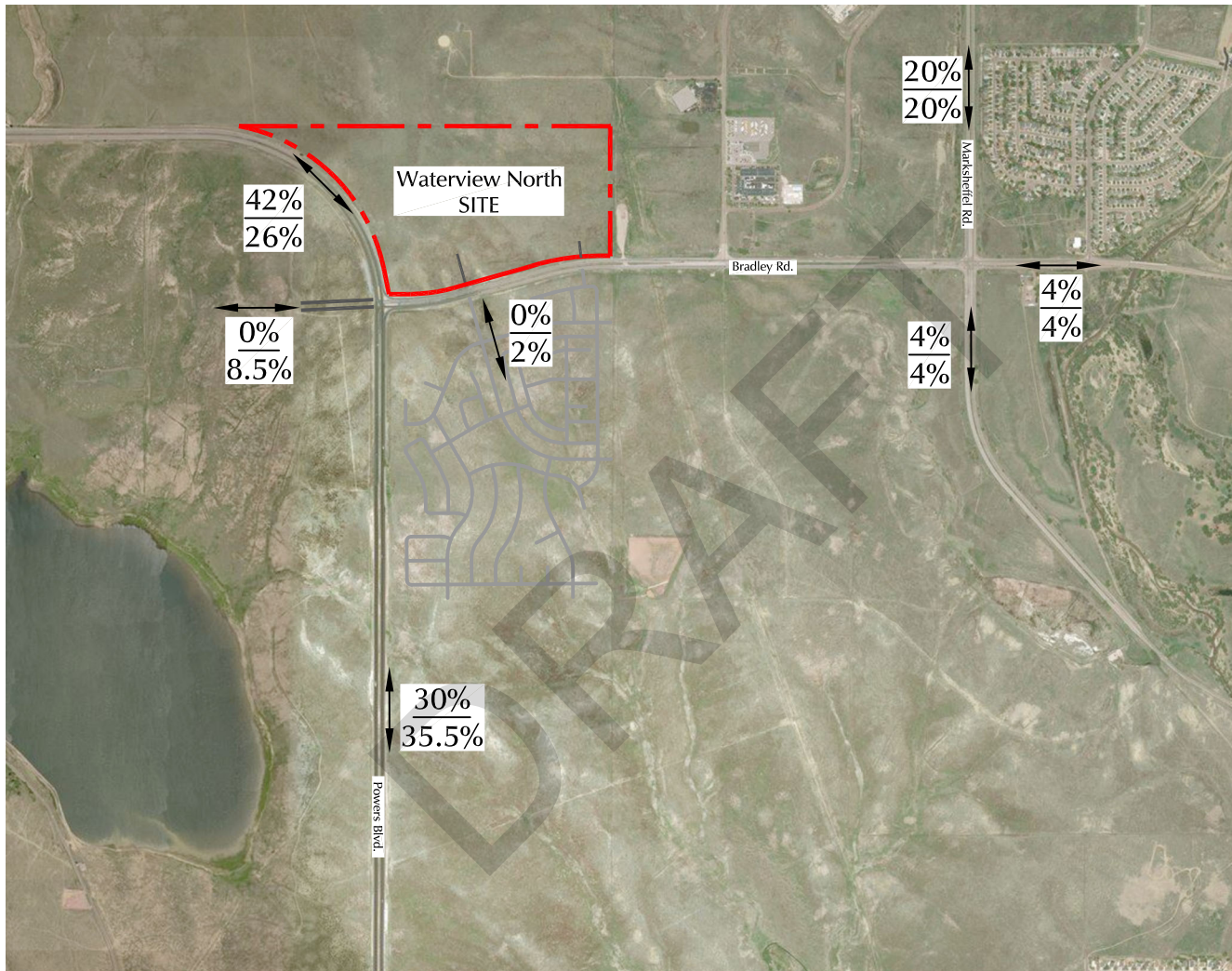
X,XXX= Average Daily Traffic (vehicles per day)



Figure 7

# Year 2040 Background Traffic, Lane Geometry, Traffic Control and Level of Service

Villages at Waterview North (LSC #S224360)



Approximate Scale  
Scale: 1" = 2,000'

Figure 8

## Directional Distribution of Residential Site Generated Traffic

Villages at Waterview North (LSC #S224360)

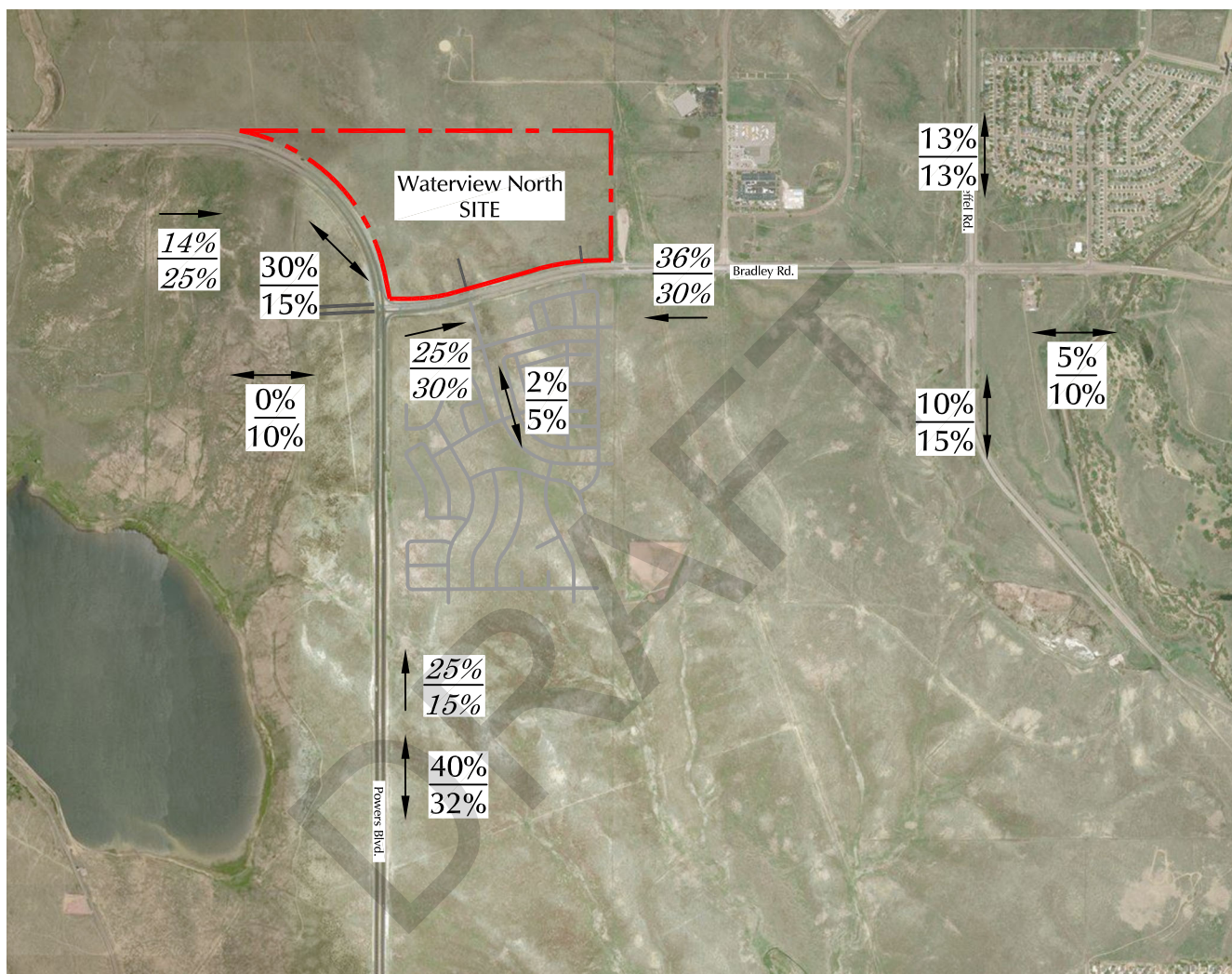


LEGEND:

$\frac{XX\%}{XX\%}$

= Short-Term Percent Directional Distribution  
Long-Term Percent Directional Distribution





LEGEND:

$\frac{XX\%}{XX\%}$  = Short-Term Percent Directional Distribution  
 Long-Term Percent Directional Distribution

$\frac{XX\%}{XX\%}$  = Passby Percent Directional Distribution AM  
 Passby Percent Directional Distribution PM

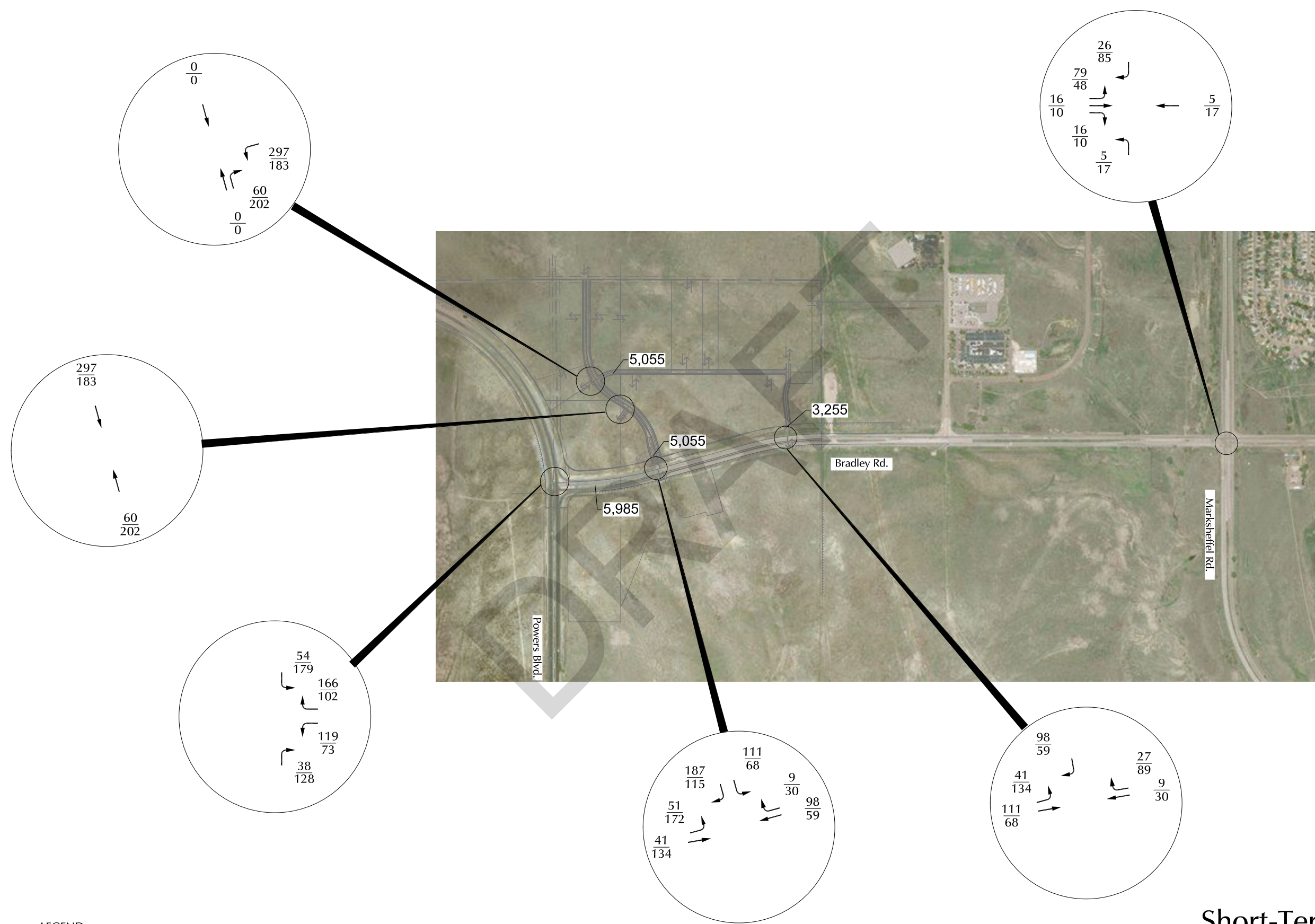
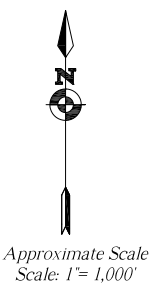


Figure 9

# Directional Distribution of Non-Residential Site Generated Traffic

Villages at Waterview North (LSC #S224360)

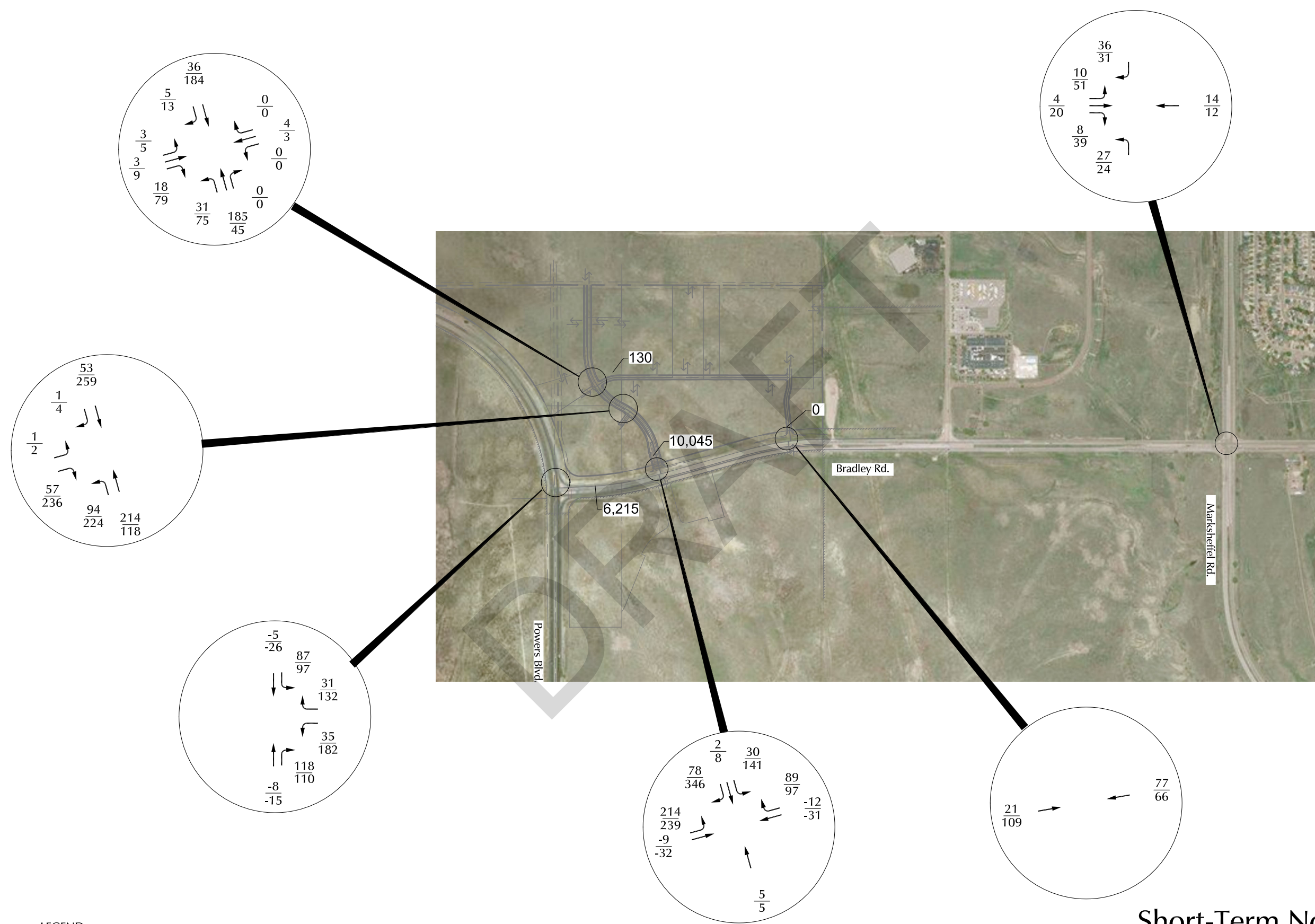
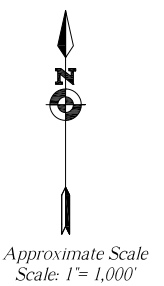




LEGEND:  
 $\frac{XX}{XX}$  = AM Weekday Peak-Hour Traffic (vehicles per hour)  
PM Weekday Peak-Hour Traffic (vehicles per hour)  
X,XXX= Average Daily Traffic (vehicles per day)



Figure 10  
**Short-Term Residential  
Site- Generated Traffic**  
Villages at Waterview North (LSC #S224360)



LEGEND:

$\frac{XX}{XX}$  = AM Weekday Peak-Hour Traffic (vehicles per hour)  
 PM Weekday Peak-Hour Traffic (vehicles per hour)

X,XXX= Average Daily Traffic (vehicles per day)

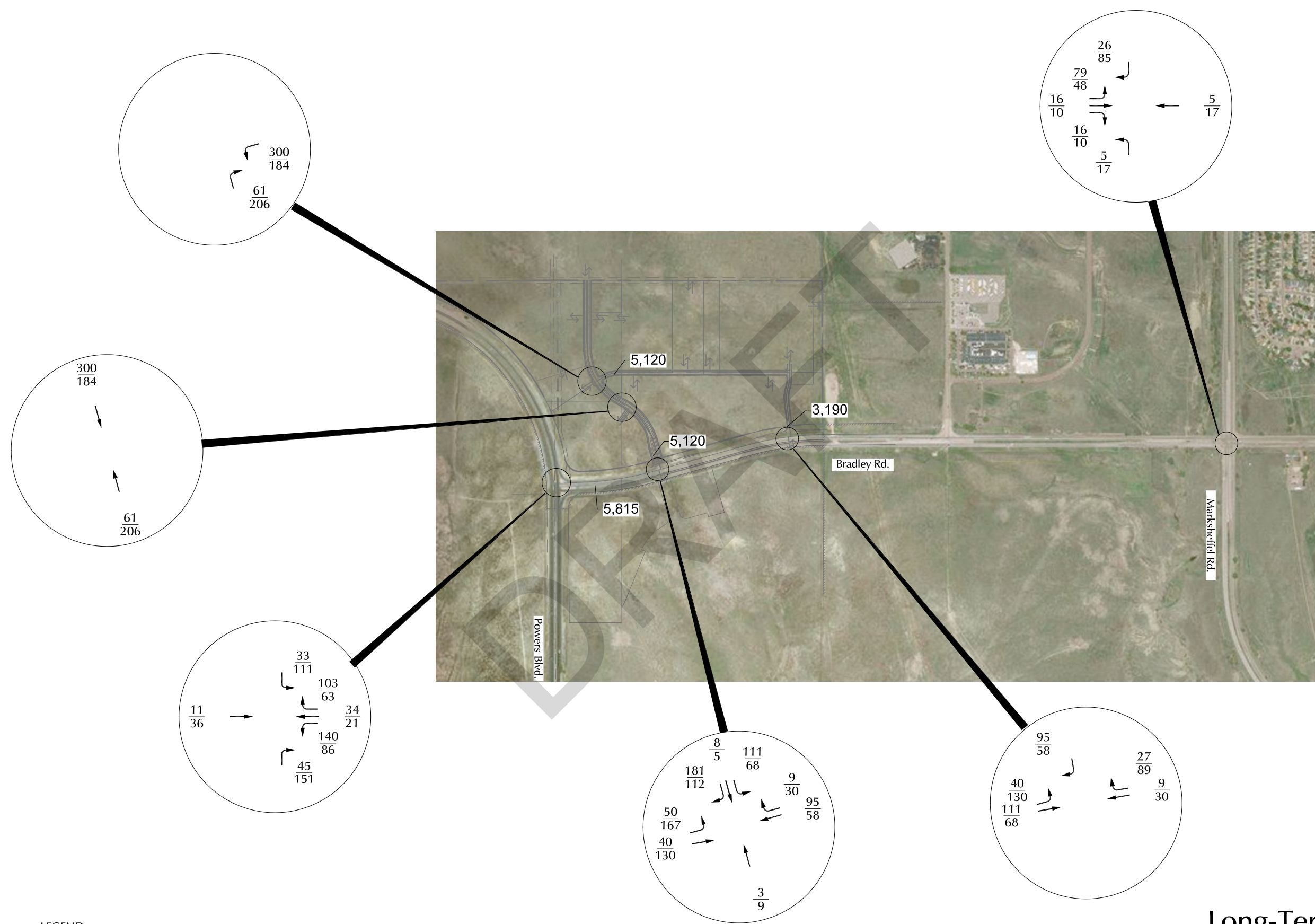
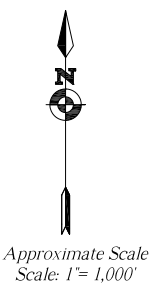


Figure 11

## Short-Term Non-Residential Site- Generated Traffic

Villages at Waterview North (LSC #S224360)





LEGEND:

$\frac{XX}{XX}$  = AM Weekday Peak-Hour Traffic (vehicles per hour)  
 PM Weekday Peak-Hour Traffic (vehicles per hour)

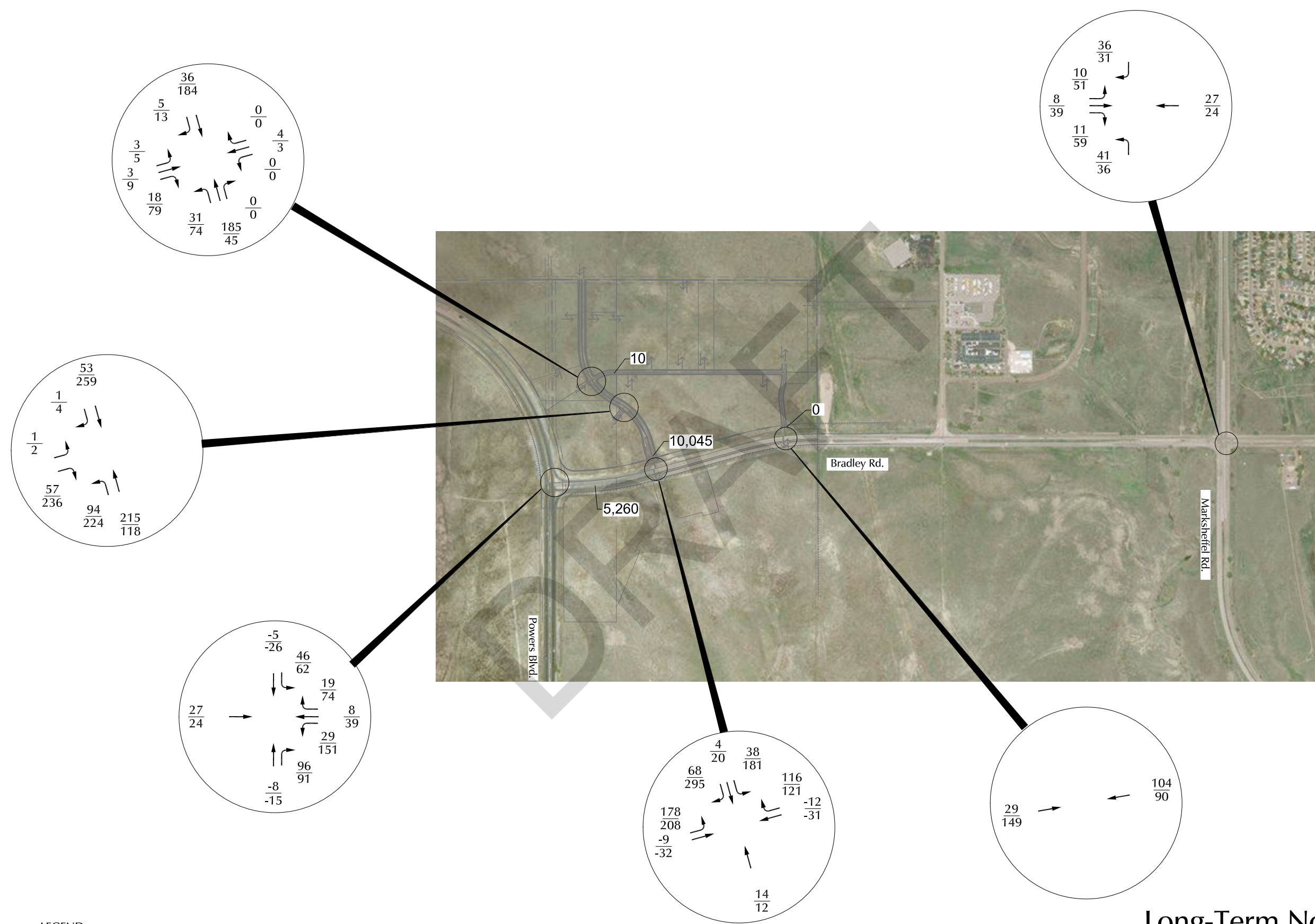
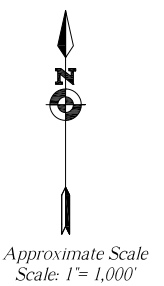
X,XXX= Average Daily Traffic (vehicles per day)



Figure 12

## Long-Term Residential Site- Generated Traffic

Villages at Waterview North (LSC #S224360)



LEGEND:

$\frac{XX}{XX}$  = AM Weekday Peak-Hour Traffic (vehicles per hour)  
 $\frac{XX}{XX}$  = PM Weekday Peak-Hour Traffic (vehicles per hour)  
 X,XXX= Average Daily Traffic (vehicles per day)



Figure 13  
**Long-Term Non-Residential  
 Site- Generated Traffic**  
 Villages at Waterview North (LSC #S224360)



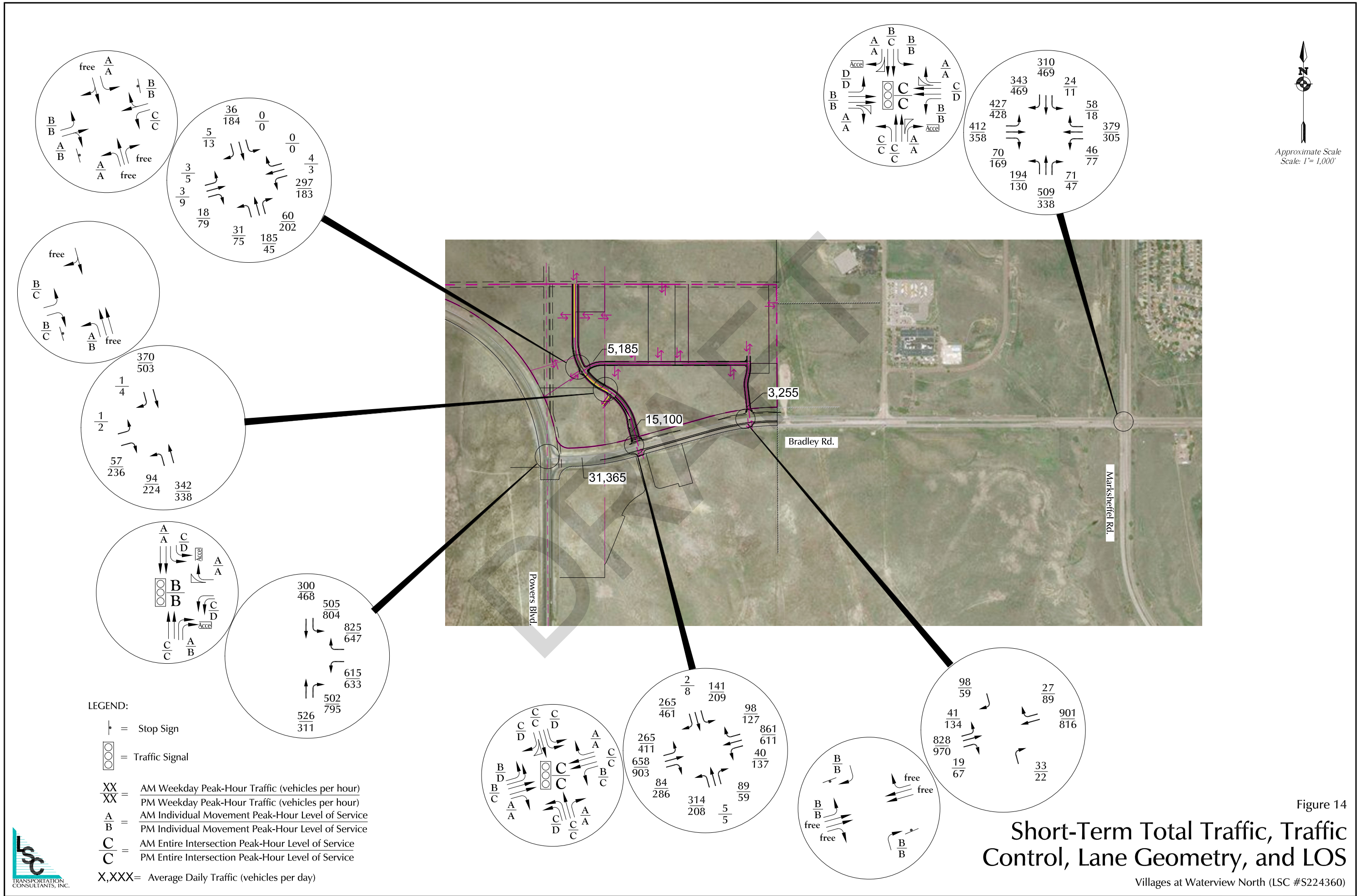


Figure 14

# Short-Term Total Traffic, Traffic Control, Lane Geometry, and LOS

Villages at Waterview North (LSC #S224360)



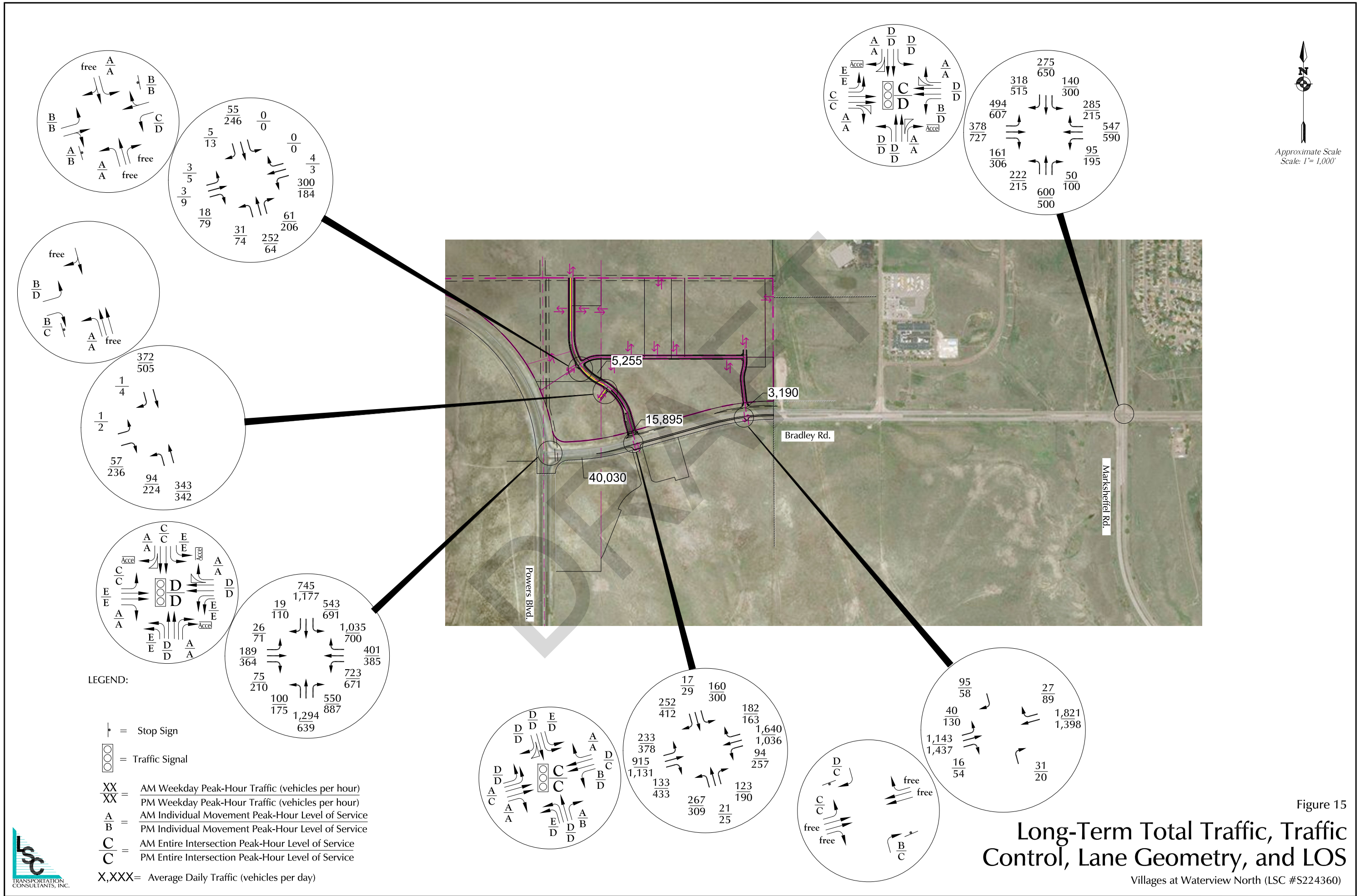
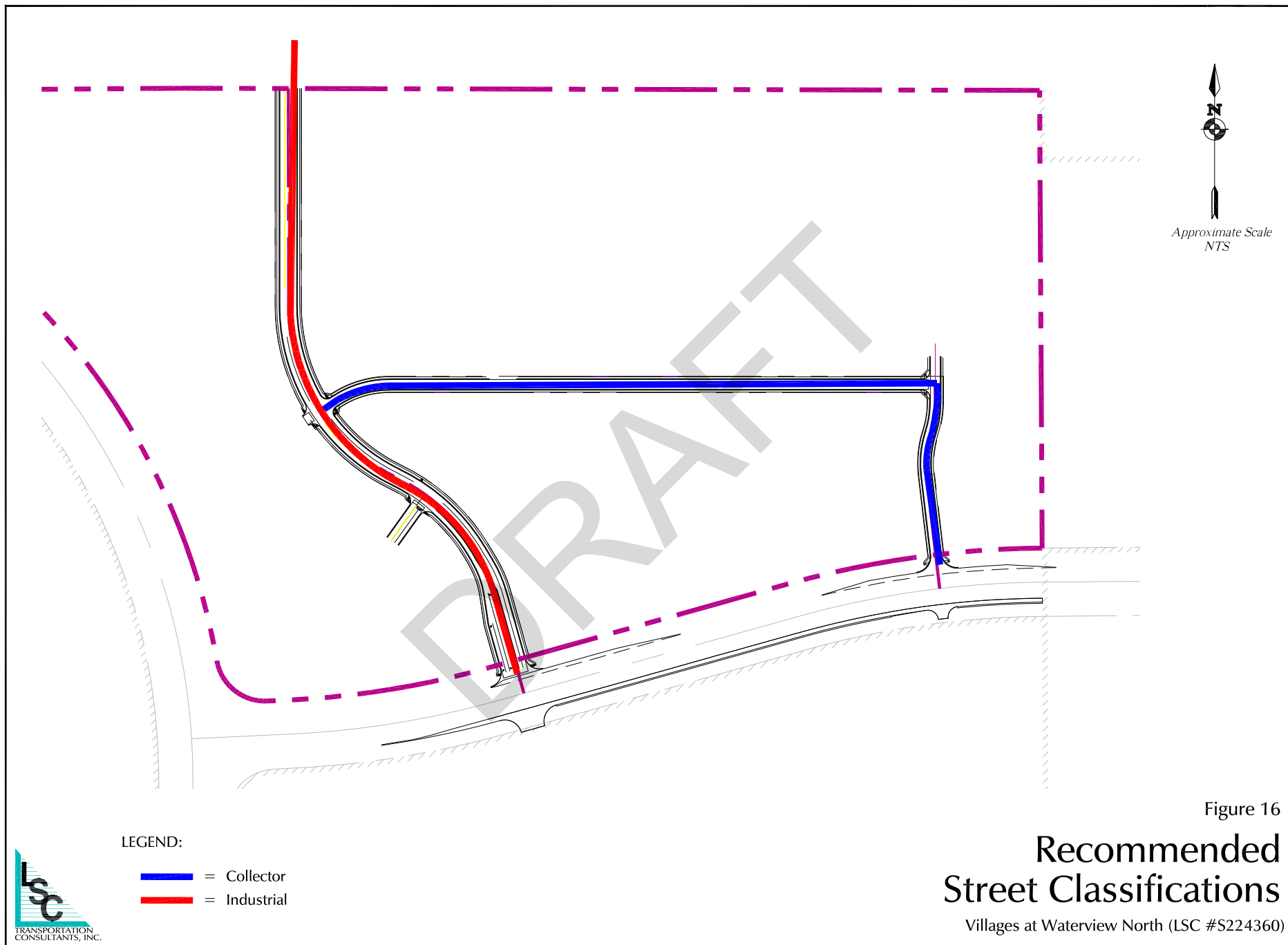


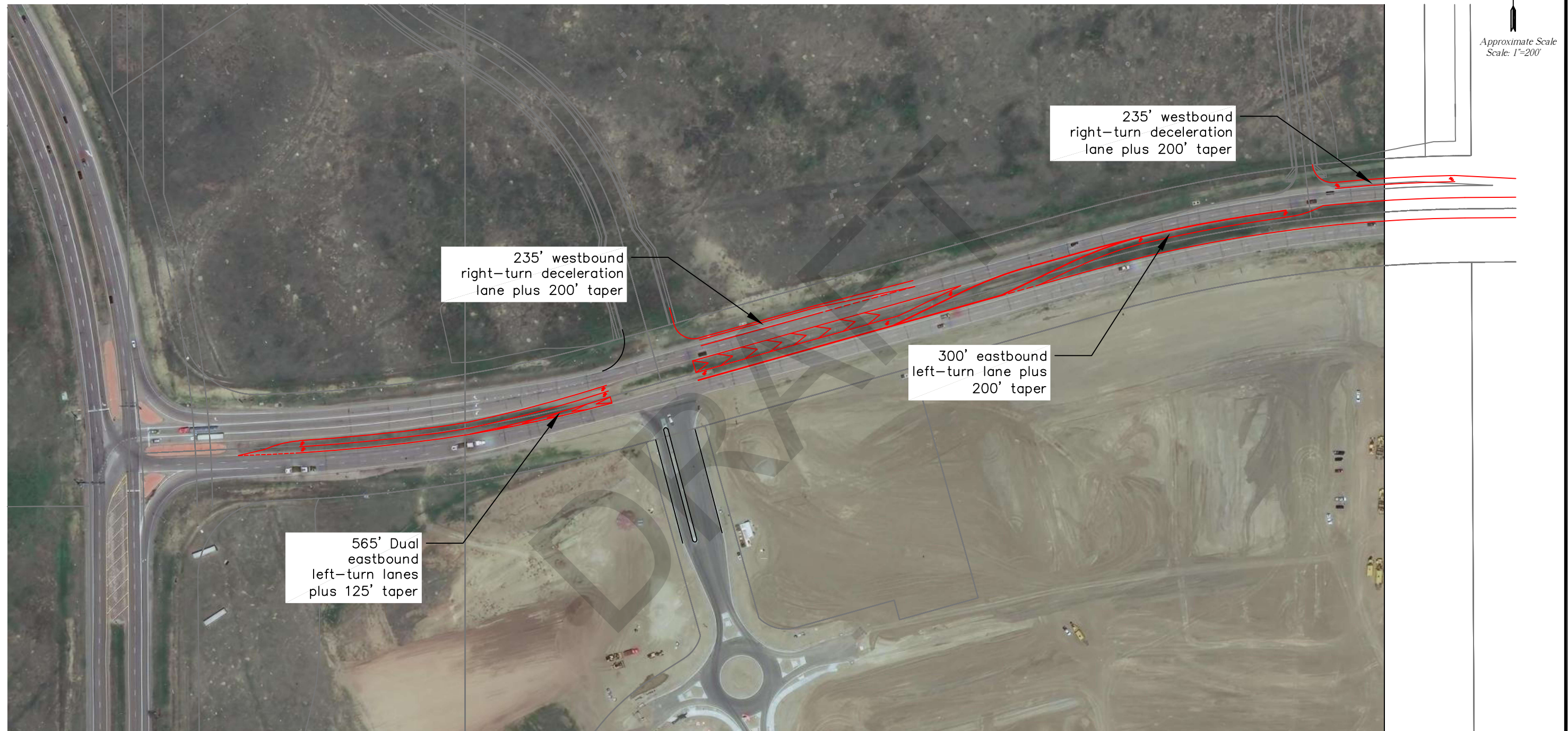
Figure 15

# Long-Term Total Traffic, Traffic Control, Lane Geometry, and LOS

Villages at Waterview North (LSC #S224360)

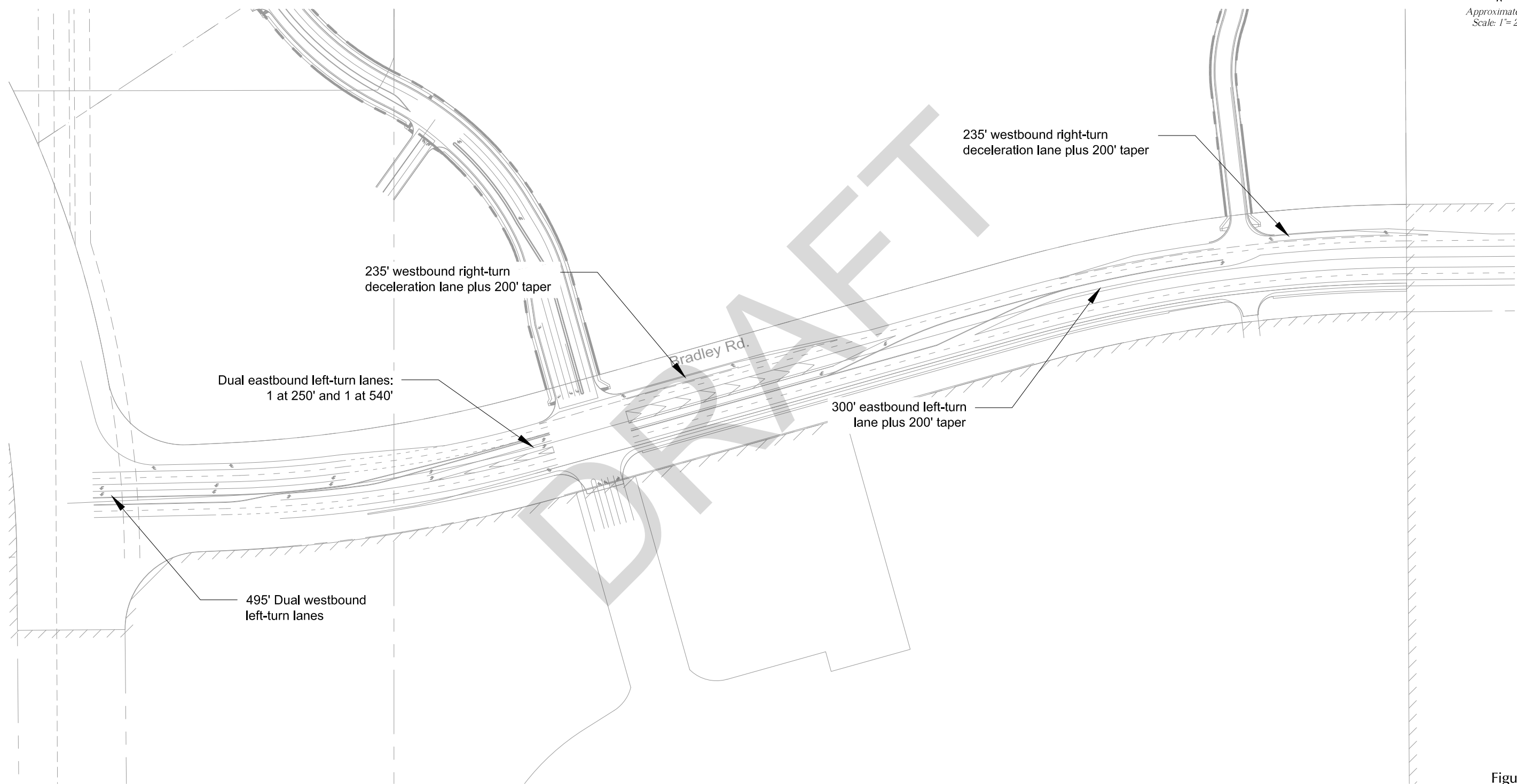






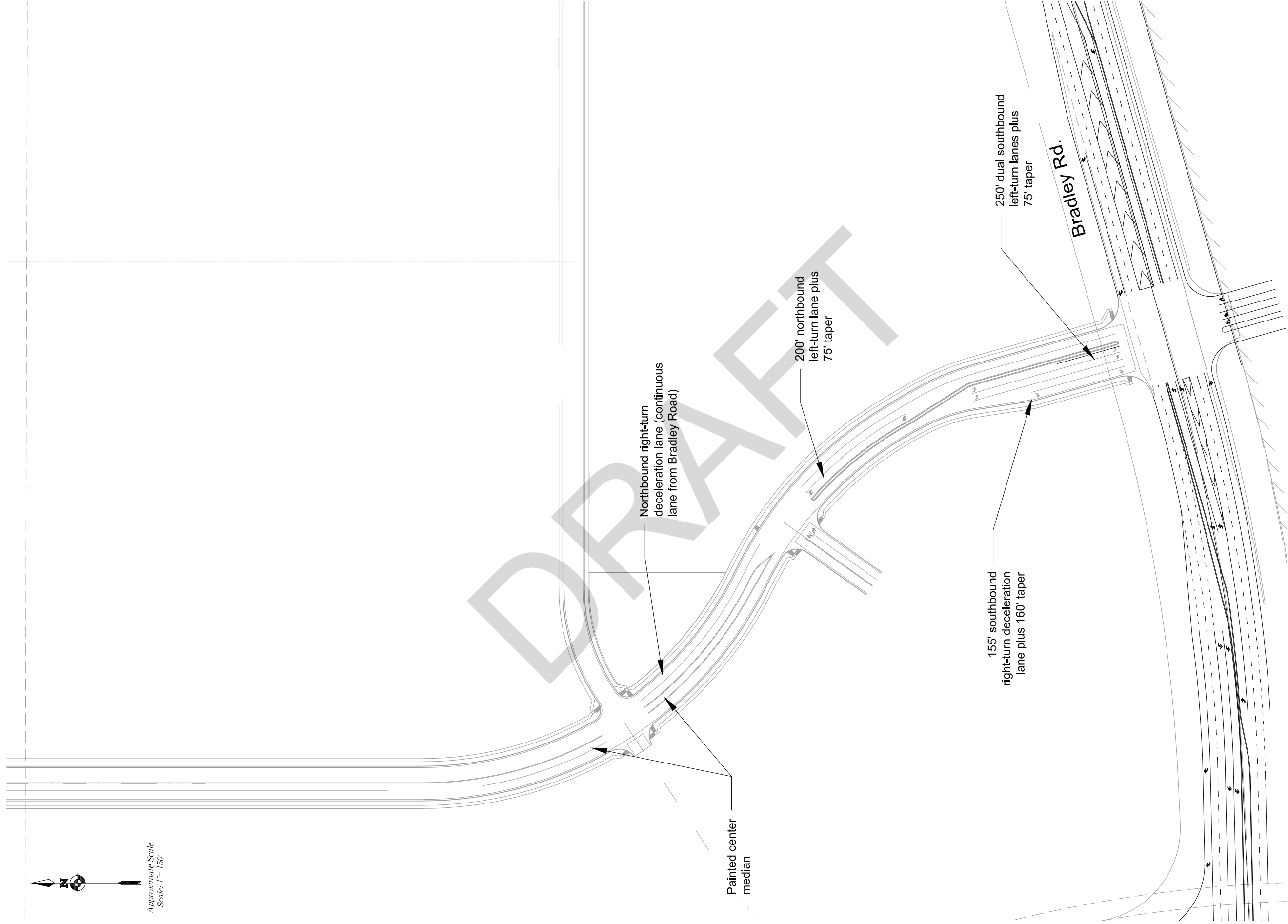
\*Note: Conceptual only - not for design





\*Note: Conceptual only - not for design

Figure 18  
**Long Term Recommended Bradley  
 Road Lane Geometry\***  
 Villages at Waterview North (LSC #S224360)



\*Note: Conceptual only - not for design

Figure 19  
Recommended Legacy  
Hill Lane Geometry\*

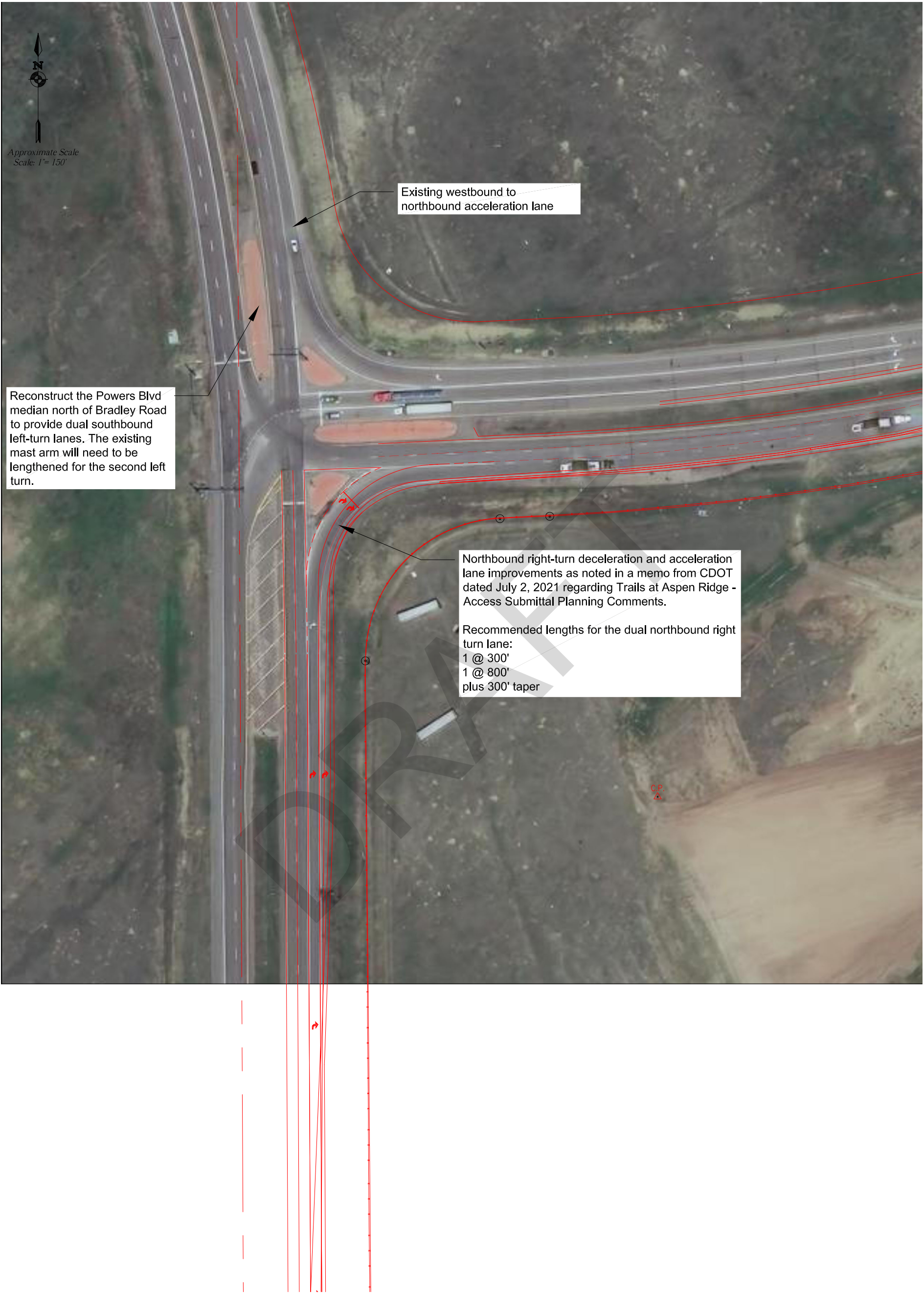


Figure 20  
CDOT/Powers Boulevard Improvements

Villages at Waterview North (LSC #S224360)

# Traffic Counts

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DRAFT

# LSC Transportation Consultants, Inc.

545 E Pikes Peak Ave, Suite 210  
Colorado Springs, CO 80905  
719-633-2868

File Name : Powers Blvd - Bradley Rd AM  
Site Code : S214180  
Start Date : 3/16/2021  
Page No : 1

## Groups Printed- Unshifted

| Start Time  | Powers Blvd Southbound |      |   |     |            | Bradley Rd Westbound |   |      |     |            | Powers Blvd Northbound |      |      |     |            | Eastbound |   |   |   |            | Int. Total |
|-------------|------------------------|------|---|-----|------------|----------------------|---|------|-----|------------|------------------------|------|------|-----|------------|-----------|---|---|---|------------|------------|
|             | L                      | T    | R | U   | App. Total | L                    | T | R    | U   | App. Total | L                      | T    | R    | U   | App. Total | L         | T | R | U | App. Total |            |
| 07:00 AM    | 65                     | 72   | 0 | 0   | 137        | 62                   | 0 | 89   | 0   | 151        | 0                      | 117  | 67   | 0   | 184        | 0         | 0 | 0 | 0 | 0          | 472        |
| 07:15 AM    | 60                     | 45   | 0 | 1   | 106        | 71                   | 0 | 99   | 0   | 170        | 0                      | 115  | 58   | 0   | 173        | 0         | 0 | 0 | 0 | 0          | 449        |
| 07:30 AM    | 64                     | 60   | 0 | 0   | 124        | 64                   | 0 | 89   | 1   | 154        | 0                      | 101  | 70   | 0   | 171        | 0         | 0 | 0 | 0 | 0          | 449        |
| 07:45 AM    | 56                     | 67   | 0 | 0   | 123        | 67                   | 0 | 79   | 0   | 146        | 0                      | 94   | 47   | 0   | 141        | 0         | 0 | 0 | 0 | 0          | 410        |
| Total       | 245                    | 244  | 0 | 1   | 490        | 264                  | 0 | 356  | 1   | 621        | 0                      | 427  | 242  | 0   | 669        | 0         | 0 | 0 | 0 | 0          | 1780       |
| 08:00 AM    | 55                     | 57   | 0 | 0   | 112        | 92                   | 0 | 53   | 0   | 145        | 0                      | 104  | 57   | 0   | 161        | 0         | 0 | 0 | 0 | 0          | 418        |
| 08:15 AM    | 60                     | 67   | 0 | 0   | 127        | 74                   | 0 | 46   | 2   | 122        | 0                      | 97   | 55   | 0   | 152        | 0         | 0 | 0 | 0 | 0          | 401        |
| 08:30 AM    | 62                     | 59   | 0 | 1   | 122        | 67                   | 0 | 55   | 0   | 122        | 0                      | 71   | 56   | 0   | 127        | 0         | 0 | 0 | 0 | 0          | 371        |
| 08:45 AM    | 59                     | 74   | 0 | 0   | 133        | 48                   | 0 | 48   | 0   | 96         | 0                      | 63   | 38   | 1   | 102        | 0         | 0 | 0 | 0 | 0          | 331        |
| Total       | 236                    | 257  | 0 | 1   | 494        | 281                  | 0 | 202  | 2   | 485        | 0                      | 335  | 206  | 1   | 542        | 0         | 0 | 0 | 0 | 0          | 1521       |
| Grand Total | 481                    | 501  | 0 | 2   | 984        | 545                  | 0 | 558  | 3   | 1106       | 0                      | 762  | 448  | 1   | 1211       | 0         | 0 | 0 | 0 | 0          | 3301       |
| Apprch %    | 48.9                   | 50.9 | 0 | 0.2 |            | 49.3                 | 0 | 50.5 | 0.3 |            | 0                      | 62.9 | 37   | 0.1 |            | 0         | 0 | 0 | 0 |            |            |
| Total %     | 14.6                   | 15.2 | 0 | 0.1 | 29.8       | 16.5                 | 0 | 16.9 | 0.1 | 33.5       | 0                      | 23.1 | 13.6 | 0   | 36.7       | 0         | 0 | 0 | 0 | 0          |            |

# LSC Transportation Consultants, Inc.

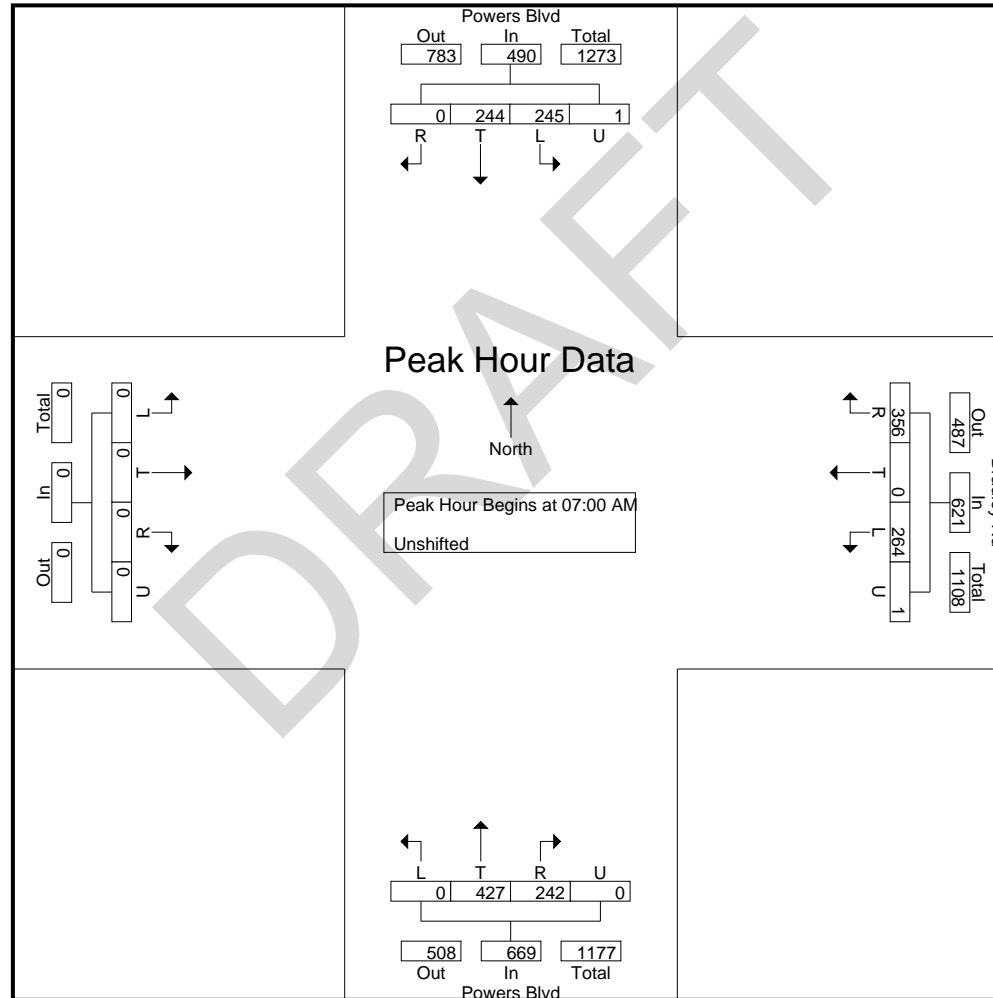
545 E Pikes Peak Ave, Suite 210  
Colorado Springs, CO 80905  
719-633-2868

File Name : Powers Blvd - Bradley Rd AM

Site Code : S214180

Start Date : 3/16/2021

Page No : 3



# LSC Transportation Consultants, Inc.

545 E Pikes Peak Ave, Suite 210  
Colorado Springs, CO 80905  
719-633-2868

File Name : Powers Blvd - Bradley Rd PM  
Site Code : S214180  
Start Date : 3/16/2021  
Page No : 1

## Groups Printed- Unshifted

| Start Time  | Powers Blvd Southbound |      |   |   |            | Bradley Rd Westbound |   |      |     |            | Powers Blvd Northbound |      |      |   |            | Eastbound |   |   |   |            | Int. Total |
|-------------|------------------------|------|---|---|------------|----------------------|---|------|-----|------------|------------------------|------|------|---|------------|-----------|---|---|---|------------|------------|
|             | L                      | T    | R | U | App. Total | L                    | T | R    | U   | App. Total | L                      | T    | R    | U | App. Total | L         | T | R | U | App. Total |            |
| 04:00 PM    | 72                     | 109  | 0 | 0 | 181        | 54                   | 0 | 75   | 0   | 129        | 0                      | 72   | 75   | 0 | 147        | 0         | 0 | 0 | 0 | 0          | 457        |
| 04:15 PM    | 68                     | 105  | 0 | 0 | 173        | 74                   | 0 | 82   | 0   | 156        | 0                      | 85   | 102  | 0 | 187        | 0         | 0 | 0 | 0 | 0          | 516        |
| 04:30 PM    | 87                     | 110  | 0 | 0 | 197        | 72                   | 0 | 73   | 1   | 146        | 0                      | 78   | 111  | 0 | 189        | 0         | 0 | 0 | 0 | 0          | 532        |
| 04:45 PM    | 69                     | 128  | 0 | 0 | 197        | 71                   | 0 | 60   | 0   | 131        | 0                      | 73   | 100  | 0 | 173        | 0         | 0 | 0 | 0 | 0          | 501        |
| Total       | 296                    | 452  | 0 | 0 | 748        | 271                  | 0 | 290  | 1   | 562        | 0                      | 308  | 388  | 0 | 696        | 0         | 0 | 0 | 0 | 0          | 2006       |
| 05:00 PM    | 83                     | 127  | 0 | 0 | 210        | 60                   | 0 | 63   | 0   | 123        | 0                      | 74   | 78   | 0 | 152        | 0         | 0 | 0 | 0 | 0          | 485        |
| 05:15 PM    | 75                     | 110  | 0 | 0 | 185        | 58                   | 0 | 45   | 0   | 103        | 0                      | 76   | 102  | 0 | 178        | 0         | 0 | 0 | 0 | 0          | 466        |
| 05:30 PM    | 61                     | 111  | 0 | 0 | 172        | 55                   | 0 | 49   | 0   | 104        | 0                      | 69   | 106  | 0 | 175        | 0         | 0 | 0 | 0 | 0          | 451        |
| 05:45 PM    | 59                     | 97   | 0 | 0 | 156        | 52                   | 0 | 44   | 0   | 96         | 0                      | 86   | 73   | 0 | 159        | 0         | 0 | 0 | 0 | 0          | 411        |
| Total       | 278                    | 445  | 0 | 0 | 723        | 225                  | 0 | 201  | 0   | 426        | 0                      | 305  | 359  | 0 | 664        | 0         | 0 | 0 | 0 | 0          | 1813       |
| Grand Total | 574                    | 897  | 0 | 0 | 1471       | 496                  | 0 | 491  | 1   | 988        | 0                      | 613  | 747  | 0 | 1360       | 0         | 0 | 0 | 0 | 0          | 3819       |
| Apprch %    | 39                     | 61   | 0 | 0 |            | 50.2                 | 0 | 49.7 | 0.1 |            | 0                      | 45.1 | 54.9 | 0 |            | 0         | 0 | 0 | 0 | 0          |            |
| Total %     | 15                     | 23.5 | 0 | 0 | 38.5       | 13                   | 0 | 12.9 | 0   | 25.9       | 0                      | 16.1 | 19.6 | 0 | 35.6       | 0         | 0 | 0 | 0 | 0          |            |



# LSC Transportation Consultants, Inc.

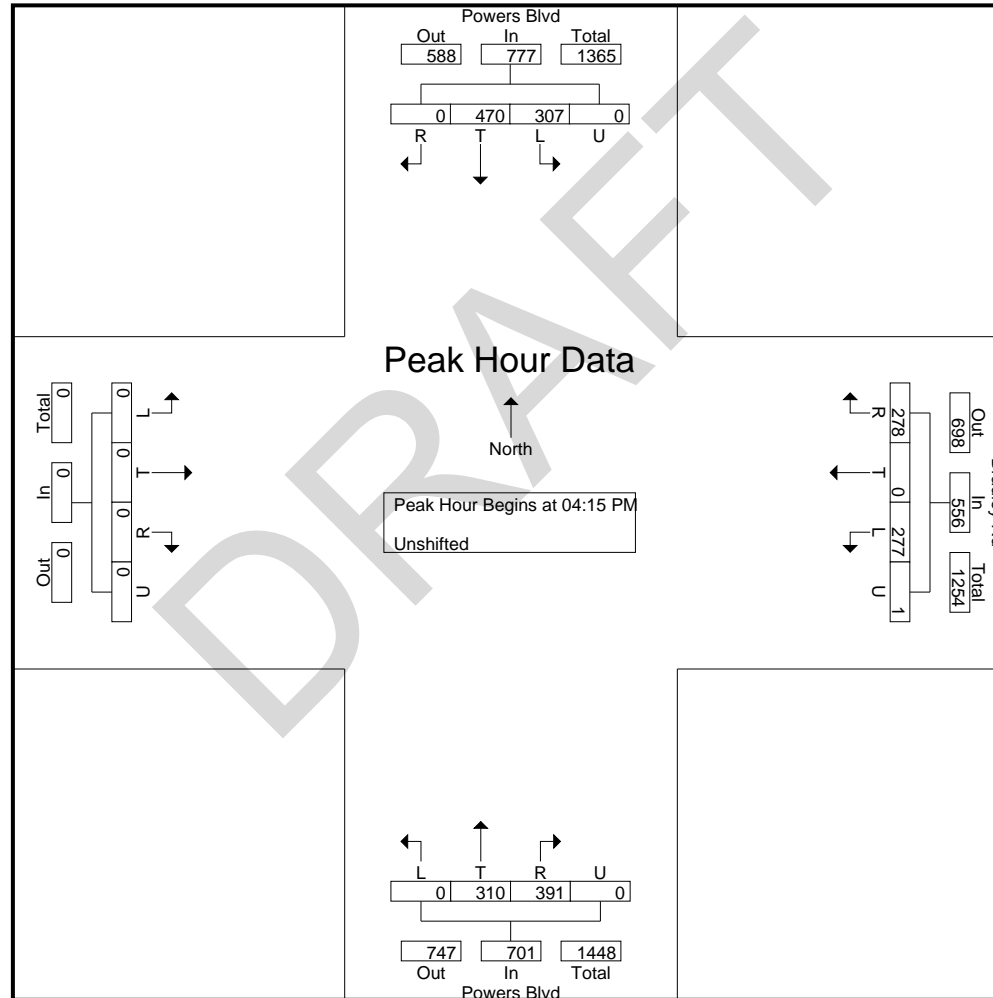
545 E Pikes Peak Ave, Suite 210  
Colorado Springs, CO 80905  
719-633-2868

File Name : Powers Blvd - Bradley Rd PM

Site Code : S214180

Start Date : 3/16/2021

Page No : 3





# LSC Transportation Consultants, Inc.

545 E Pikes Peak Ave, Suite 210  
Colorado Springs, CO 80905  
719-633-2868

File Name : Marksheffel Rd - Bradley Rd AM

Site Code : S214180

Start Date : 3/11/2021

Page No : 1

## Groups Printed- Unshifted

| Start Time  | Marksheffel Rd Southbound |      |      |     |            | Bradley Rd Westbound |      |     |     |            | Marksheffel Rd Northbound |      |     |     |            | Bradley Rd Eastbound |      |     |   |            | Int. Total |
|-------------|---------------------------|------|------|-----|------------|----------------------|------|-----|-----|------------|---------------------------|------|-----|-----|------------|----------------------|------|-----|---|------------|------------|
|             | L                         | T    | R    | U   | App. Total | L                    | T    | R   | U   | App. Total | L                         | T    | R   | U   | App. Total | L                    | T    | R   | U | App. Total |            |
| 07:00 AM    | 9                         | 55   | 30   | 0   | 94         | 8                    | 82   | 21  | 1   | 112        | 27                        | 103  | 20  | 0   | 150        | 25                   | 63   | 4   | 0 | 92         | 448        |
| 07:15 AM    | 7                         | 57   | 54   | 2   | 120        | 8                    | 49   | 7   | 0   | 64         | 27                        | 96   | 14  | 0   | 137        | 47                   | 73   | 4   | 0 | 124        | 445        |
| 07:30 AM    | 0                         | 71   | 58   | 0   | 129        | 8                    | 55   | 7   | 0   | 70         | 43                        | 106  | 12  | 0   | 161        | 62                   | 86   | 3   | 0 | 151        | 511        |
| 07:45 AM    | 3                         | 65   | 60   | 0   | 128        | 13                   | 97   | 11  | 0   | 121        | 28                        | 102  | 11  | 0   | 141        | 67                   | 78   | 12  | 0 | 157        | 547        |
| Total       | 19                        | 248  | 202  | 2   | 471        | 37                   | 283  | 46  | 1   | 367        | 125                       | 407  | 57  | 0   | 589        | 201                  | 300  | 23  | 0 | 524        | 1951       |
| 08:00 AM    | 6                         | 53   | 63   | 0   | 122        | 10                   | 60   | 3   | 0   | 73         | 16                        | 67   | 8   | 0   | 91         | 39                   | 67   | 4   | 0 | 110        | 396        |
| 08:15 AM    | 1                         | 47   | 52   | 0   | 100        | 4                    | 42   | 3   | 0   | 49         | 14                        | 63   | 8   | 1   | 86         | 38                   | 44   | 5   | 0 | 87         | 322        |
| 08:30 AM    | 3                         | 44   | 60   | 1   | 108        | 1                    | 46   | 2   | 1   | 50         | 21                        | 74   | 9   | 1   | 105        | 32                   | 63   | 8   | 0 | 103        | 366        |
| 08:45 AM    | 0                         | 30   | 36   | 0   | 66         | 3                    | 47   | 9   | 1   | 60         | 14                        | 64   | 4   | 1   | 83         | 28                   | 70   | 6   | 0 | 104        | 313        |
| Total       | 10                        | 174  | 211  | 1   | 396        | 18                   | 195  | 17  | 2   | 232        | 65                        | 268  | 29  | 3   | 365        | 137                  | 244  | 23  | 0 | 404        | 1397       |
| 09:00 AM    | 0                         | 14   | 39   | 0   | 53         | 4                    | 34   | 1   | 0   | 39         | 9                         | 48   | 1   | 0   | 58         | 19                   | 35   | 8   | 0 | 62         | 212        |
| Grand Total | 29                        | 436  | 452  | 3   | 920        | 59                   | 512  | 64  | 3   | 638        | 199                       | 723  | 87  | 3   | 1012       | 357                  | 579  | 54  | 0 | 990        | 3560       |
| Apprch %    | 3.2                       | 47.4 | 49.1 | 0.3 |            | 9.2                  | 80.3 | 10  | 0.5 |            | 19.7                      | 71.4 | 8.6 | 0.3 |            | 36.1                 | 58.5 | 5.5 | 0 |            |            |
| Total %     | 0.8                       | 12.2 | 12.7 | 0.1 | 25.8       | 1.7                  | 14.4 | 1.8 | 0.1 | 17.9       | 5.6                       | 20.3 | 2.4 | 0.1 | 28.4       | 10                   | 16.3 | 1.5 | 0 | 27.8       |            |

# LSC Transportation Consultants, Inc.

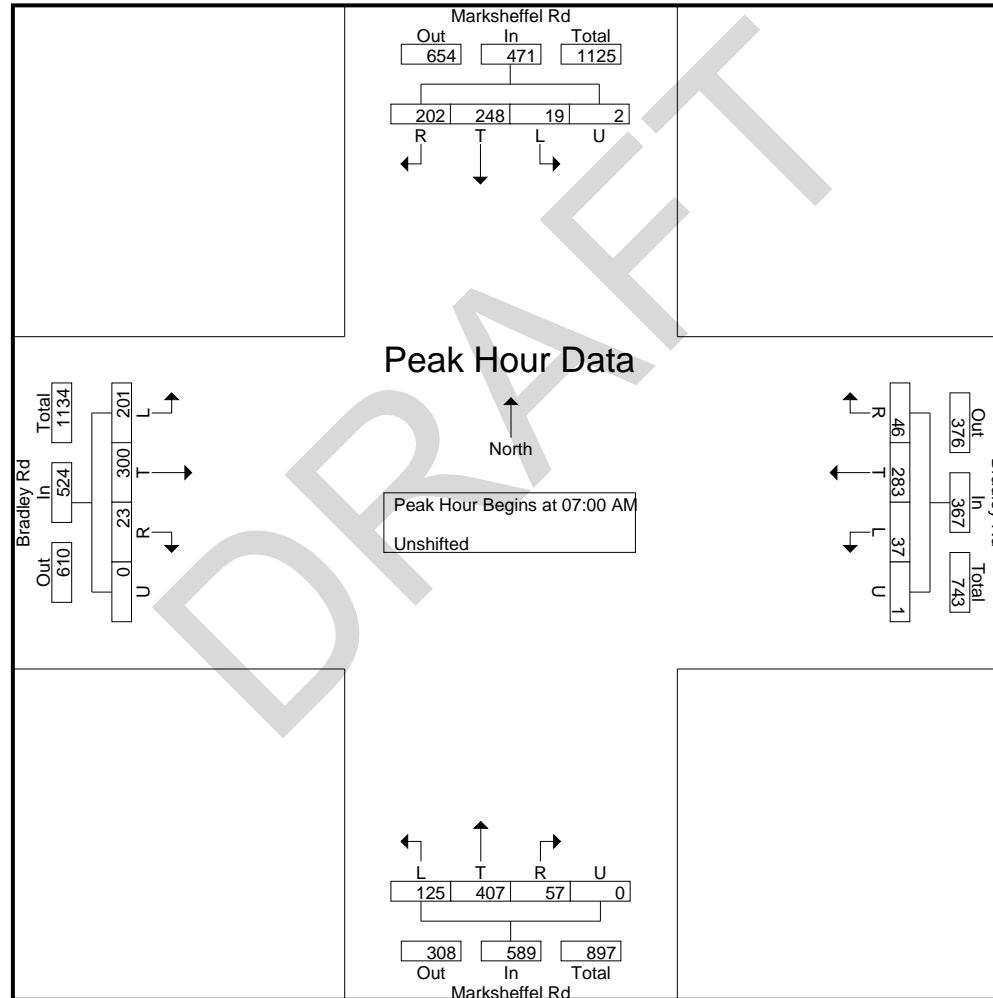
545 E Pikes Peak Ave, Suite 210  
Colorado Springs, CO 80905  
719-633-2868

File Name : Marksheffel Rd - Bradley Rd AM

Site Code : S214180

Start Date : 3/11/2021

Page No : 3



# LSC Transportation Consultants, Inc.

545 E Pikes Peak Ave, Suite 210  
Colorado Springs, CO 80905  
719-633-2868

File Name : Marksheffel Rd - Bradley Rd PM  
Site Code : S214180  
Start Date : 3/18/2021  
Page No : 1

## Groups Printed- Unshifted

| Start Time  | Marksheffel Rd Southbound |      |      |     |            | Bradley Rd Westbound |      |     |   |            | Marksheffel Rd Northbound |      |      |     |            | Bradley Rd Eastbound |      |      |     |            | Int. Total |
|-------------|---------------------------|------|------|-----|------------|----------------------|------|-----|---|------------|---------------------------|------|------|-----|------------|----------------------|------|------|-----|------------|------------|
|             | L                         | T    | R    | U   | App. Total | L                    | T    | R   | U | App. Total | L                         | T    | R    | U   | App. Total | L                    | T    | R    | U   | App. Total |            |
| 04:00 PM    | 3                         | 83   | 50   | 3   | 139        | 13                   | 52   | 4   | 0 | 69         | 17                        | 89   | 12   | 0   | 118        | 75                   | 69   | 22   | 0   | 166        | 492        |
| 04:15 PM    | 1                         | 110  | 34   | 2   | 147        | 32                   | 66   | 4   | 0 | 102        | 27                        | 93   | 16   | 0   | 136        | 90                   | 68   | 26   | 1   | 185        | 570        |
| 04:30 PM    | 2                         | 108  | 66   | 1   | 177        | 13                   | 47   | 5   | 0 | 65         | 16                        | 55   | 6    | 0   | 77         | 104                  | 80   | 28   | 0   | 212        | 531        |
| 04:45 PM    | 4                         | 100  | 59   | 0   | 163        | 20                   | 69   | 6   | 0 | 95         | 16                        | 92   | 15   | 0   | 123        | 88                   | 78   | 23   | 0   | 189        | 570        |
| Total       | 10                        | 401  | 209  | 6   | 626        | 78                   | 234  | 19  | 0 | 331        | 76                        | 329  | 49   | 0   | 454        | 357                  | 295  | 99   | 1   | 752        | 2163       |
| 05:00 PM    | 3                         | 128  | 45   | 0   | 176        | 8                    | 63   | 2   | 0 | 73         | 8                         | 82   | 8    | 2   | 100        | 88                   | 76   | 27   | 0   | 191        | 540        |
| 05:15 PM    | 4                         | 113  | 65   | 0   | 182        | 12                   | 42   | 3   | 0 | 57         | 18                        | 95   | 10   | 0   | 123        | 102                  | 59   | 16   | 0   | 177        | 539        |
| 05:30 PM    | 5                         | 97   | 47   | 0   | 149        | 9                    | 45   | 4   | 0 | 58         | 8                         | 79   | 11   | 1   | 99         | 69                   | 53   | 19   | 0   | 141        | 447        |
| 05:45 PM    | 5                         | 119  | 36   | 0   | 160        | 7                    | 38   | 5   | 0 | 50         | 15                        | 78   | 15   | 1   | 109        | 50                   | 66   | 19   | 1   | 136        | 455        |
| Total       | 17                        | 457  | 193  | 0   | 667        | 36                   | 188  | 14  | 0 | 238        | 49                        | 334  | 44   | 4   | 431        | 309                  | 254  | 81   | 1   | 645        | 1981       |
| Grand Total | 27                        | 858  | 402  | 6   | 1293       | 114                  | 422  | 33  | 0 | 569        | 125                       | 663  | 93   | 4   | 885        | 666                  | 549  | 180  | 2   | 1397       | 4144       |
| Apprch %    | 2.1                       | 66.4 | 31.1 | 0.5 |            | 20                   | 74.2 | 5.8 | 0 |            | 14.1                      | 74.9 | 10.5 | 0.5 |            | 47.7                 | 39.3 | 12.9 | 0.1 |            |            |
| Total %     | 0.7                       | 20.7 | 9.7  | 0.1 | 31.2       | 2.8                  | 10.2 | 0.8 | 0 | 13.7       | 3                         | 16   | 2.2  | 0.1 | 21.4       | 16.1                 | 13.2 | 4.3  | 0   | 33.7       |            |

# LSC Transportation Consultants, Inc.

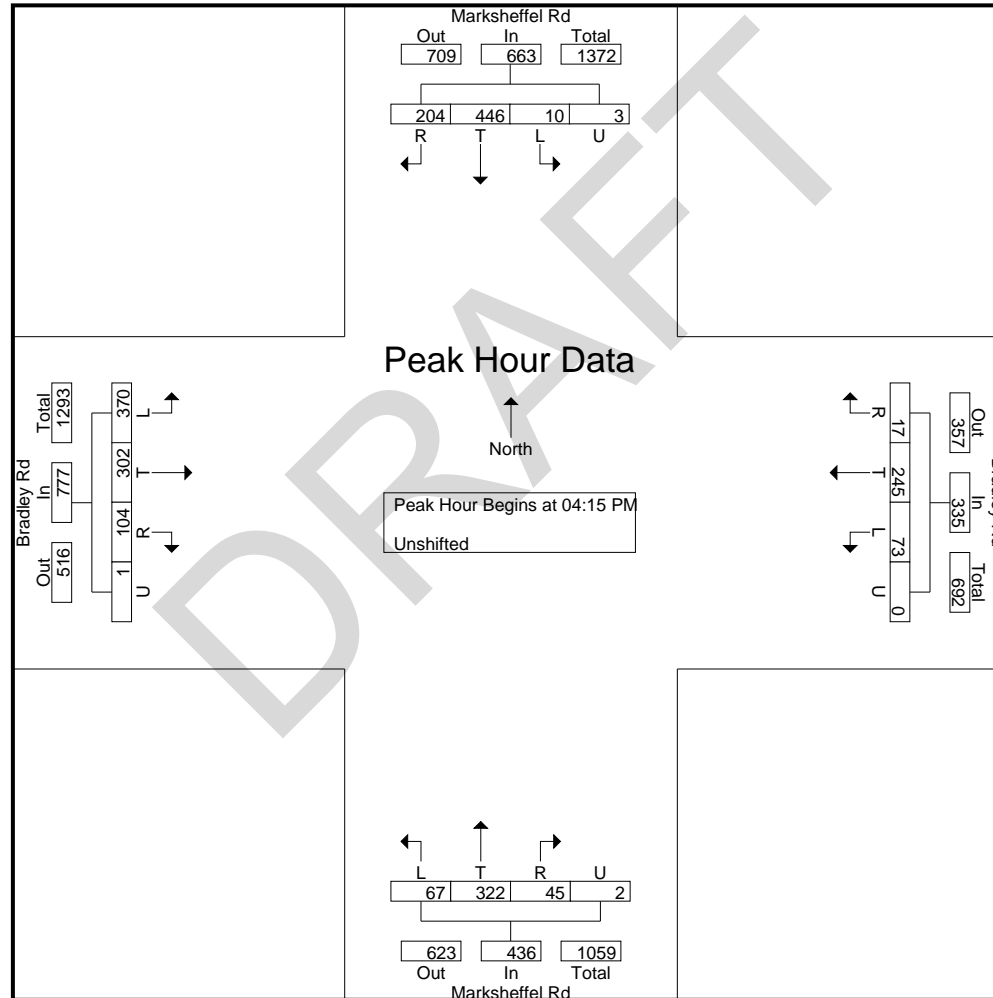
545 E Pikes Peak Ave, Suite 210  
Colorado Springs, CO 80905  
719-633-2868

File Name : Marksheffel Rd - Bradley Rd PM

Site Code : S214180

Start Date : 3/18/2021

Page No : 3



# Levels of Service













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DRAFT

# Lanes, Volumes, Timings

## 3: Powers & Bradley

Existing  
AM Peak Hour

|                         |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|
| Lane Group              | WBL   | WBR   | NBT   | NBR   | SBL   | SBT   |
| Lane Configurations     |  |  |  |  |  |  |
| Traffic Volume (vph)    | 264   | 356   | 427   | 242   | 245   | 244   |
| Future Volume (vph)     | 264   | 356   | 427   | 242   | 245   | 244   |
| Satd. Flow (prot)       | 1770  | 1583  | 3539  | 1583  | 1770  | 3539  |
| Flt Permitted           | 0.950   |   |   |   | 0.420   |   |
| Satd. Flow (perm)       | 1770  | 1583  | 3539  | 1583  | 782   | 3539  |
| Satd. Flow (RTOR)       |   | 387   |   | 266   |   |   |
| Peak Hour Factor        | 0.92  | 0.92  | 0.91  | 0.91  | 0.89  | 0.89  |
| Shared Lane Traffic (%) |   |   |   |   |   |   |
| Lane Group Flow (vph)   | 287   | 387   | 469   | 266   | 275   | 274   |
| Turn Type               | Prot  | Perm  | NA  | Perm  | pm+pt   | NA  |
| Protected Phases        | 8   |   | 2   |   | 1   | 6   |
| Permitted Phases        |   | 8   |   | 2   | 6   |   |
| Detector Phase          | 8   | 8   | 2   | 2   | 1   | 6   |
| Switch Phase            |   |   |   |   |   |   |
| Minimum Initial (s)     | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   |
| Minimum Split (s)       | 22.5  | 22.5  | 22.5  | 22.5  | 9.5   | 22.5  |
| Total Split (s)         | 25.0  | 25.0  | 54.0  | 54.0  | 21.0  | 75.0  |
| Total Split (%)         | 25.0%   | 25.0%   | 54.0%   | 54.0%   | 21.0%   | 75.0%   |
| Yellow Time (s)         | 3.5   | 3.5   | 3.5   | 3.5   | 3.5   | 3.5   |
| All-Red Time (s)        | 1.0   | 1.0   | 1.0   | 1.0   | 1.0   | 1.0   |
| Lost Time Adjust (s)    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)     | 4.5   | 4.5   | 4.5   | 4.5   | 4.5   | 4.5   |
| Lead/Lag                |   |   | Lag   | Lag   | Lead  |   |
| Lead-Lag Optimize?      |   |   | Yes   | Yes   | Yes   |   |
| Recall Mode             | None  | None  | C-Min   | C-Min   | None  | C-Min   |
| Act Effect Green (s)    | 21.9  | 21.9  | 53.0  | 53.0  | 69.1  | 69.1  |
| Actuated g/C Ratio      | 0.22  | 0.22  | 0.53  | 0.53  | 0.69  | 0.69  |
| v/c Ratio               | 0.74  | 0.60  | 0.25  | 0.28  | 0.42  | 0.11  |
| Control Delay           | 47.7  | 7.2   | 14.7  | 3.0   | 8.5   | 6.0   |
| Queue Delay             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 47.7  | 7.2   | 14.7  | 3.0   | 8.5   | 6.0   |
| LOS                     | D   | A   | B   | A   | A   | A   |
| Approach Delay          | 24.5  |   | 10.5  |   |   | 7.3   |
| Approach LOS            | C   |   | B   |   |   | A   |

### Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 14.4

Intersection LOS: B

Intersection Capacity Utilization 51.3%

ICU Level of Service A

Analysis Period (min) 15

























Splits and Phases: 3: Powers & Bradley



# Lanes, Volumes, Timings

## 5: Marksheffel & Bradley

Existing  
AM Peak Hour

|                         |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group              | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations     |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph)    | 201   | 300   | 23  | 37  | 283   | 46  | 125  | 407   | 57  | 19  | 248   | 202   |
| Future Volume (vph)     | 201   | 300   | 23  | 37  | 283   | 46  | 125  | 407   | 57  | 19  | 248   | 202   |
| Satd. Flow (prot)       | 1770  | 3539  | 1583  | 1770  | 3539  | 1583  | 1770   | 3539  | 1583  | 1770  | 3539  | 1583  |
| Flt Permitted           | 0.510   |   |   | 0.519   |   |   | 0.585  |   |   | 0.493   |   |   |
| Satd. Flow (perm)       | 950   | 3539  | 1583  | 967   | 3539  | 1583  | 1090   | 3539  | 1583  | 918   | 3539  | 1583  |
| Satd. Flow (RTOR)       |   |   | 28  |   |   | 61  |  |   | 62  |   |   | 220   |
| Peak Hour Factor        | 0.83  | 0.83  | 0.83  | 0.76  | 0.76  | 0.76  | 0.92   | 0.92  | 0.92  | 0.92  | 0.92  | 0.92  |
| Shared Lane Traffic (%) |   |   |   |   |   |   |  |   |   |   |   |   |
| Lane Group Flow (vph)   | 242   | 361   | 28  | 49  | 372   | 61  | 136  | 442   | 62  | 21  | 270   | 220   |
| Turn Type               | Perm  | NA  | Perm  | Perm  | NA  | Perm  | Perm   | NA  | Perm  | Perm  | NA  | Perm  |
| Protected Phases        |   | 4   |   |   | 8   |   |  | 2   |   |   | 6   |   |
| Permitted Phases        | 4   |   | 4   | 8   |   | 8   | 2  |   | 2   | 6   |   | 6   |
| Detector Phase          | 4   | 4   | 4   | 8   | 8   | 8   | 2  | 2   | 2   | 6   | 6   | 6   |
| Switch Phase            |   |   |   |   |   |   |  |   |   |   |   |   |
| Minimum Initial (s)     | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0  | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   |
| Minimum Split (s)       | 22.5  | 22.5  | 22.5  | 22.5  | 22.5  | 22.5  | 22.5   | 22.5  | 22.5  | 22.5  | 22.5  | 22.5  |
| Total Split (s)         | 51.0  | 51.0  | 51.0  | 51.0  | 51.0  | 51.0  | 39.0   | 39.0  | 39.0  | 39.0  | 39.0  | 39.0  |
| Total Split (%)         | 56.7%   | 56.7%   | 56.7%   | 56.7%   | 56.7%   | 56.7%   | 43.3%  | 43.3%   | 43.3%   | 43.3%   | 43.3%   | 43.3%   |
| Yellow Time (s)         | 3.5   | 3.5   | 3.5   | 3.5   | 3.5   | 3.5   | 3.5  | 3.5   | 3.5   | 3.5   | 3.5   | 3.5   |
| All-Red Time (s)        | 1.0   | 1.0   | 1.0   | 1.0   | 1.0   | 1.0   | 1.0  | 1.0   | 1.0   | 1.0   | 1.0   | 1.0   |
| Lost Time Adjust (s)    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)     | 4.5   | 4.5   | 4.5   | 4.5   | 4.5   | 4.5   | 4.5  | 4.5   | 4.5   | 4.5   | 4.5   | 4.5   |
| Lead/Lag                |   |   |   |   |   |   |  |   |   |   |   |   |
| Lead-Lag Optimize?      |   |   |   |   |   |   |  |   |   |   |   |   |
| Recall Mode             | None  | None  | None  | None  | None  | None  | Max  | Max   | Max   | Max   | Max   | Max   |
| Act Effect Green (s)    | 22.5  | 22.5  | 22.5  | 22.5  | 22.5  | 22.5  | 35.1   | 35.1  | 35.1  | 35.1  | 35.1  | 35.1  |
| Actuated g/C Ratio      | 0.34  | 0.34  | 0.34  | 0.34  | 0.34  | 0.34  | 0.53   | 0.53  | 0.53  | 0.53  | 0.53  | 0.53  |
| v/c Ratio               | 0.76  | 0.30  | 0.05  | 0.15  | 0.31  | 0.11  | 0.24   | 0.24  | 0.07  | 0.04  | 0.15  | 0.24  |
| Control Delay           | 34.7  | 16.1  | 5.3   | 15.1  | 16.2  | 4.3   | 12.9   | 10.8  | 4.1   | 11.6  | 10.4  | 2.8   |
| Queue Delay             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 34.7  | 16.1  | 5.3   | 15.1  | 16.2  | 4.3   | 12.9   | 10.8  | 4.1   | 11.6  | 10.4  | 2.8   |
| LOS                     | C   | B   | A   | B   | B   | A   | B  | B   | A   | B   | B   | A   |
| Approach Delay          |   | 22.7  |   |   | 14.6  |   |  | 10.6  |   |   | 7.2   |   |
| Approach LOS            |   | C   |   |   | B   |   |  | B   |   |   | A   |   |

### Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 66.7

Natural Cycle: 45

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 14.1

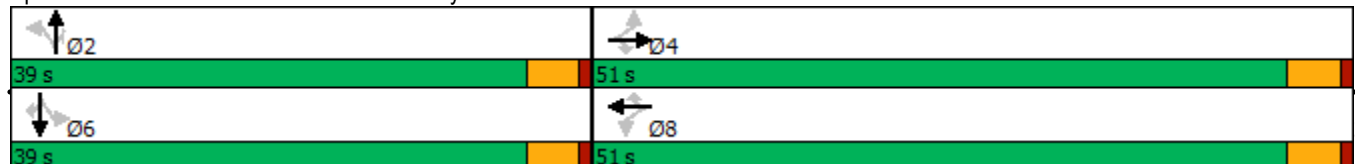
Intersection LOS: B

Intersection Capacity Utilization 49.4%

ICU Level of Service A

Analysis Period (min) 15













Splits and Phases: 5: Marksheffel & Bradley



# Lanes, Volumes, Timings

## 3: Powers & Bradley

Existing  
PM Peak Hour

|                         |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|
| Lane Group              | WBL   | WBR   | NBT   | NBR   | SBL   | SBT   |
| Lane Configurations     |  |  |  |  |  |  |
| Traffic Volume (vph)    | 277   | 278   | 310   | 391   | 307   | 470   |
| Future Volume (vph)     | 277   | 278   | 310   | 391   | 307   | 470   |
| Satd. Flow (prot)       | 1770  | 1583  | 3539  | 1583  | 1770  | 3539  |
| Flt Permitted           | 0.950   |   |   |   | 0.491   |   |
| Satd. Flow (perm)       | 1770  | 1583  | 3539  | 1583  | 915   | 3539  |
| Satd. Flow (RTOR)       |   | 302   |   | 420   |   |   |
| Peak Hour Factor        | 0.92  | 0.92  | 0.93  | 0.93  | 0.92  | 0.92  |
| Shared Lane Traffic (%) |   |   |   |   |   |   |
| Lane Group Flow (vph)   | 301   | 302   | 333   | 420   | 334   | 511   |
| Turn Type               | Prot  | Perm  | NA  | Perm  | pm+pt   | NA  |
| Protected Phases        | 8   |   | 2   |   | 1   | 6   |
| Permitted Phases        |   | 8   |   | 2   | 6   |   |
| Detector Phase          | 8   | 8   | 2   | 2   | 1   | 6   |
| Switch Phase            |   |   |   |   |   |   |
| Minimum Initial (s)     | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   |
| Minimum Split (s)       | 22.5  | 22.5  | 22.5  | 22.5  | 9.5   | 22.5  |
| Total Split (s)         | 25.0  | 25.0  | 45.0  | 45.0  | 20.0  | 65.0  |
| Total Split (%)         | 27.8%   | 27.8%   | 50.0%   | 50.0%   | 22.2%   | 72.2%   |
| Yellow Time (s)         | 3.5   | 3.5   | 3.5   | 3.5   | 3.5   | 3.5   |
| All-Red Time (s)        | 1.0   | 1.0   | 1.0   | 1.0   | 1.0   | 1.0   |
| Lost Time Adjust (s)    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)     | 4.5   | 4.5   | 4.5   | 4.5   | 4.5   | 4.5   |
| Lead/Lag                |   |   | Lag   | Lag   | Lead  |   |
| Lead-Lag Optimize?      |   |   | Yes   | Yes   | Yes   |   |
| Recall Mode             | None  | None  | C-Min   | C-Min   | None  | C-Min   |
| Act Effect Green (s)    | 20.8  | 20.8  | 42.8  | 42.8  | 60.2  | 60.2  |
| Actuated g/C Ratio      | 0.23  | 0.23  | 0.48  | 0.48  | 0.67  | 0.67  |
| v/c Ratio               | 0.74  | 0.51  | 0.20  | 0.43  | 0.45  | 0.22  |
| Control Delay           | 42.7  | 6.3   | 16.1  | 3.7   | 9.1   | 6.7   |
| Queue Delay             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 42.7  | 6.3   | 16.1  | 3.7   | 9.1   | 6.7   |
| LOS                     | D   | A   | B   | A   | A   | A   |
| Approach Delay          | 24.5  |   | 9.2   |   |   | 7.6   |
| Approach LOS            | C   |   | A   |   |   | A   |

### Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 12.8

Intersection LOS: B

Intersection Capacity Utilization 52.2%

ICU Level of Service A

Analysis Period (min) 15

























Splits and Phases: 3: Powers & Bradley





# Lanes, Volumes, Timings 5: Marksheffel & Bradley

Existing  
PM Peak Hour

|                         |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group              | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations     |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph)    | 370   | 302   | 104   | 73  | 245   | 17  | 67   | 322   | 45  | 10  | 446   | 204   |
| Future Volume (vph)     | 370   | 302   | 104   | 73  | 245   | 17  | 67   | 322   | 45  | 10  | 446   | 204   |
| Satd. Flow (prot)       | 1770  | 3539  | 1583  | 1770  | 3539  | 1583  | 1770   | 3539  | 1583  | 1770  | 3539  | 1583  |
| Flt Permitted           | 0.579   |   |   | 0.554   |   |   | 0.420  |   |   | 0.521   |   |   |
| Satd. Flow (perm)       | 1079  | 3539  | 1583  | 1032  | 3539  | 1583  | 782  | 3539  | 1583  | 970   | 3539  | 1583  |
| Satd. Flow (RTOR)       |   |   | 113   |   |   | 20  |  |   | 52  |   |   | 234   |
| Peak Hour Factor        | 0.92  | 0.92  | 0.92  | 0.87  | 0.87  | 0.87  | 0.87   | 0.87  | 0.87  | 0.87  | 0.87  | 0.87  |
| Shared Lane Traffic (%) |   |   |   |   |   |   |  |   |   |   |   |   |
| Lane Group Flow (vph)   | 402   | 328   | 113   | 84  | 282   | 20  | 77   | 370   | 52  | 11  | 513   | 234   |
| Turn Type               | Perm  | NA  | Perm  | Perm  | NA  | Perm  | Perm   | NA  | Perm  | Perm  | NA  | Perm  |
| Protected Phases        |   | 4   |   |   | 8   |   |  | 2   |   |   | 6   |   |
| Permitted Phases        | 4   |   | 4   | 8   |   | 8   | 2  |   | 2   | 6   |   | 6   |
| Detector Phase          | 4   | 4   | 4   | 8   | 8   | 8   | 2  | 2   | 2   | 6   | 6   | 6   |
| Switch Phase            |   |   |   |   |   |   |  |   |   |   |   |   |
| Minimum Initial (s)     | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0  | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   |
| Minimum Split (s)       | 22.5  | 22.5  | 22.5  | 22.5  | 22.5  | 22.5  | 22.5   | 22.5  | 22.5  | 22.5  | 22.5  | 22.5  |
| Total Split (s)         | 55.0  | 55.0  | 55.0  | 55.0  | 55.0  | 55.0  | 35.0   | 35.0  | 35.0  | 35.0  | 35.0  | 35.0  |
| Total Split (%)         | 61.1%   | 61.1%   | 61.1%   | 61.1%   | 61.1%   | 61.1%   | 38.9%  | 38.9%   | 38.9%   | 38.9%   | 38.9%   | 38.9%   |
| Yellow Time (s)         | 3.5   | 3.5   | 3.5   | 3.5   | 3.5   | 3.5   | 3.5  | 3.5   | 3.5   | 3.5   | 3.5   | 3.5   |
| All-Red Time (s)        | 1.0   | 1.0   | 1.0   | 1.0   | 1.0   | 1.0   | 1.0  | 1.0   | 1.0   | 1.0   | 1.0   | 1.0   |
| Lost Time Adjust (s)    | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)     | 4.5   | 4.5   | 4.5   | 4.5   | 4.5   | 4.5   | 4.5  | 4.5   | 4.5   | 4.5   | 4.5   | 4.5   |
| Lead/Lag                |   |   |   |   |   |   |  |   |   |   |   |   |
| Lead-Lag Optimize?      |   |   |   |   |   |   |  |   |   |   |   |   |
| Recall Mode             | None  | None  | None  | None  | None  | None  | Max  | Max   | Max   | Max   | Max   | Max   |
| Act Effect Green (s)    | 33.0  | 33.0  | 33.0  | 33.0  | 33.0  | 33.0  | 31.3   | 31.3  | 31.3  | 31.3  | 31.3  | 31.3  |
| Actuated g/C Ratio      | 0.45  | 0.45  | 0.45  | 0.45  | 0.45  | 0.45  | 0.43   | 0.43  | 0.43  | 0.43  | 0.43  | 0.43  |
| v/c Ratio               | 0.83  | 0.21  | 0.15  | 0.18  | 0.18  | 0.03  | 0.23   | 0.25  | 0.07  | 0.03  | 0.34  | 0.29  |
| Control Delay           | 32.5  | 11.7  | 2.5   | 11.8  | 11.4  | 4.2   | 20.5   | 16.8  | 6.3   | 18.1  | 17.5  | 4.1   |
| Queue Delay             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay             | 32.5  | 11.7  | 2.5   | 11.8  | 11.4  | 4.2   | 20.5   | 16.8  | 6.3   | 18.1  | 17.5  | 4.1   |
| LOS                     | C   | B   | A   | B   | B   | A   | C  | B   | A   | B   | B   | A   |
| Approach Delay          |   | 20.4  |   |   | 11.1  |   |  | 16.2  |   |   | 13.4  |   |
| Approach LOS            |   | C   |   |   | B   |   |  | B   |   |   | B   |   |

## Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 73.6

Natural Cycle: 55

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 16.0

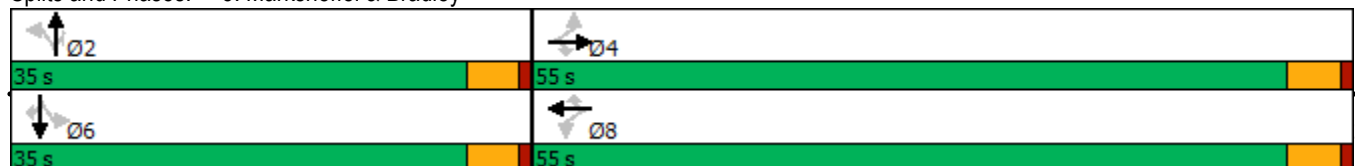
Intersection LOS: B

Intersection Capacity Utilization 58.8%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 5: Marksheffel & Bradley



Timings  
1: Powers & Bradley Rd.

Short-Term Background Traffic  
AM Peak Hour

| Lane Group           | WBL   | WBR  | NBT   | NBR   | SBL   | SBT   |
|----------------------|-------|------|-------|-------|-------|-------|
| Lane Configurations  |       |      |       |       |       |       |
| Traffic Volume (vph) | 461   | 628  | 534   | 346   | 364   | 305   |
| Future Volume (vph)  | 461   | 628  | 534   | 346   | 364   | 305   |
| Turn Type            | Prot  | Free | NA    | pt+ov | Prot  | NA    |
| Protected Phases     | 8     |      | 2     | 2 8   | 1     | 6     |
| Permitted Phases     |       | Free |       |       |       |       |
| Detector Phase       | 8     |      | 2     | 2 8   | 1     | 6     |
| Switch Phase         |       |      |       |       |       |       |
| Minimum Initial (s)  | 4.0   |      | 4.0   |       | 15.0  | 4.0   |
| Minimum Split (s)    | 9.0   |      | 9.0   |       | 20.0  | 9.0   |
| Total Split (s)      | 25.0  |      | 53.0  |       | 22.0  | 75.0  |
| Total Split (%)      | 25.0% |      | 53.0% |       | 22.0% | 75.0% |
| Yellow Time (s)      | 3.0   |      | 3.0   |       | 3.0   | 3.0   |
| All-Red Time (s)     | 2.0   |      | 2.0   |       | 2.0   | 2.0   |
| Lost Time Adjust (s) | 0.0   |      | 0.0   |       | 0.0   | 0.0   |
| Total Lost Time (s)  | 5.0   |      | 5.0   |       | 5.0   | 5.0   |
| Lead/Lag             |       |      | Lag   |       | Lead  |       |
| Lead-Lag Optimize?   |       |      | Yes   |       | Yes   |       |
| Recall Mode          | None  |      | None  |       | None  | None  |
| Act Effect Green (s) | 15.1  | 66.5 | 18.9  | 39.1  | 17.2  | 41.2  |
| Actuated g/C Ratio   | 0.23  | 1.00 | 0.28  | 0.59  | 0.26  | 0.62  |
| v/c Ratio            | 0.64  | 0.43 | 0.58  | 0.23  | 0.89  | 0.16  |
| Control Delay        | 27.9  | 0.9  | 23.1  | 5.1   | 51.2  | 5.9   |
| Queue Delay          | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay          | 27.9  | 0.9  | 23.1  | 5.1   | 51.2  | 5.9   |
| LOS                  | C     | A    | C     | A     | D     | A     |
| Approach Delay       | 12.3  |      | 16.1  |       |       | 30.5  |
| Approach LOS         | B     |      | B     |       |       | C     |

Intersection Summary

Cycle Length: 100  
 Actuated Cycle Length: 66.5  
 Natural Cycle: 60  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.89  
 Intersection Signal Delay: 18.3  
 Intersection Capacity Utilization 60.6%  
 Analysis Period (min) 15

Intersection LOS: B  
 ICU Level of Service B

Splits and Phases: 1: Powers & Bradley Rd.



Timings  
2: Legacy Hill Dr & Bradley Rd.

Short-Term Background Traffic  
AM Peak Hour

|                      | →     | ↘     | ↙     | ←     | ↖     | ↗     |
|----------------------|-------|-------|-------|-------|-------|-------|
| Lane Group           | EBT   | EBR   | WBL   | WBT   | NBL   | NBR   |
| Lane Configurations  | ↑↑    | ↑     | ↘     | ↑↑    | ↘     | ↑     |
| Traffic Volume (vph) | 626   | 84    | 40    | 775   | 314   | 89    |
| Future Volume (vph)  | 626   | 84    | 40    | 775   | 314   | 89    |
| Turn Type            | NA    | Perm  | Perm  | NA    | Prot  | Perm  |
| Protected Phases     | 2     |       |       | 6     | 8     |       |
| Permitted Phases     |       | 2     | 6     |       |       | 8     |
| Detector Phase       | 2     | 2     | 6     | 6     | 8     | 8     |
| Switch Phase         |       |       |       |       |       |       |
| Minimum Initial (s)  | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   |
| Minimum Split (s)    | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  |
| Total Split (s)      | 68.0  | 68.0  | 68.0  | 68.0  | 32.0  | 32.0  |
| Total Split (%)      | 68.0% | 68.0% | 68.0% | 68.0% | 32.0% | 32.0% |
| Yellow Time (s)      | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |
| All-Red Time (s)     | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s) | -1.0  | -1.0  | -1.0  | -1.0  | -1.0  | -1.0  |
| Total Lost Time (s)  | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| Lead/Lag             |       |       |       |       |       |       |
| Lead-Lag Optimize?   |       |       |       |       |       |       |
| Recall Mode          | C-Max | C-Max | C-Max | C-Max | None  | None  |
| Act Effect Green (s) | 66.8  | 66.8  | 66.8  | 66.8  | 25.2  | 25.2  |
| Actuated g/C Ratio   | 0.67  | 0.67  | 0.67  | 0.67  | 0.25  | 0.25  |
| v/c Ratio            | 0.29  | 0.09  | 0.10  | 0.36  | 0.83  | 0.22  |
| Control Delay        | 7.6   | 1.6   | 7.5   | 8.1   | 51.5  | 6.8   |
| Queue Delay          | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay          | 7.6   | 1.6   | 7.5   | 8.1   | 51.5  | 6.8   |
| LOS                  | A     | A     | A     | A     | D     | A     |
| Approach Delay       | 6.8   |       |       | 8.1   | 41.6  |       |
| Approach LOS         | A     |       |       | A     | D     |       |

Intersection Summary

Cycle Length: 100  
 Actuated Cycle Length: 100  
 Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green  
 Natural Cycle: 40  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.83  
 Intersection Signal Delay: 15.0  
 Intersection Capacity Utilization 48.9%  
 Analysis Period (min) 15

Intersection LOS: B  
 ICU Level of Service A

Splits and Phases: 2: Legacy Hill Dr & Bradley Rd.



























| Intersection             |        |        |        |      |      |      |
|--------------------------|--------|--------|--------|------|------|------|
| Int Delay, s/veh         | 0.3    |        |        |      |      |      |
| Movement                 | EBT    | EBR    | WBL    | WBT  | NBL  | NBR  |
| Lane Configurations      | ↑↑     | ↗      |        | ↑↑   |      | ↗    |
| Traffic Vol, veh/h       | 696    | 19     | 0      | 815  | 0    | 33   |
| Future Vol, veh/h        | 696    | 19     | 0      | 815  | 0    | 33   |
| Conflicting Peds, #/hr   | 0      | 0      | 0      | 0    | 0    | 0    |
| Sign Control             | Free   | Free   | Free   | Free | Stop | Stop |
| RT Channelized           | -      | None   | -      | None | -    | None |
| Storage Length           | -      | 500    | -      | -    | -    | 0    |
| Veh in Median Storage, # | 0      | -      | -      | 0    | 0    | -    |
| Grade, %                 | 0      | -      | -      | 0    | 0    | -    |
| Peak Hour Factor         | 92     | 85     | 85     | 92   | 85   | 85   |
| Heavy Vehicles, %        | 2      | 2      | 2      | 2    | 2    | 2    |
| Mvmt Flow                | 757    | 22     | 0      | 886  | 0    | 39   |
|                          |        |        |        |      |      |      |
| Major/Minor              | Major1 | Major2 | Minor1 |      |      |      |
| Conflicting Flow All     | 0      | 0      | -      | -    | -    | 379  |
| 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    | 619  |
| Stage 1                  | -      | -      | 0      | -    | 0    | -    |
| Stage 2                  | -      | -      | 0      | -    | 0    | -    |
| Platoon blocked, %       | -      | -      | -      | -    | -    | -    |
| Mov Cap-1 Maneuver       | -      | -      | -      | -    | -    | 619  |
| Mov Cap-2 Maneuver       | -      | -      | -      | -    | -    | -    |
| Stage 1                  | -      | -      | -      | -    | -    | -    |
| Stage 2                  | -      | -      | -      | -    | -    | -    |
|                          |        |        |        |      |      |      |
| Approach                 | EB     |        | WB     |      | NB   |      |
| HCM Control Delay, s     | 0      |        | 0      |      | 11.2 |      |
| HCM LOS                  |        |        |        |      | B    |      |
|                          |        |        |        |      |      |      |
| Minor Lane/Major Mvmt    | NBLn1  | EBT    | EBR    | WBT  |      |      |
| Capacity (veh/h)         | 619    | -      | -      | -    |      |      |
| HCM Lane V/C Ratio       | 0.063  | -      | -      | -    |      |      |
| HCM Control Delay (s)    | 11.2   | -      | -      | -    |      |      |
| HCM Lane LOS             | B      | -      | -      | -    |      |      |
| HCM 95th %tile Q(veh)    | 0.2    | -      | -      | -    |      |      |

# Timings

101: Marksheffel Rd & Bradley Rd

## Short-Term Background Traffic

AM Peak Hour

|                      |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group           | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations  |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph) | 338   | 392   | 46  | 46  | 360   | 58  | 162   | 509   | 71  | 24  | 310   | 282   |
| Future Volume (vph)  | 338   | 392   | 46  | 46  | 360   | 58  | 162   | 509   | 71  | 24  | 310   | 282   |
| Turn Type            | Perm  | NA  | Free  | Perm  | NA  | Free  | Perm  | NA  | Free  | Perm  | NA  | Free  |
| Protected Phases     |   | 4   |   |   | 8   |   |   | 2   |   |   | 6   |   |
| Permitted Phases     | 4   |   | Free  | 8   |   | Free  | 2   |   | Free  | 6   |   | Free  |
| Detector Phase       | 4   | 4   |   | 8   | 8   |   | 2   | 2   |   | 6   | 6   |   |
| Switch Phase         |   |   |   |   |   |   |   |   |   |   |   |   |
| Minimum Initial (s)  | 4.0   | 4.0   |   | 4.0   | 4.0   |   | 4.0   | 4.0   |   | 4.0   | 4.0   |   |
| Minimum Split (s)    | 21.0  | 21.0  |   | 21.0  | 21.0  |   | 21.0  | 21.0  |   | 21.0  | 21.0  |   |
| Total Split (s)      | 60.0  | 60.0  |   | 60.0  | 60.0  |   | 30.0  | 30.0  |   | 30.0  | 30.0  |   |
| Total Split (%)      | 66.7%   | 66.7%   |   | 66.7%   | 66.7%   |   | 33.3%   | 33.3%   |   | 33.3%   | 33.3%   |   |
| Yellow Time (s)      | 3.0   | 3.0   |   | 3.0   | 3.0   |   | 3.0   | 3.0   |   | 3.0   | 3.0   |   |
| All-Red Time (s)     | 2.0   | 2.0   |   | 2.0   | 2.0   |   | 2.0   | 2.0   |   | 2.0   | 2.0   |   |
| Lost Time Adjust (s) | 0.0   | 0.0   |   | 0.0   | 0.0   |   | 0.0   | 0.0   |   | 0.0   | 0.0   |   |
| Total Lost Time (s)  | 5.0   | 5.0   |   | 5.0   | 5.0   |   | 5.0   | 5.0   |   | 5.0   | 5.0   |   |
| Lead/Lag             |   |   |   |   |   |   |   |   |   |   |   |   |
| Lead-Lag Optimize?   |   |   |   |   |   |   |   |   |   |   |   |   |
| Recall Mode          | None  | None  |   | None  | None  |   | Max   | Max   |   | Max   | Max   |   |
| Act Effect Green (s) | 39.0  | 39.0  | 75.2  | 39.0  | 39.0  | 75.2  | 25.8  | 25.8  | 75.2  | 25.8  | 25.8  | 75.2  |
| Actuated g/C Ratio   | 0.52  | 0.52  | 1.00  | 0.52  | 0.52  | 1.00  | 0.34  | 0.34  | 1.00  | 0.34  | 0.34  | 1.00  |
| v/c Ratio            | 0.89  | 0.26  | 0.03  | 0.13  | 0.26  | 0.05  | 0.51  | 0.46  | 0.05  | 0.11  | 0.28  | 0.19  |
| Control Delay        | 39.2  | 9.6   | 0.0   | 8.8   | 9.6   | 0.1   | 30.8  | 23.6  | 0.1   | 24.3  | 21.8  | 0.3   |
| Queue Delay          | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay          | 39.2  | 9.6   | 0.0   | 8.8   | 9.6   | 0.1   | 30.8  | 23.6  | 0.1   | 24.3  | 21.8  | 0.3   |
| LOS                  | D   | A   | A   | A   | A   | A   | C   | C   | A   | C   | C   | A   |
| Approach Delay       |   | 21.9  |   |   | 8.3   |   |   | 22.9  |   |   | 12.0  |   |
| Approach LOS         |   | C   |   |   | A   |   |   | C   |   |   | B   |   |

### Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 75.2

Natural Cycle: 55

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 17.2

Intersection LOS: B

Intersection Capacity Utilization 62.9%

ICU Level of Service B








Analysis Period (min) 15

Splits and Phases: 101: Marksheffel Rd & Bradley Rd



Timings  
1: Powers & Bradley Rd.

Short-Term Background Traffic  
PM Peak Hour

|                      |  |   |   |   |   |   |
|----------------------|---|---|---|---|---|---|
| Lane Group           | WBL   | WBR   | NBT   | NBR   | SBL   | SBT   |
| Lane Configurations  |  |  |  |  |  |  |
| Traffic Volume (vph) | 378   | 413   | 326   | 558   | 529   | 494   |
| Future Volume (vph)  | 378   | 413   | 326   | 558   | 529   | 494   |
| Turn Type            | Prot  | Free  | NA  | pt+ov   | Prot  | NA  |
| Protected Phases     | 8   |   | 2   | 2 8   | 1   | 6   |
| Permitted Phases     |   | Free  |   |   |   |   |
| Detector Phase       | 8   |   | 2   | 2 8   | 1   | 6   |
| Switch Phase         |   |   |   |   |   |   |
| Minimum Initial (s)  | 4.0   |   | 4.0   |   | 4.0   | 4.0   |
| Minimum Split (s)    | 9.0   |   | 9.0   |   | 9.0   | 9.0   |
| Total Split (s)      | 27.0  |   | 42.0  |   | 31.0  | 73.0  |
| Total Split (%)      | 27.0%   |   | 42.0%   |   | 31.0%   | 73.0%   |
| Yellow Time (s)      | 3.0   |   | 3.0   |   | 3.0   | 3.0   |
| All-Red Time (s)     | 2.0   |   | 2.0   |   | 2.0   | 2.0   |
| Lost Time Adjust (s) | 0.0   |   | 0.0   |   | 0.0   | 0.0   |
| Total Lost Time (s)  | 5.0   |   | 5.0   |   | 5.0   | 5.0   |
| Lead/Lag             |   |   | Lag   |   | Lead  |   |
| Lead-Lag Optimize?   |   |   | Yes   |   | Yes   |   |
| Recall Mode          | None  |   | None  |   | None  | None  |
| Act Effect Green (s) | 15.0  | 72.9  | 16.4  | 36.5  | 26.3  | 47.8  |
| Actuated g/C Ratio   | 0.21  | 1.00  | 0.22  | 0.50  | 0.36  | 0.66  |
| v/c Ratio            | 0.58  | 0.28  | 0.44  | 0.42  | 0.90  | 0.23  |
| Control Delay        | 30.0  | 0.5   | 26.5  | 9.9   | 44.6  | 5.8   |
| Queue Delay          | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay          | 30.0  | 0.5   | 26.5  | 9.9   | 44.6  | 5.8   |
| LOS                  | C   | A   | C   | A   | D   | A   |
| Approach Delay       | 14.6  |   | 16.0  |   |   | 25.8  |
| Approach LOS         | B   |   | B   |   |   | C   |

Intersection Summary

Cycle Length: 100  
 Actuated Cycle Length: 72.9  
 Natural Cycle: 55  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.90  
 Intersection Signal Delay: 19.3  
 Intersection Capacity Utilization 61.6%  
 Analysis Period (min) 15

Intersection LOS: B  
 ICU Level of Service B

Splits and Phases: 1: Powers & Bradley Rd.





Timings  
2: Legacy Hill Dr & Bradley Rd.

Short-Term Background Traffic  
PM Peak Hour

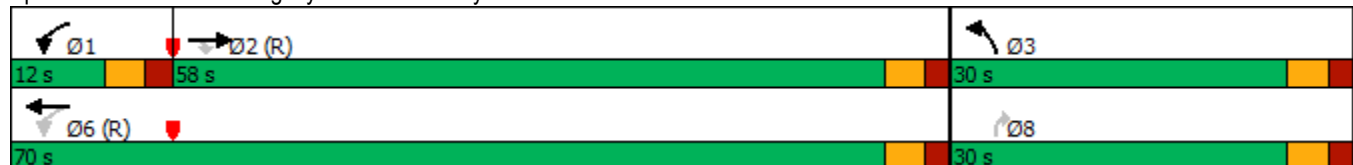
|                      | →     | ↘     | ↙     | ←     | ↖     | ↗     |
|----------------------|-------|-------|-------|-------|-------|-------|
| Lane Group           | EBT   | EBR   | WBL   | WBT   | NBL   | NBR   |
| Lane Configurations  | ↑↑    | ↑     | ↘     | ↑↑    | ↘↘    | ↘     |
| Traffic Volume (vph) | 801   | 286   | 137   | 583   | 208   | 59    |
| Future Volume (vph)  | 801   | 286   | 137   | 583   | 208   | 59    |
| Turn Type            | NA    | Perm  | pm+pt | NA    | Prot  | Perm  |
| Protected Phases     | 2     |       | 1     | 6     | 3     |       |
| Permitted Phases     |       | 2     | 6     |       |       | 8     |
| Detector Phase       | 2     | 2     | 1     | 6     | 3     | 8     |
| Switch Phase         |       |       |       |       |       |       |
| Minimum Initial (s)  | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   |
| Minimum Split (s)    | 23.0  | 23.0  | 10.0  | 23.0  | 10.0  | 23.0  |
| Total Split (s)      | 58.0  | 58.0  | 12.0  | 70.0  | 30.0  | 30.0  |
| Total Split (%)      | 58.0% | 58.0% | 12.0% | 70.0% | 30.0% | 30.0% |
| Yellow Time (s)      | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |
| All-Red Time (s)     | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s) | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)  | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   |
| Lead/Lag             | Lag   | Lag   | Lead  |       |       |       |
| Lead-Lag Optimize?   | Yes   | Yes   | Yes   |       |       |       |
| Recall Mode          | C-Max | C-Max | None  | C-Max | None  | None  |
| Act Effect Green (s) | 64.7  | 64.7  | 77.5  | 77.5  | 12.5  | 12.5  |
| Actuated g/C Ratio   | 0.65  | 0.65  | 0.78  | 0.78  | 0.12  | 0.12  |
| v/c Ratio            | 0.40  | 0.29  | 0.34  | 0.23  | 0.57  | 0.27  |
| Control Delay        | 9.5   | 1.7   | 5.1   | 3.5   | 46.4  | 12.2  |
| Queue Delay          | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay          | 9.5   | 1.7   | 5.1   | 3.5   | 46.4  | 12.2  |
| LOS                  | A     | A     | A     | A     | D     | B     |
| Approach Delay       | 7.4   |       |       | 3.8   | 38.9  |       |
| Approach LOS         | A     |       |       | A     | D     |       |

Intersection Summary

Cycle Length: 100  
 Actuated Cycle Length: 100  
 Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green  
 Natural Cycle: 60  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.57  
 Intersection Signal Delay: 10.4  
 Intersection Capacity Utilization 48.2%  
 Analysis Period (min) 15

Intersection LOS: B  
 ICU Level of Service A

Splits and Phases: 2: Legacy Hill Dr & Bradley Rd.



























| Intersection             |        |      |        |      |        |      |
|--------------------------|--------|------|--------|------|--------|------|
| Int Delay, s/veh         | 0.2    |      |        |      |        |      |
| Movement                 | EBT    | EBR  | WBL    | WBT  | NBL    | NBR  |
| Lane Configurations      | ↑↑     | ↗    |        | ↑↑   |        | ↗    |
| Traffic Vol, veh/h       | 793    | 67   | 0      | 720  | 0      | 22   |
| Future Vol, veh/h        | 793    | 67   | 0      | 720  | 0      | 22   |
| Conflicting Peds, #/hr   | 0      | 0    | 0      | 0    | 0      | 0    |
| Sign Control             | Free   | Free | Free   | Free | Stop   | Stop |
| RT Channelized           | -      | None | -      | None | -      | None |
| Storage Length           | -      | 500  | -      | -    | -      | 0    |
| Veh in Median Storage, # | 0      | -    | -      | 0    | 0      | -    |
| Grade, %                 | 0      | -    | -      | 0    | 0      | -    |
| Peak Hour Factor         | 86     | 85   | 85     | 92   | 85     | 85   |
| Heavy Vehicles, %        | 2      | 2    | 2      | 2    | 2      | 2    |
| Mvmt Flow                | 922    | 79   | 0      | 783  | 0      | 26   |
|                          |        |      |        |      |        |      |
| Major/Minor              | Major1 |      | Major2 |      | Minor1 |      |
| Conflicting Flow All     | 0      | 0    | -      | -    | -      | 461  |
| 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      | 547  |
| Stage 1                  | -      | -    | 0      | -    | 0      | -    |
| Stage 2                  | -      | -    | 0      | -    | 0      | -    |
| Platoon blocked, %       | -      | -    | -      | -    | -      | -    |
| Mov Cap-1 Maneuver       | -      | -    | -      | -    | -      | 547  |
| Mov Cap-2 Maneuver       | -      | -    | -      | -    | -      | -    |
| Stage 1                  | -      | -    | -      | -    | -      | -    |
| Stage 2                  | -      | -    | -      | -    | -      | -    |
|                          |        |      |        |      |        |      |
| Approach                 | EB     |      | WB     |      | NB     |      |
| HCM Control Delay, s     | 0      |      | 0      |      | 11.9   |      |
| HCM LOS                  |        |      |        |      | B      |      |
|                          |        |      |        |      |        |      |
| Minor Lane/Major Mvmt    | NBLn1  | EBT  | EBR    | WBT  |        |      |
| Capacity (veh/h)         | 547    | -    | -      | -    |        |      |
| HCM Lane V/C Ratio       | 0.047  | -    | -      | -    |        |      |
| HCM Control Delay (s)    | 11.9   | -    | -      | -    |        |      |
| HCM Lane LOS             | B      | -    | -      | -    |        |      |
| HCM 95th %tile Q(veh)    | 0.1    | -    | -      | -    |        |      |

# Timings

## 101: Marksheffel Rd & Bradley Rd

# Short-Term Background Traffic

PM Peak Hour

|                      |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group           | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations  |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph) | 447   | 329   | 121   | 77  | 277   | 18  | 90  | 338   | 47  | 11  | 469   | 312   |
| Future Volume (vph)  | 447   | 329   | 121   | 77  | 277   | 18  | 90  | 338   | 47  | 11  | 469   | 312   |
| Turn Type            | Perm  | NA  | Free  | Perm  | NA  | Free  | Perm  | NA  | Free  | Perm  | NA  | Free  |
| Protected Phases     |   | 4   |   |   | 8   |   |   | 2   |   |   | 6   |   |
| Permitted Phases     | 4   |   | Free  | 8   |   | Free  | 2   |   | Free  | 6   |   | Free  |
| Detector Phase       | 4   | 4   |   | 8   | 8   |   | 2   | 2   |   | 6   | 6   |   |
| Switch Phase         |   |   |   |   |   |   |   |   |   |   |   |   |
| Minimum Initial (s)  | 4.0   | 4.0   |   | 4.0   | 4.0   |   | 4.0   | 4.0   |   | 4.0   | 4.0   |   |
| Minimum Split (s)    | 21.0  | 21.0  |   | 21.0  | 21.0  |   | 21.0  | 21.0  |   | 21.0  | 21.0  |   |
| Total Split (s)      | 58.0  | 58.0  |   | 58.0  | 58.0  |   | 32.0  | 32.0  |   | 32.0  | 32.0  |   |
| Total Split (%)      | 64.4%   | 64.4%   |   | 64.4%   | 64.4%   |   | 35.6%   | 35.6%   |   | 35.6%   | 35.6%   |   |
| Yellow Time (s)      | 3.0   | 3.0   |   | 3.0   | 3.0   |   | 3.0   | 3.0   |   | 3.0   | 3.0   |   |
| All-Red Time (s)     | 2.0   | 2.0   |   | 2.0   | 2.0   |   | 2.0   | 2.0   |   | 2.0   | 2.0   |   |
| Lost Time Adjust (s) | 0.0   | 0.0   |   | 0.0   | 0.0   |   | 0.0   | 0.0   |   | 0.0   | 0.0   |   |
| Total Lost Time (s)  | 5.0   | 5.0   |   | 5.0   | 5.0   |   | 5.0   | 5.0   |   | 5.0   | 5.0   |   |
| Lead/Lag             |   |   |   |   |   |   |   |   |   |   |   |   |
| Lead-Lag Optimize?   |   |   |   |   |   |   |   |   |   |   |   |   |
| Recall Mode          | None  | None  |   | None  | None  |   | Max   | Max   |   | Max   | Max   |   |
| Act Effect Green (s) | 43.4  | 43.4  | 81.1  | 43.4  | 43.4  | 81.1  | 27.5  | 27.5  | 81.1  | 27.5  | 27.5  | 81.1  |
| Actuated g/C Ratio   | 0.54  | 0.54  | 1.00  | 0.54  | 0.54  | 1.00  | 0.34  | 0.34  | 1.00  | 0.34  | 0.34  | 1.00  |
| v/c Ratio            | 0.92  | 0.20  | 0.09  | 0.17  | 0.17  | 0.01  | 0.42  | 0.31  | 0.03  | 0.04  | 0.45  | 0.23  |
| Control Delay        | 41.3  | 9.5   | 0.1   | 9.6   | 9.3   | 0.0   | 31.6  | 22.8  | 0.0   | 22.8  | 24.4  | 0.3   |
| Queue Delay          | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay          | 41.3  | 9.5   | 0.1   | 9.6   | 9.3   | 0.0   | 31.6  | 22.8  | 0.0   | 22.8  | 24.4  | 0.3   |
| LOS                  | D   | A   | A   | A   | A   | A   | C   | C   | A   | C   | C   | A   |
| Approach Delay       |   | 24.1  |   |   | 8.9   |   |   | 22.2  |   |   | 14.9  |   |
| Approach LOS         |   | C   |   |   | A   |   |   | C   |   |   | B   |   |

## Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 81.1

Natural Cycle: 60

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.92

Intersection Signal Delay: 18.6

Intersection LOS: B

Intersection Capacity Utilization 67.0%

ICU Level of Service C


Analysis Period (min) 15

Splits and Phases: 101: Marksheffel Rd & Bradley Rd



Timings  
1: Powers & Bradley Rd.

Short-Term Total Traffic  
AM Peak Hour

|                      |  |      |       |       |       |       |
|----------------------|---|------|-------|-------|-------|-------|
| Lane Group           | WBL   | WBR  | NBT   | NBR   | SBL   | SBT   |
| Lane Configurations  | ↰↰  | ↰    | ↕↕    | ↰↰    | ↰↰    | ↕↕    |
| Traffic Volume (vph) | 615   | 825  | 526   | 502   | 505   | 300   |
| Future Volume (vph)  | 615   | 825  | 526   | 502   | 505   | 300   |
| Turn Type            | Prot  | Free | NA    | pt+ov | Prot  | NA    |
| Protected Phases     | 8   |      | 2     | 2 8   | 1     | 6     |
| Permitted Phases     |   | Free |       |       |       |       |
| Detector Phase       | 8   |      | 2     | 2 8   | 1     | 6     |
| Switch Phase         |   |      |       |       |       |       |
| Minimum Initial (s)  | 4.0   |      | 4.0   |       | 4.0   | 4.0   |
| Minimum Split (s)    | 9.0   |      | 9.0   |       | 9.0   | 9.0   |
| Total Split (s)      | 20.0  |      | 60.0  |       | 20.0  | 80.0  |
| Total Split (%)      | 20.0%   |      | 60.0% |       | 20.0% | 80.0% |
| Yellow Time (s)      | 3.0   |      | 3.0   |       | 3.0   | 3.0   |
| All-Red Time (s)     | 2.0   |      | 2.0   |       | 2.0   | 2.0   |
| Lost Time Adjust (s) | 0.0   |      | 0.0   |       | 0.0   | 0.0   |
| Total Lost Time (s)  | 5.0   |      | 5.0   |       | 5.0   | 5.0   |
| Lead/Lag             |   |      | Lag   |       | Lead  |       |
| Lead-Lag Optimize?   |   |      | Yes   |       | Yes   |       |
| Recall Mode          | None  |      | None  |       | None  | None  |
| Act Effect Green (s) | 15.1  | 63.8 | 18.6  | 38.7  | 15.1  | 38.7  |
| Actuated g/C Ratio   | 0.24  | 1.00 | 0.29  | 0.61  | 0.24  | 0.61  |
| v/c Ratio            | 0.82  | 0.57 | 0.56  | 0.33  | 0.70  | 0.16  |
| Control Delay        | 34.9  | 1.5  | 21.1  | 6.5   | 29.0  | 5.5   |
| Queue Delay          | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay          | 34.9  | 1.5  | 21.1  | 6.5   | 29.0  | 5.5   |
| LOS                  | C   | A    | C     | A     | C     | A     |
| Approach Delay       | 15.7  |      | 14.0  |       |       | 20.3  |
| Approach LOS         | B   |      | B     |       |       | C     |

Intersection Summary

























Cycle Length: 100  
 Actuated Cycle Length: 63.8  
 Natural Cycle: 55  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.82  
 Intersection Signal Delay: 16.3  
 Intersection LOS: B  
 Intersection Capacity Utilization 59.0%  
 ICU Level of Service B  
 Analysis Period (min) 15

Splits and Phases: 1: Powers & Bradley Rd.



# Timings 2: Legacy Hill Dr & Bradley Rd.

Short-Term Total Traffic  
AM Peak Hour

|                      |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group           | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations  |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph) | 265   | 658   | 84  | 40  | 861   | 98  | 314   | 5   | 89  | 141   | 2   | 265   |
| Future Volume (vph)  | 265   | 658   | 84  | 40  | 861   | 98  | 314   | 5   | 89  | 141   | 2   | 265   |
| Turn Type            | pm+pt   | NA  | Perm  | pm+pt   | NA  | Perm  | pm+pt   | NA  | Perm  | pm+pt   | NA  | Perm  |
| Protected Phases     | 5   | 2   |   | 1   | 6   |   | 3   | 8   |   | 7   | 4   |   |
| Permitted Phases     | 2   |   | 2   | 6   |   | 6   | 8   |   | 8   | 4   |   | 4   |
| Detector Phase       | 5   | 2   | 2   | 1   | 6   | 6   | 3   | 8   | 8   | 7   | 4   | 4   |
| Switch Phase         |   |   |   |   |   |   |   |   |   |   |   |   |
| Minimum Initial (s)  | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   |
| Minimum Split (s)    | 10.0  | 23.0  | 23.0  | 10.0  | 23.0  | 23.0  | 10.0  | 23.0  | 23.0  | 10.0  | 23.0  | 23.0  |
| Total Split (s)      | 15.0  | 45.0  | 45.0  | 10.0  | 40.0  | 40.0  | 22.0  | 23.0  | 23.0  | 22.0  | 23.0  | 23.0  |
| Total Split (%)      | 15.0%   | 45.0%   | 45.0%   | 10.0%   | 40.0%   | 40.0%   | 22.0%   | 23.0%   | 23.0%   | 22.0%   | 23.0%   | 23.0%   |
| Yellow Time (s)      | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |
| All-Red Time (s)     | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s) | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)  | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   |
| Lead/Lag             | Lead  | Lag   | Lag   | Lead  | Lag   | Lag   | Lead  | Lag   | Lag   | Lead  | Lag   | Lag   |
| Lead-Lag Optimize?   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   |
| Recall Mode          | None  | C-Max   | C-Max   | None  | C-Max   | C-Max   | None  | None  | None  | None  | None  | None  |
| Act Effect Green (s) | 57.0  | 50.8  | 50.8  | 49.3  | 43.3  | 43.3  | 32.2  | 18.6  | 18.6  | 22.4  | 13.7  | 13.7  |
| Actuated g/C Ratio   | 0.57  | 0.51  | 0.51  | 0.49  | 0.43  | 0.43  | 0.32  | 0.19  | 0.19  | 0.22  | 0.14  | 0.14  |
| v/c Ratio            | 0.51  | 0.40  | 0.11  | 0.12  | 0.61  | 0.15  | 0.44  | 0.02  | 0.26  | 0.25  | 0.01  | 0.86  |
| Control Delay        | 14.1  | 18.3  | 2.0   | 12.7  | 25.7  | 3.6   | 26.3  | 29.6  | 4.9   | 23.9  | 33.5  | 41.0  |
| Queue Delay          | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay          | 14.1  | 18.3  | 2.0   | 12.7  | 25.7  | 3.6   | 26.3  | 29.6  | 4.9   | 23.9  | 33.5  | 41.0  |
| LOS                  | B   | B   | A   | B   | C   | A   | C   | C   | A   | C   | C   | D   |
| Approach Delay       |   | 15.7  |   |   | 22.8  |   |   | 21.6  |   |   | 35.1  |   |
| Approach LOS         |   | B   |   |   | C   |   |   | C   |   |   | D   |   |

## Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 9 (9%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 22.0

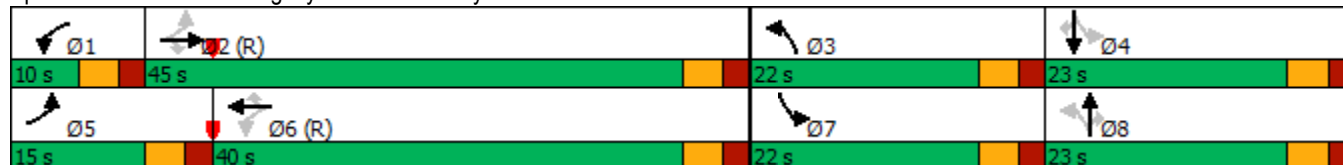
Intersection LOS: C

Intersection Capacity Utilization 61.7%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 2: Legacy Hill Dr & Bradley Rd.



HCM 6th TWSC  
3: Blackmeer Dr/Waterview North RIRO Access & Bradley Rd.







Short-Term Total Traffic  
AM Peak Hour

| Intersection             |        |       |      |        |      |      |        |      |      |        |      |      |
|--------------------------|--------|-------|------|--------|------|------|--------|------|------|--------|------|------|
| Int Delay, s/veh         | 1.2    |       |      |        |      |      |        |      |      |        |      |      |
| Movement                 | EBL    | EBT   | EBR  | WBL    | WBT  | WBR  | NBL    | NBT  | NBR  | SBL    | SBT  | SBR  |
| Lane Configurations      | ↰      | ↱↱    | ↰    |        | ↱↱   | ↰    |        |      | ↰    |        |      | ↰    |
| Traffic Vol, veh/h       | 41     | 828   | 19   | 0      | 901  | 27   | 0      | 0    | 33   | 0      | 0    | 98   |
| Future Vol, veh/h        | 41     | 828   | 19   | 0      | 901  | 27   | 0      | 0    | 33   | 0      | 0    | 98   |
| 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           | 300    | -     | 500  | -      | -    | 500  | -      | -    | 0    | -      | -    | 0    |
| Veh in Median Storage, # | -      | 0     | -    | -      | 0    | -    | -      | 0    | -    | -      | 0    | -    |
| Grade, %                 | -      | 0     | -    | -      | 0    | -    | -      | 0    | -    | -      | 0    | -    |
| Peak Hour Factor         | 85     | 92    | 85   | 85     | 92   | 85   | 85     | 85   | 85   | 85     | 85   | 85   |
| Heavy Vehicles, %        | 2      | 2     | 2    | 2      | 2    | 2    | 2      | 2    | 2    | 2      | 2    | 2    |
| Mvmt Flow                | 48     | 900   | 22   | 0      | 979  | 32   | 0      | 0    | 39   | 0      | 0    | 115  |
|                          |        |       |      |        |      |      |        |      |      |        |      |      |
| Major/Minor              | Major1 |       |      | Major2 |      |      | Minor1 |      |      | Minor2 |      |      |
| Conflicting Flow All     | 1011   | 0     | 0    | -      | -    | 0    | -      | -    | 450  | -      | -    | 490  |
| Stage 1                  | -      | -     | -    | -      | -    | -    | -      | -    | -    | -      | -    | -    |
| Stage 2                  | -      | -     | -    | -      | -    | -    | -      | -    | -    | -      | -    | -    |
| Critical Hdwy            | 4.14   | -     | -    | -      | -    | -    | -      | -    | 6.94 | -      | -    | 6.94 |
| Critical Hdwy Stg 1      | -      | -     | -    | -      | -    | -    | -      | -    | -    | -      | -    | -    |
| Critical Hdwy Stg 2      | -      | -     | -    | -      | -    | -    | -      | -    | -    | -      | -    | -    |
| Follow-up Hdwy           | 2.22   | -     | -    | -      | -    | -    | -      | -    | 3.32 | -      | -    | 3.32 |
| Pot Cap-1 Maneuver       | 681    | -     | -    | 0      | -    | -    | 0      | 0    | 556  | 0      | 0    | 524  |
| Stage 1                  | -      | -     | -    | 0      | -    | -    | 0      | 0    | -    | 0      | 0    | -    |
| Stage 2                  | -      | -     | -    | 0      | -    | -    | 0      | 0    | -    | 0      | 0    | -    |
| Platoon blocked, %       |        | -     | -    |        | -    | -    |        | -    |      | -      | -    |      |
| Mov Cap-1 Maneuver       | 681    | -     | -    | -      | -    | -    | -      | -    | 556  | -      | -    | 524  |
| Mov Cap-2 Maneuver       | -      | -     | -    | -      | -    | -    | -      | -    | -    | -      | -    | -    |
| Stage 1                  | -      | -     | -    | -      | -    | -    | -      | -    | -    | -      | -    | -    |
| Stage 2                  | -      | -     | -    | -      | -    | -    | -      | -    | -    | -      | -    | -    |
|                          |        |       |      |        |      |      |        |      |      |        |      |      |
| Approach                 | EB     |       |      | WB     |      |      | NB     |      |      | SB     |      |      |
| HCM Control Delay, s     | 0.5    |       |      | 0      |      |      | 12     |      |      | 13.8   |      |      |
| HCM LOS                  |        |       |      |        |      |      | B      |      |      | B      |      |      |
|                          |        |       |      |        |      |      |        |      |      |        |      |      |
| Minor Lane/Major Mvmt    | NBLn1  | EBL   | EBT  | EBR    | WBT  | WBR  | SBLn1  |      |      |        |      |      |
| Capacity (veh/h)         | 556    | 681   | -    | -      | -    | -    | 524    |      |      |        |      |      |
| HCM Lane V/C Ratio       | 0.07   | 0.071 | -    | -      | -    | -    | 0.22   |      |      |        |      |      |
| HCM Control Delay (s)    | 12     | 10.7  | -    | -      | -    | -    | 13.8   |      |      |        |      |      |
| HCM Lane LOS             | B      | B     | -    | -      | -    | -    | B      |      |      |        |      |      |
| HCM 95th %tile Q(veh)    | 0.2    | 0.2   | -    | -      | -    | -    | 0.8    |      |      |        |      |      |



























HCM 6th TWSC  
26: Legacy Hill Dr & Commercial Access

Short-Term Total Traffic  
AM Peak Hour

| Intersection             |   |   |   |   |   |   |
|--------------------------|---|---|---|---|---|---|
| Int Delay, s/veh         | 1.7   |   |   |   |   |   |
| Movement                 | EBL   | EBR   | NBL   | NBT   | SBT   | SBR   |
| Lane Configurations      |  |  |  |  |  |  |
| Traffic Vol, veh/h       | 1   | 57  | 94  | 342   | 370   | 1   |
| Future Vol, veh/h        | 1   | 57  | 94  | 342   | 370   | 1   |
| 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   | 0   | 200   | -   | -   | -   |
| Veh in Median Storage, # | 0   | -   | -   | 0   | 0   | -   |
| Grade, %                 | 0   | -   | -   | 0   | 0   | -   |
| Peak Hour Factor         | 85  | 85  | 85  | 85  | 85  | 85  |
| Heavy Vehicles, %        | 2   | 2   | 2   | 2   | 2   | 2   |
| Mvmt Flow                | 1   | 67  | 111   | 402   | 435   | 1   |
|                          |   |   |   |   |   |   |
| Major/Minor              | Minor2  | Major1  |   | Major2  |   |   |
| Conflicting Flow All     | 859   | 436   | 436   | 0   | -   | 0   |
| Stage 1                  | 436   | -   | -   | -   | -   | -   |
| Stage 2                  | 423   | -   | -   | -   | -   | -   |
| Critical Hdwy            | 6.63  | 6.23  | 4.13  | -   | -   | -   |
| Critical Hdwy Stg 1      | 5.43  | -   | -   | -   | -   | -   |
| Critical Hdwy Stg 2      | 5.83  | -   | -   | -   | -   | -   |
| Follow-up Hdwy           | 3.519   | 3.319   | 2.219   | -   | -   | -   |
| Pot Cap-1 Maneuver       | 417   | 619   | 1122  | -   | -   | -   |
| Stage 1                  | 651   | -   | -   | -   | -   | -   |
| Stage 2                  | 839   | -   | -   | -   | -   | -   |
| Platoon blocked, %       | 1   |   |   | -   | -   | -   |
| Mov Cap-1 Maneuver       | 376   | 619   | 1122  | -   | -   | -   |
| Mov Cap-2 Maneuver       | 476   | -   | -   | -   | -   | -   |
| Stage 1                  | 587   | -   | -   | -   | -   | -   |
| Stage 2                  | 839   | -   | -   | -   | -   | -   |
|                          |   |   |   |   |   |   |
| Approach                 | EB  | NB  |   | SB  |   |   |
| HCM Control Delay, s     | 11.5  | 1.8   |   | 0   |   |   |
| HCM LOS                  | B   |   |   |   |   |   |
|                          |   |   |   |   |   |   |
| Minor Lane/Major Mvmt    | NBL   | NBT   | EBLn1   | EBLn2   | SBT   | SBR   |
| Capacity (veh/h)         | 1122  | -   | 476   | 619   | -   | -   |
| HCM Lane V/C Ratio       | 0.099   | -   | 0.002   | 0.108   | -   | -   |
| HCM Control Delay (s)    | 8.6   | -   | 12.6  | 11.5  | -   | -   |
| HCM Lane LOS             | A   | -   | B   | B   | -   | -   |
| HCM 95th %tile Q(veh)    | 0.3   | -   | 0   | 0.4   | -   | -   |

Timings  
101: Marksheffel Rd & Bradley Rd

Short-Term Total Traffic  
AM Peak Hour

|                      |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group           | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations  |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph) | 427   | 412   | 70  | 46  | 379   | 58  | 194   | 509   | 71  | 24  | 310   | 343   |
| Future Volume (vph)  | 427   | 412   | 70  | 46  | 379   | 58  | 194   | 509   | 71  | 24  | 310   | 343   |
| Turn Type            | pm+pt   | NA  | Free  | pm+pt   | NA  | Free  | Perm  | NA  | Free  | Perm  | NA  | Free  |
| Protected Phases     | 7   | 4   |   | 3   | 8   |   |   | 2   |   |   | 6   |   |
| Permitted Phases     | 4   |   | Free  | 8   |   | Free  | 2   |   | Free  | 6   |   | Free  |
| Detector Phase       | 7   | 4   |   | 3   | 8   |   | 2   | 2   |   | 6   | 6   |   |
| Switch Phase         |   |   |   |   |   |   |   |   |   |   |   |   |
| Minimum Initial (s)  | 5.0   | 4.0   |   | 5.0   | 4.0   |   | 4.0   | 4.0   |   | 4.0   | 4.0   |   |
| Minimum Split (s)    | 11.0  | 21.0  |   | 10.0  | 21.0  |   | 21.0  | 21.0  |   | 21.0  | 21.0  |   |
| Total Split (s)      | 23.0  | 50.0  |   | 15.0  | 42.0  |   | 35.0  | 35.0  |   | 35.0  | 35.0  |   |
| Total Split (%)      | 23.0%   | 50.0%   |   | 15.0%   | 42.0%   |   | 35.0%   | 35.0%   |   | 35.0%   | 35.0%   |   |
| Yellow Time (s)      | 3.0   | 3.0   |   | 3.0   | 3.0   |   | 3.0   | 3.0   |   | 3.0   | 3.0   |   |
| All-Red Time (s)     | 2.0   | 2.0   |   | 2.0   | 2.0   |   | 2.0   | 2.0   |   | 2.0   | 2.0   |   |
| Lost Time Adjust (s) | 0.0   | 0.0   |   | 0.0   | 0.0   |   | 0.0   | 0.0   |   | 0.0   | 0.0   |   |
| Total Lost Time (s)  | 5.0   | 5.0   |   | 5.0   | 5.0   |   | 5.0   | 5.0   |   | 5.0   | 5.0   |   |
| Lead/Lag             | Lead  | Lag   |   | Lead  | Lag   |   |   |   |   |   |   |   |
| Lead-Lag Optimize?   | Yes   | Yes   |   | Yes   | Yes   |   |   |   |   |   |   |   |
| Recall Mode          | None  | None  |   | None  | None  |   | Max   | Max   |   | Max   | Max   |   |
| Act Effect Green (s) | 39.6  | 30.0  | 79.7  | 23.5  | 16.6  | 79.7  | 30.1  | 30.1  | 79.7  | 30.1  | 30.1  | 79.7  |
| Actuated g/C Ratio   | 0.50  | 0.38  | 1.00  | 0.29  | 0.21  | 1.00  | 0.38  | 0.38  | 1.00  | 0.38  | 0.38  | 1.00  |
| v/c Ratio            | 0.98  | 0.37  | 0.05  | 0.18  | 0.68  | 0.05  | 0.56  | 0.41  | 0.05  | 0.10  | 0.25  | 0.24  |
| Control Delay        | 54.6  | 19.8  | 0.1   | 13.1  | 34.0  | 0.1   | 27.5  | 20.1  | 0.1   | 18.9  | 18.4  | 0.3   |
| Queue Delay          | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay          | 54.6  | 19.8  | 0.1   | 13.1  | 34.0  | 0.1   | 27.5  | 20.1  | 0.1   | 18.9  | 18.4  | 0.3   |
| LOS                  | D   | B   | A   | B   | C   | A   | C   | C   | A   | B   | B   | A   |
| Approach Delay       |   | 34.6  |   |   | 27.9  |   |   | 20.1  |   |   | 9.2   |   |
| Approach LOS         |   | C   |   |   | C   |   |   | C   |   |   | A   |   |

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 79.7

Natural Cycle: 60

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.98

Intersection Signal Delay: 24.0

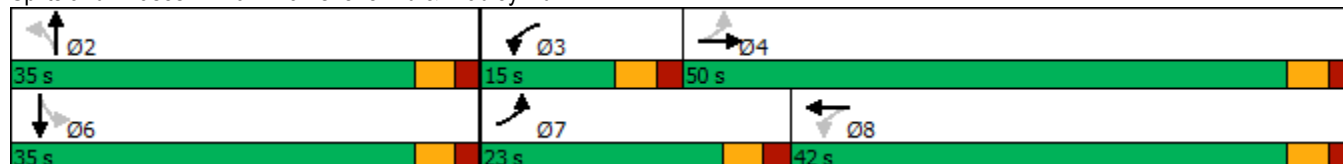
Intersection LOS: C

Intersection Capacity Utilization 70.1%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 101: Marksheffel Rd & Bradley Rd














HCM 6th TWSC  
107: Legacy Dr & North Commercial Access/E/W Collector

Short-Term Total Traffic  
AM Peak Hour

| Intersection             |        |       |        |       |        |       |        |      |        |       |        |      |
|--------------------------|--------|-------|--------|-------|--------|-------|--------|------|--------|-------|--------|------|
| Int Delay, s/veh         | 10.1   |       |        |       |        |       |        |      |        |       |        |      |
| Movement                 | EBL    | EBT   | EBR    | WBL   | WBT    | WBR   | NBL    | NBT  | NBR    | SBL   | SBT    | SBR  |
| Lane Configurations      | ↰      | ↱     |        | ↰     | ↱      |       | ↰      | ↱    | ↰      | ↱     | ↰      |      |
| Traffic Vol, veh/h       | 3      | 3     | 18     | 297   | 4      | 0     | 31     | 185  | 60     | 0     | 36     | 5    |
| Future Vol, veh/h        | 3      | 3     | 18     | 297   | 4      | 0     | 31     | 185  | 60     | 0     | 36     | 5    |
| Conflicting Peds, #/hr   | 0      | 0     | 0      | 0     | 0      | 0     | 0      | 0    | 0      | 0     | 0      | 0    |
| Sign Control             | Stop   | Stop  | Stop   | Stop  | Stop   | Stop  | Free   | Free | Free   | Free  | Free   | Free |
| RT Channelized           | -      | -     | None   | -     | -      | None  | -      | -    | None   | -     | -      | None |
| Storage Length           | 0      | -     | -      | 155   | -      | -     | 105    | -    | -      | 100   | -      | -    |
| Veh in Median Storage, # | -      | 0     | -      | -     | 0      | -     | -      | 0    | -      | -     | 0      | -    |
| Grade, %                 | -      | 0     | -      | -     | 0      | -     | -      | 0    | -      | -     | 0      | -    |
| Peak Hour Factor         | 85     | 85    | 85     | 85    | 85     | 85    | 85     | 85   | 85     | 85    | 85     | 85   |
| Heavy Vehicles, %        | 2      | 2     | 2      | 2     | 2      | 2     | 2      | 2    | 2      | 2     | 2      | 2    |
| Mvmt Flow                | 4      | 4     | 21     | 349   | 5      | 0     | 36     | 218  | 71     | 0     | 42     | 6    |
| Major/Minor              | Minor2 |       | Minor1 |       | Major1 |       | Major2 |      | Major2 |       | Major2 |      |
| Conflicting Flow All     | 373    | 406   | 45     | 348   | 338    | 218   | 48     | 0    | 0      | 289   | 0      | 0    |
| Stage 1                  | 45     | 45    | -      | 290   | 290    | -     | -      | -    | -      | -     | -      | -    |
| Stage 2                  | 328    | 361   | -      | 58    | 48     | -     | -      | -    | -      | -     | -      | -    |
| Critical Hdwy            | 7.12   | 6.52  | 6.22   | 7.12  | 6.52   | 6.22  | 4.12   | -    | -      | 4.12  | -      | -    |
| Critical Hdwy Stg 1      | 6.12   | 5.52  | -      | 6.12  | 5.52   | -     | -      | -    | -      | -     | -      | -    |
| Critical Hdwy Stg 2      | 6.12   | 5.52  | -      | 6.12  | 5.52   | -     | -      | -    | -      | -     | -      | -    |
| Follow-up Hdwy           | 3.518  | 4.018 | 3.318  | 3.518 | 4.018  | 3.318 | 2.218  | -    | -      | 2.218 | -      | -    |
| Pot Cap-1 Maneuver       | 584    | 534   | 1025   | 607   | 583    | 822   | 1559   | -    | -      | 1273  | -      | -    |
| Stage 1                  | 969    | 857   | -      | 718   | 672    | -     | -      | -    | -      | -     | -      | -    |
| Stage 2                  | 685    | 626   | -      | 954   | 855    | -     | -      | -    | -      | -     | -      | -    |
| Platoon blocked, %       | -      | -     | -      | -     | -      | -     | -      | -    | -      | -     | -      | -    |
| Mov Cap-1 Maneuver       | 570    | 522   | 1025   | 581   | 570    | 822   | 1559   | -    | -      | 1273  | -      | -    |
| Mov Cap-2 Maneuver       | 570    | 522   | -      | 581   | 570    | -     | -      | -    | -      | -     | -      | -    |
| Stage 1                  | 947    | 857   | -      | 701   | 657    | -     | -      | -    | -      | -     | -      | -    |
| Stage 2                  | 664    | 612   | -      | 930   | 855    | -     | -      | -    | -      | -     | -      | -    |
| Approach                 | EB     |       | WB     |       | NB     |       | SB     |      | SB     |       | SB     |      |
| HCM Control Delay, s     | 9.4    |       | 20     |       | 0.8    |       | 0      |      | 0      |       | 0      |      |
| HCM LOS                  | A      |       | C      |       |        |       |        |      |        |       |        |      |
| Minor Lane/Major Mvmt    | NBL    | NBT   | NBR    | EBLn1 | EBLn2  | WBLn1 | WBLn2  | SBL  | SBT    | SBR   |        |      |
| Capacity (veh/h)         | 1559   | -     | -      | 570   | 901    | 581   | 570    | 1273 | -      | -     |        |      |
| HCM Lane V/C Ratio       | 0.023  | -     | -      | 0.006 | 0.027  | 0.601 | 0.008  | -    | -      | -     |        |      |
| HCM Control Delay (s)    | 7.4    | -     | -      | 11.4  | 9.1    | 20.1  | 11.4   | 0    | -      | -     |        |      |
| HCM Lane LOS             | A      | -     | -      | B     | A      | C     | B      | A    | -      | -     |        |      |
| HCM 95th %tile Q(veh)    | 0.1    | -     | -      | 0     | 0.1    | 4     | 0      | 0    | -      | -     |        |      |

Timings  
1: Powers & Bradley Rd.

Short-Term Total Traffic  
PM Peak Hour

|                      |  |  |  |  |  |   |
|----------------------|---|---|---|---|---|---|
| Lane Group           | WBL   | WBR   | NBT   | NBR   | SBL   | SBT   |
| Lane Configurations  |  |  |  |  |  |  |
| Traffic Volume (vph) | 633   | 647   | 311   | 795   | 804   | 468   |
| Future Volume (vph)  | 633   | 647   | 311   | 795   | 804   | 468   |
| Turn Type            | Prot  | Free  | NA  | pt+ov   | Prot  | NA  |
| Protected Phases     | 8   |   | 2   | 2 8   | 1   | 6   |
| Permitted Phases     | Free  |   |   |   |   |   |
| Detector Phase       | 8   |   | 2   | 2 8   | 1   | 6   |
| Switch Phase         |   |   |   |   |   |   |
| Minimum Initial (s)  | 4.0   |   | 4.0   |   | 4.0   | 4.0   |
| Minimum Split (s)    | 9.0   |   | 9.0   |   | 9.0   | 9.0   |
| Total Split (s)      | 27.0  |   | 42.0  |   | 31.0  | 73.0  |
| Total Split (%)      | 27.0%   |   | 42.0%   |   | 31.0%   | 73.0%   |
| Yellow Time (s)      | 3.0   |   | 3.0   |   | 3.0   | 3.0   |
| All-Red Time (s)     | 2.0   |   | 2.0   |   | 2.0   | 2.0   |
| Lost Time Adjust (s) | 0.0   |   | 0.0   |   | 0.0   | 0.0   |
| Total Lost Time (s)  | 5.0   |   | 5.0   |   | 5.0   | 5.0   |
| Lead/Lag             |   |   | Lag   |   | Lead  |   |
| Lead-Lag Optimize?   |   |   | Yes   |   | Yes   |   |
| Recall Mode          | None  |   | None  |   | None  | None  |
| Act Effect Green (s) | 21.5  | 88.0  | 25.5  | 52.1  | 25.8  | 56.4  |
| Actuated g/C Ratio   | 0.24  | 1.00  | 0.29  | 0.59  | 0.29  | 0.64  |
| v/c Ratio            | 0.82  | 0.44  | 0.33  | 0.52  | 0.87  | 0.22  |
| Control Delay        | 41.9  | 0.9   | 25.0  | 11.4  | 41.5  | 6.8   |
| Queue Delay          | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay          | 41.9  | 0.9   | 25.0  | 11.4  | 41.5  | 6.8   |
| LOS                  | D   | A   | C   | B   | D   | A   |
| Approach Delay       | 21.2  |   | 15.2  |   |   | 28.7  |
| Approach LOS         | C   |   | B   |   |   | C   |

Intersection Summary

























Cycle Length: 100  
 Actuated Cycle Length: 88  
 Natural Cycle: 50  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.87  
 Intersection Signal Delay: 22.0  
 Intersection LOS: C  
 Intersection Capacity Utilization 62.1%  
 ICU Level of Service B  
 Analysis Period (min) 15

Splits and Phases: 1: Powers & Bradley Rd.



# Timings 2: Legacy Hill Dr & Bradley Rd.

Short-Term Total Traffic  
PM Peak Hour

|                      |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group           | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations  |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph) | 411   | 903   | 286   | 137   | 611   | 127   | 208   | 5   | 59  | 209   | 8   | 461   |
| Future Volume (vph)  | 411   | 903   | 286   | 137   | 611   | 127   | 208   | 5   | 59  | 209   | 8   | 461   |
| Turn Type            | Prot  | NA  | Perm  | pm+pt   | NA  | Perm  | Prot  | NA  | Perm  | Prot  | NA  | Perm  |
| Protected Phases     | 5   | 2   |   | 1   | 6   |   | 3   | 8   |   | 7   | 4   |   |
| Permitted Phases     |   |   | 2   | 6   |   | 6   |   |   | 8   |   |   | 4   |
| Detector Phase       | 5   | 2   | 2   | 1   | 6   | 6   | 3   | 8   | 8   | 7   | 4   | 4   |
| Switch Phase         |   |   |   |   |   |   |   |   |   |   |   |   |
| Minimum Initial (s)  | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   |
| Minimum Split (s)    | 10.0  | 23.0  | 23.0  | 10.0  | 23.0  | 23.0  | 10.0  | 23.0  | 23.0  | 10.0  | 23.0  | 23.0  |
| Total Split (s)      | 24.0  | 50.0  | 50.0  | 10.0  | 36.0  | 36.0  | 17.0  | 28.0  | 28.0  | 12.0  | 23.0  | 23.0  |
| Total Split (%)      | 24.0%   | 50.0%   | 50.0%   | 10.0%   | 36.0%   | 36.0%   | 17.0%   | 28.0%   | 28.0%   | 12.0%   | 23.0%   | 23.0%   |
| Yellow Time (s)      | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |
| All-Red Time (s)     | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s) | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Lost Time (s)  | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   |
| Lead/Lag             | Lead  | Lag   | Lag   | Lead  | Lag   | Lag   | Lead  | Lag   | Lag   | Lead  | Lag   | Lag   |
| Lead-Lag Optimize?   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   |
| Recall Mode          | None  | C-Max   | C-Max   | None  | C-Max   | C-Max   | None  | None  | None  | None  | None  | None  |
| Act Effect Green (s) | 17.7  | 45.7  | 45.7  | 39.0  | 33.5  | 33.5  | 11.2  | 19.5  | 19.5  | 11.4  | 17.6  | 17.6  |
| Actuated g/C Ratio   | 0.18  | 0.46  | 0.46  | 0.39  | 0.34  | 0.34  | 0.11  | 0.20  | 0.20  | 0.11  | 0.18  | 0.18  |
| v/c Ratio            | 0.80  | 0.63  | 0.37  | 0.68  | 0.56  | 0.23  | 0.64  | 0.02  | 0.15  | 0.63  | 0.03  | 0.97  |
| Control Delay        | 49.8  | 23.1  | 3.1   | 33.0  | 30.2  | 2.8   | 50.4  | 30.0  | 0.7   | 53.9  | 34.2  | 48.1  |
| Queue Delay          | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay          | 49.8  | 23.1  | 3.1   | 33.0  | 30.2  | 2.8   | 50.4  | 30.0  | 0.7   | 53.9  | 34.2  | 48.1  |
| LOS                  | D   | C   | A   | C   | C   | A   | D   | C   | A   | D   | C   | D   |
| Approach Delay       |   | 26.5  |   |   | 26.5  |   |   | 39.3  |   |   | 49.7  |   |
| Approach LOS         |   | C   |   |   | C   |   |   | D   |   |   | D   |   |

## Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

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

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 32.2

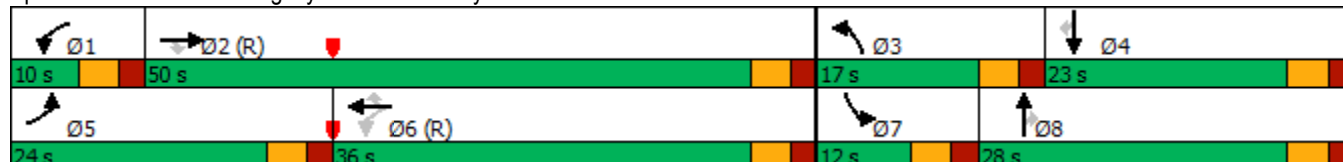
Intersection LOS: C

Intersection Capacity Utilization 63.9%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 2: Legacy Hill Dr & Bradley Rd.



HCM 6th TWSC  
3: Blackmeer Dr/Waterview North RIRO Access & Bradley Rd.







Short-Term Total Traffic  
PM Peak Hour

| Intersection             |        |       |      |        |      |      |        |      |      |        |      |      |
|--------------------------|--------|-------|------|--------|------|------|--------|------|------|--------|------|------|
| Int Delay, s/veh         | 1.3    |       |      |        |      |      |        |      |      |        |      |      |
| Movement                 | EBL    | EBT   | EBR  | WBL    | WBT  | WBR  | NBL    | NBT  | NBR  | SBL    | SBT  | SBR  |
| Lane Configurations      | ↰      | ↑↑    | ↱    |        | ↑↑   | ↱    |        |      | ↱    |        |      | ↱    |
| Traffic Vol, veh/h       | 134    | 970   | 67   | 0      | 816  | 89   | 0      | 0    | 22   | 0      | 0    | 59   |
| Future Vol, veh/h        | 134    | 970   | 67   | 0      | 816  | 89   | 0      | 0    | 22   | 0      | 0    | 59   |
| 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           | 300    | -     | 500  | -      | -    | 500  | -      | -    | 0    | -      | -    | 0    |
| Veh in Median Storage, # | -      | 0     | -    | -      | 0    | -    | -      | 0    | -    | -      | 0    | -    |
| Grade, %                 | -      | 0     | -    | -      | 0    | -    | -      | 0    | -    | -      | 0    | -    |
| Peak Hour Factor         | 85     | 86    | 85   | 85     | 92   | 85   | 85     | 85   | 85   | 85     | 85   | 85   |
| Heavy Vehicles, %        | 2      | 2     | 2    | 2      | 2    | 2    | 2      | 2    | 2    | 2      | 2    | 2    |
| Mvmt Flow                | 158    | 1128  | 79   | 0      | 887  | 105  | 0      | 0    | 26   | 0      | 0    | 69   |
| Major/Minor              | Major1 |       |      | Major2 |      |      | Minor1 |      |      | Minor2 |      |      |
| Conflicting Flow All     | 992    | 0     | 0    | -      | -    | 0    | -      | -    | 564  | -      | -    | 444  |
| Stage 1                  | -      | -     | -    | -      | -    | -    | -      | -    | -    | -      | -    | -    |
| Stage 2                  | -      | -     | -    | -      | -    | -    | -      | -    | -    | -      | -    | -    |
| Critical Hdwy            | 4.14   | -     | -    | -      | -    | -    | -      | -    | 6.94 | -      | -    | 6.94 |
| Critical Hdwy Stg 1      | -      | -     | -    | -      | -    | -    | -      | -    | -    | -      | -    | -    |
| Critical Hdwy Stg 2      | -      | -     | -    | -      | -    | -    | -      | -    | -    | -      | -    | -    |
| Follow-up Hdwy           | 2.22   | -     | -    | -      | -    | -    | -      | -    | 3.32 | -      | -    | 3.32 |
| Pot Cap-1 Maneuver       | 693    | -     | -    | 0      | -    | -    | 0      | 0    | 469  | 0      | 0    | 561  |
| Stage 1                  | -      | -     | -    | 0      | -    | -    | 0      | 0    | -    | 0      | 0    | -    |
| Stage 2                  | -      | -     | -    | 0      | -    | -    | 0      | 0    | -    | 0      | 0    | -    |
| Platoon blocked, %       | -      | -     | -    | -      | -    | -    | -      | -    | -    | -      | -    | -    |
| Mov Cap-1 Maneuver       | 693    | -     | -    | -      | -    | -    | -      | -    | 469  | -      | -    | 561  |
| Mov Cap-2 Maneuver       | -      | -     | -    | -      | -    | -    | -      | -    | -    | -      | -    | -    |
| Stage 1                  | -      | -     | -    | -      | -    | -    | -      | -    | -    | -      | -    | -    |
| Stage 2                  | -      | -     | -    | -      | -    | -    | -      | -    | -    | -      | -    | -    |
| Approach                 | EB     |       |      | WB     |      |      | NB     |      |      | SB     |      |      |
| HCM Control Delay, s     | 1.4    |       |      | 0      |      |      | 13.1   |      |      | 12.3   |      |      |
| HCM LOS                  |        |       |      |        |      |      | B      |      |      | B      |      |      |
| Minor Lane/Major Mvmt    | NBLn1  | EBL   | EBT  | EBR    | WBT  | WBR  | SBLn1  |      |      |        |      |      |
| Capacity (veh/h)         | 469    | 693   | -    | -      | -    | -    | 561    |      |      |        |      |      |
| HCM Lane V/C Ratio       | 0.055  | 0.227 | -    | -      | -    | -    | 0.124  |      |      |        |      |      |
| HCM Control Delay (s)    | 13.1   | 11.7  | -    | -      | -    | -    | 12.3   |      |      |        |      |      |
| HCM Lane LOS             | B      | B     | -    | -      | -    | -    | B      |      |      |        |      |      |
| HCM 95th %tile Q(veh)    | 0.2    | 0.9   | -    | -      | -    | -    | 0.4    |      |      |        |      |      |



























HCM 6th TWSC  
26: Legacy Hill Dr & Commercial Access

Short-Term Total Traffic  
PM Peak Hour

| Intersection             |   |   |   |   |   |   |
|--------------------------|---|---|---|---|---|---|
| Int Delay, s/veh         | 5.5   |   |   |   |   |   |
| Movement                 | EBL   | EBR   | NBL   | NBT   | SBT   | SBR   |
| Lane Configurations      |  |  |  |  |  |  |
| Traffic Vol, veh/h       | 2   | 236   | 224   | 338   | 503   | 4   |
| Future Vol, veh/h        | 2   | 236   | 224   | 338   | 503   | 4   |
| Conflicting Peds, #/hr   | 0   | 0   | 0   | 0   | 0   | 0   |
| Sign Control             | Stop  | Stop  | Free  | Free  | Free  | Free  |
| RT Channelized           | -   | None  | -   | None  | -   | None  |
| Storage Length           | 0   | 0   | 200   | -   | -   | -   |
| Veh in Median Storage, # | 0   | -   | -   | 0   | 0   | -   |
| Grade, %                 | 0   | -   | -   | 0   | 0   | -   |
| Peak Hour Factor         | 85  | 85  | 85  | 85  | 85  | 85  |
| Heavy Vehicles, %        | 2   | 2   | 2   | 2   | 2   | 2   |
| Mvmt Flow                | 2   | 278   | 264   | 398   | 592   | 5   |
|                          |   |   |   |   |   |   |
| Major/Minor              | Minor2  | Major1  |   | Major2  |   |   |
| Conflicting Flow All     | 1322  | 595   | 597   | 0   | -   | 0   |
| Stage 1                  | 595   | -   | -   | -   | -   | -   |
| Stage 2                  | 727   | -   | -   | -   | -   | -   |
| Critical Hdwy            | 6.63  | 6.23  | 4.13  | -   | -   | -   |
| Critical Hdwy Stg 1      | 5.43  | -   | -   | -   | -   | -   |
| Critical Hdwy Stg 2      | 5.83  | -   | -   | -   | -   | -   |
| Follow-up Hdwy           | 3.519   | 3.319   | 2.219   | -   | -   | -   |
| Pot Cap-1 Maneuver       | 197   | 503   | 978   | -   | -   | -   |
| Stage 1                  | 550   | -   | -   | -   | -   | -   |
| Stage 2                  | 563   | -   | -   | -   | -   | -   |
| Platoon blocked, %       | 1   |   |   | -   | -   | -   |
| Mov Cap-1 Maneuver       | 144   | 503   | 978   | -   | -   | -   |
| Mov Cap-2 Maneuver       | 277   | -   | -   | -   | -   | -   |
| Stage 1                  | 402   | -   | -   | -   | -   | -   |
| Stage 2                  | 563   | -   | -   | -   | -   | -   |
|                          |   |   |   |   |   |   |
| Approach                 | EB  | NB  |   | SB  |   |   |
| HCM Control Delay, s     | 20.6  | 4   |   | 0   |   |   |
| HCM LOS                  | C   |   |   |   |   |   |
|                          |   |   |   |   |   |   |
| Minor Lane/Major Mvmt    | NBL   | NBT   | EBLn1   | EBLn2   | SBT   | SBR   |
| Capacity (veh/h)         | 978   | -   | 277   | 503   | -   | -   |
| HCM Lane V/C Ratio       | 0.269   | -   | 0.008   | 0.552   | -   | -   |
| HCM Control Delay (s)    | 10  | -   | 18.1  | 20.6  | -   | -   |
| HCM Lane LOS             | B   | -   | C   | C   | -   | -   |
| HCM 95th %tile Q(veh)    | 1.1   | -   | 0   | 3.3   | -   | -   |

Timings  
101: Marksheffel Rd & Bradley Rd

Short-Term Total Traffic  
PM Peak Hour

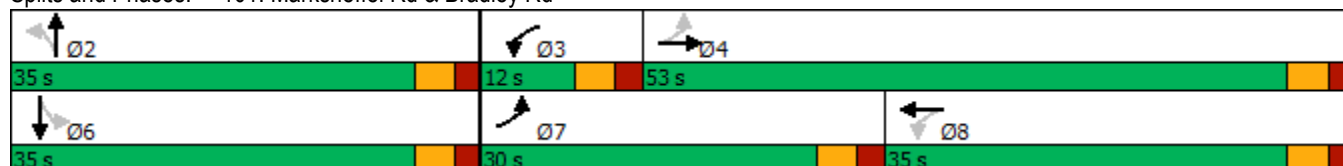
|                      |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group           | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations  |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph) | 546   | 358   | 169   | 77  | 305   | 18  | 130   | 338   | 47  | 11  | 469   | 428   |
| Future Volume (vph)  | 546   | 358   | 169   | 77  | 305   | 18  | 130   | 338   | 47  | 11  | 469   | 428   |
| Turn Type            | pm+pt   | NA  | Free  | pm+pt   | NA  | Free  | Perm  | NA  | Free  | Perm  | NA  | Free  |
| Protected Phases     | 7   | 4   |   | 3   | 8   |   |   | 2   |   |   | 6   |   |
| Permitted Phases     | 4   |   | Free  | 8   |   | Free  | 2   |   | Free  | 6   |   | Free  |
| Detector Phase       | 7   | 4   |   | 3   | 8   |   | 2   | 2   |   | 6   | 6   |   |
| Switch Phase         |   |   |   |   |   |   |   |   |   |   |   |   |
| Minimum Initial (s)  | 5.0   | 4.0   |   | 5.0   | 4.0   |   | 4.0   | 4.0   |   | 4.0   | 4.0   |   |
| Minimum Split (s)    | 10.0  | 21.0  |   | 10.0  | 21.0  |   | 21.0  | 21.0  |   | 21.0  | 21.0  |   |
| Total Split (s)      | 30.0  | 53.0  |   | 12.0  | 35.0  |   | 35.0  | 35.0  |   | 35.0  | 35.0  |   |
| Total Split (%)      | 30.0%   | 53.0%   |   | 12.0%   | 35.0%   |   | 35.0%   | 35.0%   |   | 35.0%   | 35.0%   |   |
| Yellow Time (s)      | 3.0   | 3.0   |   | 3.0   | 3.0   |   | 3.0   | 3.0   |   | 3.0   | 3.0   |   |
| All-Red Time (s)     | 2.0   | 2.0   |   | 2.0   | 2.0   |   | 2.0   | 2.0   |   | 2.0   | 2.0   |   |
| Lost Time Adjust (s) | 0.0   | 0.0   |   | 0.0   | 0.0   |   | 0.0   | 0.0   |   | 0.0   | 0.0   |   |
| Total Lost Time (s)  | 5.0   | 5.0   |   | 5.0   | 5.0   |   | 5.0   | 5.0   |   | 5.0   | 5.0   |   |
| Lead/Lag             | Lead  | Lag   |   | Lead  | Lag   |   |   |   |   |   |   |   |
| Lead-Lag Optimize?   | Yes   | Yes   |   | Yes   | Yes   |   |   |   |   |   |   |   |
| Recall Mode          | None  | None  |   | None  | None  |   | Max   | Max   |   | Max   | Max   |   |
| Act Effect Green (s) | 43.4  | 33.9  | 83.4  | 20.1  | 13.4  | 83.4  | 30.0  | 30.0  | 83.4  | 30.0  | 30.0  | 83.4  |
| Actuated g/C Ratio   | 0.52  | 0.41  | 1.00  | 0.24  | 0.16  | 1.00  | 0.36  | 0.36  | 1.00  | 0.36  | 0.36  | 1.00  |
| v/c Ratio            | 0.95  | 0.29  | 0.12  | 0.30  | 0.62  | 0.01  | 0.56  | 0.29  | 0.03  | 0.04  | 0.42  | 0.31  |
| Control Delay        | 43.5  | 18.0  | 0.2   | 16.3  | 37.6  | 0.0   | 32.9  | 20.3  | 0.0   | 19.0  | 21.8  | 0.5   |
| Queue Delay          | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay          | 43.5  | 18.0  | 0.2   | 16.3  | 37.6  | 0.0   | 32.9  | 20.3  | 0.0   | 19.0  | 21.8  | 0.5   |
| LOS                  | D   | B   | A   | B   | D   | A   | C   | C   | A   | B   | C   | A   |
| Approach Delay       |   | 28.2  |   |   | 31.8  |   |   | 21.6  |   |   | 11.8  |   |
| Approach LOS         |   | C   |   |   | C   |   |   | C   |   |   | B   |   |

Intersection Summary

Cycle Length: 100  
 Actuated Cycle Length: 83.4  
 Natural Cycle: 75  
 Control Type: Semi Act-Uncoord  
 Maximum v/c Ratio: 0.95  
 Intersection Signal Delay: 22.4  
 Intersection Capacity Utilization 75.5%  
 Analysis Period (min) 15

Intersection LOS: C  
 ICU Level of Service D

Splits and Phases: 101: Marksheffel Rd & Bradley Rd



























HCM 6th TWSC  
107: Legacy Dr & North Commercial Access/E/W Collector

Short-Term Total Traffic  
PM Peak Hour

| Intersection             |        |       |        |       |        |       |        |      |        |       |        |      |
|--------------------------|--------|-------|--------|-------|--------|-------|--------|------|--------|-------|--------|------|
| Int Delay, s/veh         | 7.7    |       |        |       |        |       |        |      |        |       |        |      |
| Movement                 | EBL    | EBT   | EBR    | WBL   | WBT    | WBR   | NBL    | NBT  | NBR    | SBL   | SBT    | SBR  |
| Lane Configurations      | ↰      | ↱     |        | ↰     | ↱      |       | ↰      | ↱    | ↰      | ↱     | ↰      | ↱    |
| Traffic Vol, veh/h       | 5      | 9     | 79     | 183   | 3      | 0     | 75     | 45   | 202    | 0     | 184    | 13   |
| Future Vol, veh/h        | 5      | 9     | 79     | 183   | 3      | 0     | 75     | 45   | 202    | 0     | 184    | 13   |
| Conflicting Peds, #/hr   | 0      | 0     | 0      | 0     | 0      | 0     | 0      | 0    | 0      | 0     | 0      | 0    |
| Sign Control             | Stop   | Stop  | Stop   | Stop  | Stop   | Stop  | Free   | Free | Free   | Free  | Free   | Free |
| RT Channelized           | -      | -     | None   | -     | -      | None  | -      | -    | None   | -     | -      | None |
| Storage Length           | 0      | -     | -      | 155   | -      | -     | 105    | -    | -      | 100   | -      | -    |
| Veh in Median Storage, # | -      | 0     | -      | -     | 0      | -     | -      | 0    | -      | -     | 0      | -    |
| Grade, %                 | -      | 0     | -      | -     | 0      | -     | -      | 0    | -      | -     | 0      | -    |
| Peak Hour Factor         | 85     | 85    | 85     | 85    | 85     | 85    | 85     | 85   | 85     | 85    | 85     | 85   |
| Heavy Vehicles, %        | 2      | 2     | 2      | 2     | 2      | 2     | 2      | 2    | 2      | 2     | 2      | 2    |
| Mvmt Flow                | 6      | 11    | 93     | 215   | 4      | 0     | 88     | 53   | 238    | 0     | 216    | 15   |
| Major/Minor              | Minor2 |       | Minor1 |       | Major1 |       | Major2 |      | Major2 |       | Major2 |      |
| Conflicting Flow All     | 574    | 691   | 224    | 505   | 460    | 53    | 231    | 0    | 0      | 291   | 0      | 0    |
| Stage 1                  | 224    | 224   | -      | 229   | 229    | -     | -      | -    | -      | -     | -      | -    |
| Stage 2                  | 350    | 467   | -      | 276   | 231    | -     | -      | -    | -      | -     | -      | -    |
| Critical Hdwy            | 7.12   | 6.52  | 6.22   | 7.12  | 6.52   | 6.22  | 4.12   | -    | -      | 4.12  | -      | -    |
| Critical Hdwy Stg 1      | 6.12   | 5.52  | -      | 6.12  | 5.52   | -     | -      | -    | -      | -     | -      | -    |
| Critical Hdwy Stg 2      | 6.12   | 5.52  | -      | 6.12  | 5.52   | -     | -      | -    | -      | -     | -      | -    |
| Follow-up Hdwy           | 3.518  | 4.018 | 3.318  | 3.518 | 4.018  | 3.318 | 2.218  | -    | -      | 2.218 | -      | -    |
| Pot Cap-1 Maneuver       | 430    | 368   | 815    | 478   | 498    | 1014  | 1337   | -    | -      | 1271  | -      | -    |
| Stage 1                  | 779    | 718   | -      | 774   | 715    | -     | -      | -    | -      | -     | -      | -    |
| Stage 2                  | 666    | 562   | -      | 730   | 713    | -     | -      | -    | -      | -     | -      | -    |
| Platoon blocked, %       |        |       |        |       |        |       |        | -    | -      | -     | -      | -    |
| Mov Cap-1 Maneuver       | 406    | 344   | 815    | 393   | 465    | 1014  | 1337   | -    | -      | 1271  | -      | -    |
| Mov Cap-2 Maneuver       | 406    | 344   | -      | 393   | 465    | -     | -      | -    | -      | -     | -      | -    |
| Stage 1                  | 728    | 718   | -      | 723   | 668    | -     | -      | -    | -      | -     | -      | -    |
| Stage 2                  | 619    | 525   | -      | 637   | 713    | -     | -      | -    | -      | -     | -      | -    |
| Approach                 | EB     |       | WB     |       | NB     |       | SB     |      | SB     |       | SB     |      |
| HCM Control Delay, s     | 11.1   |       | 24.5   |       | 1.8    |       | 0      |      | 0      |       | 0      |      |
| HCM LOS                  | B      |       | C      |       |        |       |        |      |        |       |        |      |
| Minor Lane/Major Mvmt    | NBL    | NBT   | NBR    | EBLn1 | EBLn2  | WBLn1 | WBLn2  | SBL  | SBT    | SBR   |        |      |
| Capacity (veh/h)         | 1337   | -     | -      | 406   | 715    | 393   | 465    | 1271 | -      | -     |        |      |
| HCM Lane V/C Ratio       | 0.066  | -     | -      | 0.014 | 0.145  | 0.548 | 0.008  | -    | -      | -     |        |      |
| HCM Control Delay (s)    | 7.9    | -     | -      | 14    | 10.9   | 24.7  | 12.8   | 0    | -      | -     |        |      |
| HCM Lane LOS             | A      | -     | -      | B     | B      | C     | B      | A    | -      | -     |        |      |
| HCM 95th %tile Q(veh)    | 0.2    | -     | -      | 0     | 0.5    | 3.2   | 0      | 0    | -      | -     |        |      |

Timings  
1: Powers & Bradley Rd

2040 Background Traffic  
AM Peak Hour

|                      |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group           | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations  |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph) | 26  | 151   | 75  | 553   | 360   | 913   | 100  | 1302  | 408   | 464   | 750   | 19  |
| Future Volume (vph)  | 26  | 151   | 75  | 553   | 360   | 913   | 100  | 1302  | 408   | 464   | 750   | 19  |
| Turn Type            | pm+pt   | NA  | Free  | Prot  | NA  | Free  | Prot   | NA  | pt+ov   | Prot  | NA  | Perm  |
| Protected Phases     | 7   | 4   |   | 3   | 8   |   | 5  | 2   | 2 3   | 1   | 6   |   |
| Permitted Phases     | 4   |   | Free  |   |   | Free  |  |   |   |   |   | 6   |
| Detector Phase       | 7   | 4   |   | 3   | 8   |   | 5  | 2   | 2 3   | 1   | 6   | 6   |
| Switch Phase         |   |   |   |   |   |   |  |   |   |   |   |   |
| Minimum Initial (s)  | 4.0   | 10.0  |   | 4.0   | 4.0   |   | 4.0  | 4.0   |   | 4.0   | 4.0   | 4.0   |
| Minimum Split (s)    | 9.0   | 15.0  |   | 9.0   | 9.0   |   | 9.0  | 9.0   |   | 9.0   | 9.0   | 9.0   |
| Total Split (s)      | 10.0  | 19.0  |   | 32.0  | 41.0  |   | 15.0   | 55.0  |   | 24.0  | 64.0  | 64.0  |
| Total Split (%)      | 7.7%  | 14.6%   |   | 24.6%   | 31.5%   |   | 11.5%  | 42.3%   |   | 18.5%   | 49.2%   | 49.2%   |
| Yellow Time (s)      | 3.0   | 3.0   |   | 3.0   | 3.0   |   | 3.0  | 3.0   |   | 3.0   | 3.0   | 3.0   |
| All-Red Time (s)     | 2.0   | 2.0   |   | 2.0   | 2.0   |   | 2.0  | 2.0   |   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s) | -1.0  | -1.0  |   | -2.0  | -1.0  |   | -1.0   | -2.0  |   | -2.0  | -2.0  | -1.0  |
| Total Lost Time (s)  | 4.0   | 4.0   |   | 3.0   | 4.0   |   | 4.0  | 3.0   |   | 3.0   | 3.0   | 4.0   |
| Lead/Lag             | Lead  | Lag   |   | Lead  | Lag   |   | Lead   | Lag   |   | Lead  | Lag   | Lag   |
| Lead-Lag Optimize?   | Yes   | Yes   |   | Yes   | Yes   |   | Yes  | Yes   |   | Yes   | Yes   | Yes   |
| Recall Mode          | None  | None  |   | None  | None  |   | None   | None  |   | C-Max   | None  | None  |
| Act Effect Green (s) | 18.5  | 12.5  | 130.0   | 27.3  | 36.9  | 130.0   | 9.9  | 52.0  | 80.3  | 25.1  | 66.2  | 65.2  |
| Actuated g/C Ratio   | 0.14  | 0.10  | 1.00  | 0.21  | 0.28  | 1.00  | 0.08   | 0.40  | 0.62  | 0.19  | 0.51  | 0.50  |
| v/c Ratio            | 0.15  | 0.47  | 0.05  | 0.79  | 0.37  | 0.59  | 0.39   | 0.95  | 0.24  | 0.72  | 0.43  | 0.02  |
| Control Delay        | 32.7  | 60.0  | 0.1   | 58.0  | 37.7  | 2.8   | 61.5   | 52.4  | 6.4   | 56.8  | 21.7  | 0.1   |
| Queue Delay          | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay          | 32.7  | 60.0  | 0.1   | 58.0  | 37.7  | 2.8   | 61.5   | 52.4  | 6.4   | 56.8  | 21.7  | 0.1   |
| LOS                  | C   | E   | A   | E   | D   | A   | E  | D   | A   | E   | C   | A   |
| Approach Delay       |   | 39.3  |   |   | 26.4  |   |  | 42.5  |   |   | 34.6  |   |
| Approach LOS         |   | D   |   |   | C   |   |  | D   |   |   | C   |   |

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 125 (96%), Referenced to phase 1:SBL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 34.7

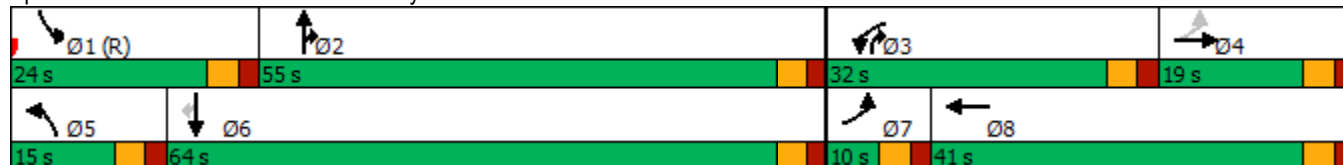
Intersection LOS: C

Intersection Capacity Utilization 86.7%

ICU Level of Service E

























Analysis Period (min) 15

Splits and Phases: 1: Powers & Bradley Rd



# Timings 2: Legacy Dr & Bradley Rd

2040 Background Traffic  
AM Peak Hour

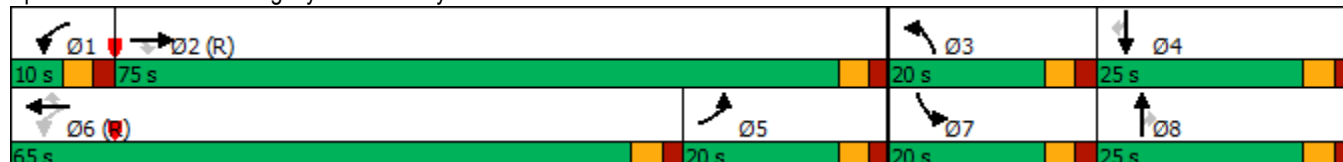
|                      |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group           | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations  |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph) | 5   | 885   | 133   | 94  | 1557  | 57  | 267   | 5   | 123   | 12  | 5   | 2   |
| Future Volume (vph)  | 5   | 885   | 133   | 94  | 1557  | 57  | 267   | 5   | 123   | 12  | 5   | 2   |
| Turn Type            | Prot  | NA  | Perm  | pm+pt   | NA  | Perm  | Prot  | NA  | Perm  | Prot  | NA  | Perm  |
| Protected Phases     | 5   | 2   |   | 1   | 6   |   | 3   | 8   |   | 7   | 4   |   |
| Permitted Phases     |   |   | 2   | 6   |   | 6   |   |   | 8   |   |   | 4   |
| Detector Phase       | 5   | 2   | 2   | 1   | 6   | 6   | 3   | 8   | 8   | 7   | 4   | 4   |
| Switch Phase         |   |   |   |   |   |   |   |   |   |   |   |   |
| Minimum Initial (s)  | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 15.0  | 5.0   | 5.0   | 15.0  | 10.0  | 10.0  |
| Minimum Split (s)    | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  | 20.0  | 10.0  | 10.0  | 20.0  | 15.0  | 15.0  |
| Total Split (s)      | 20.0  | 75.0  | 75.0  | 10.0  | 65.0  | 65.0  | 20.0  | 25.0  | 25.0  | 20.0  | 25.0  | 25.0  |
| Total Split (%)      | 15.4%   | 57.7%   | 57.7%   | 7.7%  | 50.0%   | 50.0%   | 15.4%   | 19.2%   | 19.2%   | 15.4%   | 19.2%   | 19.2%   |
| Yellow Time (s)      | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |
| All-Red Time (s)     | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s) | -1.0  | -1.0  | -1.0  | -1.0  | -1.0  | -1.0  | -1.0  | -1.0  | -1.0  | -1.0  | -1.0  | -1.0  |
| Total Lost Time (s)  | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| Lead/Lag             | Lag   | Lag   | Lag   | Lead  | Lead  | Lead  | Lead  | Lag   | Lag   | Lead  | Lag   | Lag   |
| Lead-Lag Optimize?   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   |
| Recall Mode          | None  | C-Max   | C-Max   | None  | C-Max   | C-Max   | None  | None  | None  | None  | None  | None  |
| Act Effect Green (s) | 8.5   | 87.6  | 87.6  | 96.4  | 96.4  | 96.4  | 18.4  | 13.6  | 13.6  | 16.0  | 11.2  | 11.2  |
| Actuated g/C Ratio   | 0.07  | 0.67  | 0.67  | 0.74  | 0.74  | 0.74  | 0.14  | 0.10  | 0.10  | 0.12  | 0.09  | 0.09  |
| v/c Ratio            | 0.02  | 0.39  | 0.13  | 0.24  | 0.62  | 0.05  | 0.58  | 0.03  | 0.44  | 0.03  | 0.03  | 0.01  |
| Control Delay        | 34.4  | 4.0   | 0.2   | 8.7   | 12.4  | 0.6   | 57.2  | 54.8  | 11.7  | 50.5  | 54.8  | 0.0   |
| Queue Delay          | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay          | 34.4  | 4.0   | 0.2   | 8.7   | 12.4  | 0.6   | 57.2  | 54.8  | 11.7  | 50.5  | 54.8  | 0.0   |
| LOS                  | C   | A   | A   | A   | B   | A   | E   | D   | B   | D   | D   | A   |
| Approach Delay       |   | 3.6   |   |   | 11.8  |   |   | 43.0  |   |   | 46.5  |   |
| Approach LOS         |   | A   |   |   | B   |   |   | D   |   |   | D   |   |

## Intersection Summary

Cycle Length: 130  
 Actuated Cycle Length: 130  
 Offset: 102 (78%), Referenced to phase 2:EBT and 6:WBTL, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.62  
 Intersection Signal Delay: 13.3  
 Intersection Capacity Utilization 71.5%  
 Analysis Period (min) 15

Intersection LOS: B  
 ICU Level of Service C

Splits and Phases: 2: Legacy Dr & Bradley Rd




HCM 6th TWSC  
3: Blackmer St/Waterview North RIRO Access & Bradley Rd

2040 Background Traffic  
AM Peak Hour

| Intersection             |        |      |      |        |      |      |        |       |      |        |      |      |
|--------------------------|--------|------|------|--------|------|------|--------|-------|------|--------|------|------|
| Int Delay, s/veh         | 0.1    |      |      |        |      |      |        |       |      |        |      |      |
| Movement                 | EBL    | EBT  | EBR  | WBL    | WBT  | WBR  | NBL    | NBT   | NBR  | SBL    | SBT  | SBR  |
| Lane Configurations      |        | ↑↑   | ↑    |        | ↑↑   | ↑    |        |       | ↑    |        |      | ↑    |
| Traffic Vol, veh/h       | 0      | 1004 | 16   | 0      | 1708 | 0    | 0      | 0     | 31   | 0      | 0    | 0    |
| Future Vol, veh/h        | 0      | 1004 | 16   | 0      | 1708 | 0    | 0      | 0     | 31   | 0      | 0    | 0    |
| Conflicting Peds, #/hr   | 0      | 0    | 0    | 0      | 0    | 0    | 0      | 0     | 0    | 0      | 0    | 0    |
| Sign Control             | Free   | Free | Free | Free   | Free | Free | Stop   | Stop  | Stop | Stop   | Stop | Stop |
| RT Channelized           | -      | -    | None | -      | -    | None | -      | -     | None | -      | -    | None |
| Storage Length           | -      | -    | 0    | -      | -    | 0    | -      | -     | 0    | -      | -    | 0    |
| Veh in Median Storage, # | -      | 0    | -    | -      | 0    | -    | -      | 0     | -    | -      | 0    | -    |
| Grade, %                 | -      | 0    | -    | -      | 0    | -    | -      | 0     | -    | -      | 0    | -    |
| Peak Hour Factor         | 95     | 95   | 95   | 95     | 95   | 95   | 95     | 95    | 95   | 95     | 95   | 95   |
| Heavy Vehicles, %        | 2      | 2    | 2    | 2      | 2    | 2    | 2      | 2     | 2    | 2      | 2    | 2    |
| Mvmt Flow                | 0      | 1057 | 17   | 0      | 1798 | 0    | 0      | 0     | 33   | 0      | 0    | 0    |
| Major/Minor              | Major1 |      |      | Major2 |      |      | Minor1 |       |      | Minor2 |      |      |
| Conflicting Flow All     | -      | 0    | 0    | -      | -    | 0    | -      | -     | 529  | -      | -    | 899  |
| Stage 1                  | -      | -    | -    | -      | -    | -    | -      | -     | -    | -      | -    | -    |
| Stage 2                  | -      | -    | -    | -      | -    | -    | -      | -     | -    | -      | -    | -    |
| Critical Hdwy            | -      | -    | -    | -      | -    | -    | -      | -     | 6.94 | -      | -    | 6.94 |
| Critical Hdwy Stg 1      | -      | -    | -    | -      | -    | -    | -      | -     | -    | -      | -    | -    |
| Critical Hdwy Stg 2      | -      | -    | -    | -      | -    | -    | -      | -     | -    | -      | -    | -    |
| Follow-up Hdwy           | -      | -    | -    | -      | -    | -    | -      | -     | 3.32 | -      | -    | 3.32 |
| Pot Cap-1 Maneuver       | 0      | -    | -    | 0      | -    | -    | 0      | 0     | 494  | 0      | 0    | 282  |
| Stage 1                  | 0      | -    | -    | 0      | -    | -    | 0      | 0     | -    | 0      | 0    | -    |
| Stage 2                  | 0      | -    | -    | 0      | -    | -    | 0      | 0     | -    | 0      | 0    | -    |
| Platoon blocked, %       | -      | -    | -    | -      | -    | -    | -      | -     | -    | -      | -    | -    |
| Mov Cap-1 Maneuver       | -      | -    | -    | -      | -    | -    | -      | -     | 494  | -      | -    | 282  |
| Mov Cap-2 Maneuver       | -      | -    | -    | -      | -    | -    | -      | -     | -    | -      | -    | -    |
| Stage 1                  | -      | -    | -    | -      | -    | -    | -      | -     | -    | -      | -    | -    |
| Stage 2                  | -      | -    | -    | -      | -    | -    | -      | -     | -    | -      | -    | -    |
| Approach                 | EB     |      |      | WB     |      |      | NB     |       |      | SB     |      |      |
| HCM Control Delay, s     | 0      |      |      | 0      |      |      | 12.8   |       |      | 0      |      |      |
| HCM LOS                  |        |      |      |        |      |      | B      |       |      | A      |      |      |
| Minor Lane/Major Mvmt    | NBLn1  |      |      | EBT    | EBR  | WBT  | WBR    | SBLn1 |      |        |      |      |
| Capacity (veh/h)         | 494    |      |      | -      | -    | -    | -      | -     |      |        |      |      |
| HCM Lane V/C Ratio       | 0.066  |      |      | -      | -    | -    | -      | -     |      |        |      |      |
| HCM Control Delay (s)    | 12.8   |      |      | -      | -    | -    | -      | 0     |      |        |      |      |
| HCM Lane LOS             | B      |      |      | -      | -    | -    | -      | A     |      |        |      |      |
| HCM 95th %tile Q(veh)    | 0.2    |      |      | -      | -    | -    | -      | -     |      |        |      |      |

Timings  
101: Marksheffel Rd & Bradley Rd

2040 Background Traffic  
AM Peak Hour

|                      |  |       |       |       |       |       |       |       |       |       |       |       |
|----------------------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Lane Group           | EBL  | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations  |  |       |       |       |       |       |       |       |       |       |       |       |
| Traffic Volume (vph) | 405  | 355   | 134   | 95    | 515   | 285   | 176   | 600   | 50    | 140   | 275   | 257   |
| Future Volume (vph)  | 405  | 355   | 134   | 95    | 515   | 285   | 176   | 600   | 50    | 140   | 275   | 257   |
| Turn Type            | Prot   | NA    | Free  | pm+pt | NA    | Free  | pm+pt | NA    | Free  | pm+pt | NA    | Free  |
| Protected Phases     | 5  | 2     |       | 1     | 6     |       | 3     | 8     |       | 7     | 4     |       |
| Permitted Phases     |  |       | Free  | 6     |       | Free  | 8     |       | Free  | 4     |       | Free  |
| Detector Phase       | 5  | 2     |       | 1     | 6     |       | 3     | 8     |       | 7     | 4     |       |
| Switch Phase         |  |       |       |       |       |       |       |       |       |       |       |       |
| Minimum Initial (s)  | 5.0  | 4.0   |       | 5.0   | 4.0   |       | 5.0   | 4.0   |       | 5.0   | 4.0   |       |
| Minimum Split (s)    | 10.0   | 21.0  |       | 10.0  | 21.0  |       | 10.0  | 21.0  |       | 10.0  | 21.0  |       |
| Total Split (s)      | 27.0   | 64.4  |       | 10.0  | 47.4  |       | 15.0  | 40.6  |       | 15.0  | 40.6  |       |
| Total Split (%)      | 20.8%  | 49.5% |       | 7.7%  | 36.5% |       | 11.5% | 31.2% |       | 11.5% | 31.2% |       |
| Yellow Time (s)      | 3.0  | 3.0   |       | 3.0   | 3.0   |       | 3.0   | 3.0   |       | 3.0   | 3.0   |       |
| All-Red Time (s)     | 2.0  | 2.0   |       | 2.0   | 2.0   |       | 2.0   | 2.0   |       | 2.0   | 2.0   |       |
| Lost Time Adjust (s) | 0.0  | 0.0   |       | 0.0   | 0.0   |       | 0.0   | 0.0   |       | 0.0   | 0.0   |       |
| Total Lost Time (s)  | 5.0  | 5.0   |       | 5.0   | 5.0   |       | 5.0   | 5.0   |       | 5.0   | 5.0   |       |
| Lead/Lag             | Lead   | Lag   |       | Lead  | Lag   |       | Lead  | Lag   |       | Lead  | Lag   |       |
| Lead-Lag Optimize?   | Yes  | Yes   |       | Yes   | Yes   |       | Yes   | Yes   |       | Yes   | Yes   |       |
| Recall Mode          | None   | C-Max |       | None  | C-Max |       | None  | Max   |       | None  | Max   |       |
| Act Effect Green (s) | 20.1   | 59.4  | 130.0 | 49.3  | 44.3  | 130.0 | 45.9  | 35.9  | 130.0 | 45.3  | 35.6  | 130.0 |
| Actuated g/C Ratio   | 0.15   | 0.46  | 1.00  | 0.38  | 0.34  | 1.00  | 0.35  | 0.28  | 1.00  | 0.35  | 0.27  | 1.00  |
| v/c Ratio            | 0.80   | 0.23  | 0.09  | 0.25  | 0.45  | 0.19  | 0.46  | 0.65  | 0.03  | 0.60  | 0.30  | 0.17  |
| Control Delay        | 65.2   | 21.9  | 0.1   | 19.5  | 35.2  | 0.3   | 32.2  | 45.2  | 0.0   | 37.6  | 38.3  | 0.2   |
| Queue Delay          | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay          | 65.2   | 21.9  | 0.1   | 19.5  | 35.2  | 0.3   | 32.2  | 45.2  | 0.0   | 37.6  | 38.3  | 0.2   |
| LOS                  | E  | C     | A     | B     | D     | A     | C     | D     | A     | D     | D     | A     |
| Approach Delay       |  | 38.3  |       |       | 22.4  |       |       | 39.7  |       |       | 23.6  |       |
| Approach LOS         |  | D     |       |       | C     |       |       | D     |       |       | C     |       |

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

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

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 31.3

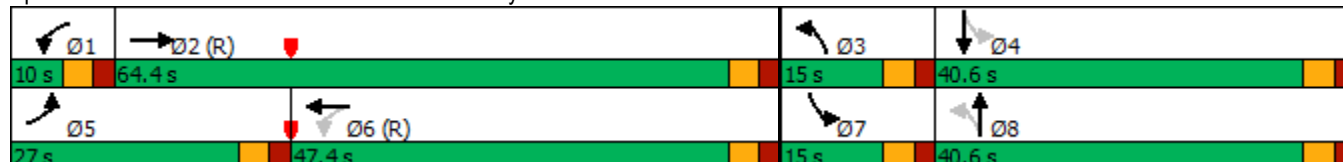
Intersection LOS: C

Intersection Capacity Utilization 66.8%

ICU Level of Service C

Analysis Period (min) 15

























Splits and Phases: 101: Marksheffel Rd & Bradley Rd





Timings  
1: Powers & Bradley Rd

2040 Background Traffic  
PM Peak Hour

|                      |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Lane Group           | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL  | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations  |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph) | 71  | 305   | 210   | 434   | 326   | 563   | 175  | 654   | 645   | 519   | 1203  | 110   |
| Future Volume (vph)  | 71  | 305   | 210   | 434   | 326   | 563   | 175  | 654   | 645   | 519   | 1203  | 110   |
| Turn Type            | pm+pt   | NA  | Free  | Prot  | NA  | Free  | Prot   | NA  | pt+ov   | Prot  | NA  | Perm  |
| Protected Phases     | 7   | 4   |   | 3   | 8   |   | 5  | 2   | 2 3   | 1   | 6   |   |
| Permitted Phases     | 4   |   | Free  |   |   | Free  |  |   |   |   |   | 6   |
| Detector Phase       | 7   | 4   |   | 3   | 8   |   | 5  | 2   | 2 3   | 1   | 6   | 6   |
| Switch Phase         |   |   |   |   |   |   |  |   |   |   |   |   |
| Minimum Initial (s)  | 4.0   | 4.0   |   | 4.0   | 4.0   |   | 4.0  | 4.0   |   | 4.0   | 4.0   | 4.0   |
| Minimum Split (s)    | 9.0   | 9.0   |   | 9.0   | 9.0   |   | 9.0  | 9.0   |   | 9.0   | 9.0   | 9.0   |
| Total Split (s)      | 10.0  | 26.0  |   | 34.0  | 50.0  |   | 15.0   | 40.0  |   | 30.0  | 55.0  | 55.0  |
| Total Split (%)      | 7.7%  | 20.0%   |   | 26.2%   | 38.5%   |   | 11.5%  | 30.8%   |   | 23.1%   | 42.3%   | 42.3%   |
| Yellow Time (s)      | 3.0   | 3.0   |   | 3.0   | 3.0   |   | 3.0  | 3.0   |   | 3.0   | 3.0   | 3.0   |
| All-Red Time (s)     | 2.0   | 2.0   |   | 2.0   | 2.0   |   | 2.0  | 2.0   |   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s) | -1.0  | -1.0  |   | -1.0  | -1.0  |   | -1.0   | -1.0  |   | -1.0  | -1.0  | -1.0  |
| Total Lost Time (s)  | 4.0   | 4.0   |   | 4.0   | 4.0   |   | 4.0  | 4.0   |   | 4.0   | 4.0   | 4.0   |
| Lead/Lag             | Lead  | Lag   |   | Lead  | Lag   |   | Lead   | Lag   |   | Lead  | Lag   | Lag   |
| Lead-Lag Optimize?   | Yes   | Yes   |   | Yes   | Yes   |   | Yes  | Yes   |   | Yes   | Yes   | Yes   |
| Recall Mode          | None  | None  |   | None  | None  |   | None   | Max   |   | C-Max   | Max   | Max   |
| Act Effect Green (s) | 24.0  | 18.0  | 130.0   | 24.5  | 38.4  | 130.0   | 12.0   | 36.0  | 63.5  | 35.6  | 59.6  | 59.6  |
| Actuated g/C Ratio   | 0.18  | 0.14  | 1.00  | 0.19  | 0.30  | 1.00  | 0.09   | 0.28  | 0.49  | 0.27  | 0.46  | 0.46  |
| v/c Ratio            | 0.34  | 0.66  | 0.14  | 0.69  | 0.32  | 0.37  | 0.57   | 0.69  | 0.47  | 0.57  | 0.76  | 0.14  |
| Control Delay        | 32.8  | 59.5  | 0.2   | 51.3  | 37.4  | 0.6   | 63.9   | 46.3  | 19.0  | 45.1  | 34.8  | 2.2   |
| Queue Delay          | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay          | 32.8  | 59.5  | 0.2   | 51.3  | 37.4  | 0.6   | 63.9   | 46.3  | 19.0  | 45.1  | 34.8  | 2.2   |
| LOS                  | C   | E   | A   | D   | D   | A   | E  | D   | B   | D   | C   | A   |
| Approach Delay       |   | 35.0  |   |   | 26.3  |   |  | 36.4  |   |   | 35.7  |   |
| Approach LOS         |   | D   |   |   | C   |   |  | D   |   |   | D   |   |

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 1 (1%), Referenced to phase 1:SBL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 33.5

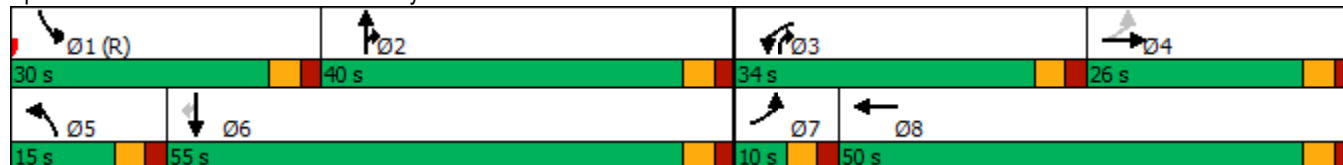
Intersection LOS: C

Intersection Capacity Utilization 72.4%

ICU Level of Service C

























Analysis Period (min) 15

Splits and Phases: 1: Powers & Bradley Rd



# Timings 2: Legacy Dr & Bradley Rd

2040 Background Traffic  
PM Peak Hour

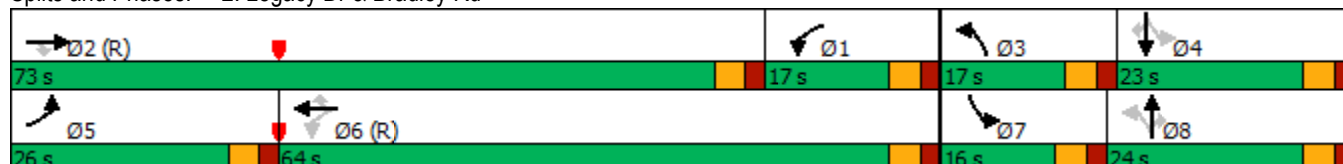
|                      |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group           | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations  |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph) | 2   | 1033  | 433   | 257   | 1009  | 12  | 309   | 5   | 190   | 52  | 5   | 5   |
| Future Volume (vph)  | 2   | 1033  | 433   | 257   | 1009  | 12  | 309   | 5   | 190   | 52  | 5   | 5   |
| Turn Type            | Prot  | NA  | Perm  | pm+pt   | NA  | Perm  | pm+pt   | NA  | Perm  | pm+pt   | NA  | Perm  |
| Protected Phases     | 5   | 2   |   | 1   | 6   |   | 3   | 8   |   | 7   | 4   |   |
| Permitted Phases     |   |   | 2   | 6   |   | 6   | 8   |   | 8   | 4   |   | 4   |
| Detector Phase       | 5   | 2   | 2   | 1   | 6   | 6   | 3   | 8   | 8   | 7   | 4   | 4   |
| Switch Phase         |   |   |   |   |   |   |   |   |   |   |   |   |
| Minimum Initial (s)  | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   |
| Minimum Split (s)    | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  |
| Total Split (s)      | 26.0  | 73.0  | 73.0  | 17.0  | 64.0  | 64.0  | 17.0  | 24.0  | 24.0  | 16.0  | 23.0  | 23.0  |
| Total Split (%)      | 20.0%   | 56.2%   | 56.2%   | 13.1%   | 49.2%   | 49.2%   | 13.1%   | 18.5%   | 18.5%   | 12.3%   | 17.7%   | 17.7%   |
| Yellow Time (s)      | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |
| All-Red Time (s)     | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s) | -1.0  | -1.0  | -1.0  | -1.0  | -1.0  | -1.0  | -1.0  | -1.0  | -1.0  | -1.0  | -1.0  | -1.0  |
| Total Lost Time (s)  | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| Lead/Lag             | Lead  | Lead  | Lead  | Lag   | Lag   | Lag   | Lead  | Lag   | Lag   | Lead  | Lag   | Lag   |
| Lead-Lag Optimize?   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   |
| Recall Mode          | None  | C-Max   | C-Max   | None  | C-Max   | C-Max   | None  | None  | None  | None  | None  | None  |
| Act Effect Green (s) | 6.6   | 84.3  | 84.3  | 99.1  | 99.1  | 99.1  | 20.6  | 10.6  | 10.6  | 12.1  | 7.8   | 7.8   |
| Actuated g/C Ratio   | 0.05  | 0.65  | 0.65  | 0.76  | 0.76  | 0.76  | 0.16  | 0.08  | 0.08  | 0.09  | 0.06  | 0.06  |
| v/c Ratio            | 0.01  | 0.47  | 0.38  | 0.62  | 0.39  | 0.01  | 0.69  | 0.03  | 0.64  | 0.17  | 0.05  | 0.02  |
| Control Delay        | 59.0  | 19.6  | 6.4   | 23.8  | 6.9   | 0.0   | 57.8  | 53.6  | 17.0  | 48.8  | 56.8  | 0.2   |
| Queue Delay          | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay          | 59.0  | 19.6  | 6.4   | 23.8  | 6.9   | 0.0   | 57.8  | 53.6  | 17.0  | 48.8  | 56.8  | 0.2   |
| LOS                  | E   | B   | A   | C   | A   | A   | E   | D   | B   | D   | E   | A   |
| Approach Delay       |   | 15.8  |   |   | 10.2  |   |   | 42.3  |   |   | 45.7  |   |
| Approach LOS         |   | B   |   |   | B   |   |   | D   |   |   | D   |   |

## Intersection Summary

Cycle Length: 130  
 Actuated Cycle Length: 130  
 Offset: 67 (52%), Referenced to phase 2:EBT and 6:WBTL, Start of Green  
 Natural Cycle: 60  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.69  
 Intersection Signal Delay: 18.2  
 Intersection Capacity Utilization 68.3%  
 Analysis Period (min) 15

Intersection LOS: B  
 ICU Level of Service C

Splits and Phases: 2: Legacy Dr & Bradley Rd



























HCM 6th TWSC  
3: Blackmer St/Waterview North RIRO Access & Bradley Rd

2040 Background Traffic  
PM Peak Hour

| Intersection             |        |      |      |        |      |      |        |      |      |        |      |      |
|--------------------------|--------|------|------|--------|------|------|--------|------|------|--------|------|------|
| Int Delay, s/veh         | 0.1    |      |      |        |      |      |        |      |      |        |      |      |
| Movement                 | EBL    | EBT  | EBR  | WBL    | WBT  | WBR  | NBL    | NBT  | NBR  | SBL    | SBT  | SBR  |
| Lane Configurations      |        | ↑↑   | ↑    |        | ↑↑   | ↑    |        |      | ↑    |        |      | ↑    |
| Traffic Vol, veh/h       | 0      | 1221 | 54   | 0      | 1278 | 0    | 0      | 0    | 20   | 0      | 0    | 0    |
| Future Vol, veh/h        | 0      | 1221 | 54   | 0      | 1278 | 0    | 0      | 0    | 20   | 0      | 0    | 0    |
| Conflicting Peds, #/hr   | 0      | 0    | 0    | 0      | 0    | 0    | 0      | 0    | 0    | 0      | 0    | 0    |
| Sign Control             | Free   | Free | Free | Free   | Free | Free | Stop   | Stop | Stop | Stop   | Stop | Stop |
| RT Channelized           | -      | -    | None | -      | -    | None | -      | -    | None | -      | -    | None |
| Storage Length           | -      | -    | 0    | -      | -    | 0    | -      | -    | 0    | -      | -    | 0    |
| Veh in Median Storage, # | -      | 0    | -    | -      | 0    | -    | -      | 0    | -    | -      | 0    | -    |
| Grade, %                 | -      | 0    | -    | -      | 0    | -    | -      | 0    | -    | -      | 0    | -    |
| Peak Hour Factor         | 95     | 95   | 95   | 95     | 95   | 95   | 95     | 95   | 95   | 95     | 95   | 95   |
| Heavy Vehicles, %        | 2      | 2    | 2    | 2      | 2    | 2    | 2      | 2    | 2    | 2      | 2    | 2    |
| Mvmt Flow                | 0      | 1285 | 57   | 0      | 1345 | 0    | 0      | 0    | 21   | 0      | 0    | 0    |
| Major/Minor              | Major1 |      |      | Major2 |      |      | Minor1 |      |      | Minor2 |      |      |
| Conflicting Flow All     | -      | 0    | 0    | -      | -    | 0    | -      | -    | 643  | -      | -    | 673  |
| Stage 1                  | -      | -    | -    | -      | -    | -    | -      | -    | -    | -      | -    | -    |
| Stage 2                  | -      | -    | -    | -      | -    | -    | -      | -    | -    | -      | -    | -    |
| Critical Hdwy            | -      | -    | -    | -      | -    | -    | -      | -    | 6.94 | -      | -    | 6.94 |
| Critical Hdwy Stg 1      | -      | -    | -    | -      | -    | -    | -      | -    | -    | -      | -    | -    |
| Critical Hdwy Stg 2      | -      | -    | -    | -      | -    | -    | -      | -    | -    | -      | -    | -    |
| Follow-up Hdwy           | -      | -    | -    | -      | -    | -    | -      | -    | 3.32 | -      | -    | 3.32 |
| Pot Cap-1 Maneuver       | 0      | -    | -    | 0      | -    | -    | 0      | 0    | 416  | 0      | 0    | 398  |
| Stage 1                  | 0      | -    | -    | 0      | -    | -    | 0      | 0    | -    | 0      | 0    | -    |
| Stage 2                  | 0      | -    | -    | 0      | -    | -    | 0      | 0    | -    | 0      | 0    | -    |
| Platoon blocked, %       | -      | -    | -    | -      | -    | -    | -      | -    | -    | -      | -    | -    |
| Mov Cap-1 Maneuver       | -      | -    | -    | -      | -    | -    | -      | -    | 416  | -      | -    | 398  |
| Mov Cap-2 Maneuver       | -      | -    | -    | -      | -    | -    | -      | -    | -    | -      | -    | -    |
| Stage 1                  | -      | -    | -    | -      | -    | -    | -      | -    | -    | -      | -    | -    |
| Stage 2                  | -      | -    | -    | -      | -    | -    | -      | -    | -    | -      | -    | -    |
| Approach                 | EB     |      |      | WB     |      |      | NB     |      |      | SB     |      |      |
| HCM Control Delay, s     | 0      |      |      | 0      |      |      | 14.1   |      |      | 0      |      |      |
| HCM LOS                  |        |      |      |        |      |      | B      |      |      | A      |      |      |
| Minor Lane/Major Mvmt    | NBLn1  |      |      | EBT    |      |      | EBR    |      |      | WBT    |      |      |
| Capacity (veh/h)         | 416    |      |      | -      |      |      | -      |      |      | -      |      |      |
| HCM Lane V/C Ratio       | 0.051  |      |      | -      |      |      | -      |      |      | -      |      |      |
| HCM Control Delay (s)    | 14.1   |      |      | -      |      |      | -      |      |      | 0      |      |      |
| HCM Lane LOS             | B      |      |      | -      |      |      | -      |      |      | A      |      |      |
| HCM 95th %tile Q(veh)    | 0.2    |      |      | -      |      |      | -      |      |      | -      |      |      |

Timings  
101: Marksheffel Rd & Bradley Rd

2040 Background Traffic  
PM Peak Hour

|                      |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group           | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations  |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph) | 508   | 678   | 238   | 195   | 549   | 215   | 162   | 500   | 100   | 300   | 650   | 399   |
| Future Volume (vph)  | 508   | 678   | 238   | 195   | 549   | 215   | 162   | 500   | 100   | 300   | 650   | 399   |
| Turn Type            | Prot  | NA  | Free  | pm+pt   | NA  | Free  | pm+pt   | NA  | Free  | pm+pt   | NA  | Free  |
| Protected Phases     | 5   | 2   |   | 1   | 6   |   | 3   | 8   |   | 7   | 4   |   |
| Permitted Phases     |   |   | Free  | 6   |   | Free  | 8   |   | Free  | 4   |   | Free  |
| Detector Phase       | 5   | 2   |   | 1   | 6   |   | 3   | 8   |   | 7   | 4   |   |
| Switch Phase         |   |   |   |   |   |   |   |   |   |   |   |   |
| Minimum Initial (s)  | 5.0   | 4.0   |   | 5.0   | 4.0   |   | 5.0   | 4.0   |   | 5.0   | 4.0   |   |
| Minimum Split (s)    | 10.0  | 21.0  |   | 10.0  | 21.0  |   | 10.0  | 21.0  |   | 10.0  | 21.0  |   |
| Total Split (s)      | 35.0  | 55.0  |   | 15.0  | 35.0  |   | 30.0  | 30.0  |   | 30.0  | 30.0  |   |
| Total Split (%)      | 26.9%   | 42.3%   |   | 11.5%   | 26.9%   |   | 23.1%   | 23.1%   |   | 23.1%   | 23.1%   |   |
| Yellow Time (s)      | 3.0   | 3.0   |   | 3.0   | 3.0   |   | 3.0   | 3.0   |   | 3.0   | 3.0   |   |
| All-Red Time (s)     | 2.0   | 2.0   |   | 2.0   | 2.0   |   | 2.0   | 2.0   |   | 2.0   | 2.0   |   |
| Lost Time Adjust (s) | 0.0   | 0.0   |   | 0.0   | 0.0   |   | 0.0   | 0.0   |   | 0.0   | 0.0   |   |
| Total Lost Time (s)  | 5.0   | 5.0   |   | 5.0   | 5.0   |   | 5.0   | 5.0   |   | 5.0   | 5.0   |   |
| Lead/Lag             | Lead  | Lag   |   | Lead  | Lag   |   | Lead  | Lag   |   | Lead  | Lag   |   |
| Lead-Lag Optimize?   | Yes   | Yes   |   | Yes   | Yes   |   | Yes   | Yes   |   | Yes   | Yes   |   |
| Recall Mode          | None  | C-Max   |   | None  | C-Max   |   | None  | Max   |   | None  | Max   |   |
| Act Effect Green (s) | 25.2  | 50.1  | 130.0   | 44.8  | 34.8  | 130.0   | 42.7  | 28.6  | 130.0   | 55.0  | 35.9  | 130.0   |
| Actuated g/C Ratio   | 0.19  | 0.39  | 1.00  | 0.34  | 0.27  | 1.00  | 0.33  | 0.22  | 1.00  | 0.42  | 0.28  | 1.00  |
| v/c Ratio            | 0.81  | 0.52  | 0.16  | 0.64  | 0.61  | 0.14  | 0.59  | 0.68  | 0.07  | 0.81  | 0.70  | 0.27  |
| Control Delay        | 59.8  | 32.5  | 0.2   | 32.8  | 45.7  | 0.2   | 34.0  | 52.3  | 0.1   | 44.1  | 47.5  | 0.4   |
| Queue Delay          | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay          | 59.8  | 32.5  | 0.2   | 32.8  | 45.7  | 0.2   | 34.0  | 52.3  | 0.1   | 44.1  | 47.5  | 0.4   |
| LOS                  | E   | C   | A   | C   | D   | A   | C   | D   | A   | D   | D   | A   |
| Approach Delay       |   | 36.9  |   |   | 32.9  |   |   | 41.5  |   |   | 32.8  |   |
| Approach LOS         |   | D   |   |   | C   |   |   | D   |   |   | C   |   |

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

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

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 35.6

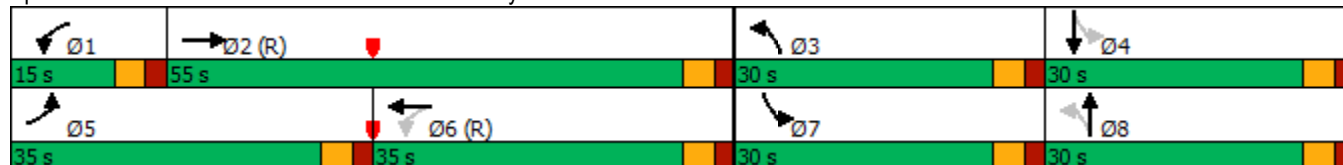
Intersection LOS: D

Intersection Capacity Utilization 76.8%

ICU Level of Service D

























Analysis Period (min) 15

Splits and Phases: 101: Marksheffel Rd & Bradley Rd



Timings  
1: Powers & Bradley Rd

2040 Total Traffic  
AM Peak Hour

|                      |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group           | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations  |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph) | 26  | 189   | 75  | 723   | 401   | 1035  | 100   | 1294  | 550   | 543   | 745   | 19  |
| Future Volume (vph)  | 26  | 189   | 75  | 723   | 401   | 1035  | 100   | 1294  | 550   | 543   | 745   | 19  |
| Turn Type            | pm+pt   | NA  | Free  | Prot  | NA  | Free  | Prot  | NA  | pt+ov   | Prot  | NA  | Perm  |
| Protected Phases     | 7   | 4   |   | 3   | 8   |   | 5   | 2   | 2 3   | 1   | 6   |   |
| Permitted Phases     | 4   |   | Free  |   |   | Free  |   |   |   |   |   | 6   |
| Detector Phase       | 7   | 4   |   | 3   | 8   |   | 5   | 2   | 2 3   | 1   | 6   | 6   |
| Switch Phase         |   |   |   |   |   |   |   |   |   |   |   |   |
| Minimum Initial (s)  | 4.0   | 10.0  |   | 4.0   | 4.0   |   | 4.0   | 4.0   |   | 4.0   | 4.0   | 4.0   |
| Minimum Split (s)    | 9.0   | 15.0  |   | 9.0   | 9.0   |   | 9.0   | 9.0   |   | 9.0   | 9.0   | 9.0   |
| Total Split (s)      | 10.0  | 18.0  |   | 33.0  | 41.0  |   | 15.0  | 53.0  |   | 26.0  | 64.0  | 64.0  |
| Total Split (%)      | 7.7%  | 13.8%   |   | 25.4%   | 31.5%   |   | 11.5%   | 40.8%   |   | 20.0%   | 49.2%   | 49.2%   |
| Yellow Time (s)      | 3.0   | 3.0   |   | 3.0   | 3.0   |   | 3.0   | 3.0   |   | 3.0   | 3.0   | 3.0   |
| All-Red Time (s)     | 2.0   | 2.0   |   | 2.0   | 2.0   |   | 2.0   | 2.0   |   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s) | -1.0  | -1.0  |   | -2.0  | -1.0  |   | -1.0  | -3.0  |   | -2.0  | -2.0  | -1.0  |
| Total Lost Time (s)  | 4.0   | 4.0   |   | 3.0   | 4.0   |   | 4.0   | 2.0   |   | 3.0   | 3.0   | 4.0   |
| Lead/Lag             | Lead  | Lag   |   | Lead  | Lag   |   | Lead  | Lag   |   | Lead  | Lag   | Lag   |
| Lead-Lag Optimize?   | Yes   | Yes   |   | Yes   | Yes   |   | Yes   | Yes   |   | Yes   | Yes   | Yes   |
| Recall Mode          | None  | None  |   | None  | None  |   | None  | None  |   | C-Max   | None  | None  |
| Act Effect Green (s) | 19.0  | 13.0  | 130.0   | 30.0  | 40.0  | 130.0   | 9.9   | 51.0  | 81.0  | 24.0  | 63.2  | 62.2  |
| Actuated g/C Ratio   | 0.15  | 0.10  | 1.00  | 0.23  | 0.31  | 1.00  | 0.08  | 0.39  | 0.62  | 0.18  | 0.49  | 0.48  |
| v/c Ratio            | 0.15  | 0.56  | 0.05  | 0.93  | 0.38  | 0.67  | 0.40  | 0.95  | 0.32  | 0.87  | 0.44  | 0.02  |
| Control Delay        | 32.1  | 62.2  | 0.1   | 76.1  | 44.8  | 4.4   | 61.7  | 53.5  | 9.7   | 67.3  | 23.2  | 0.1   |
| Queue Delay          | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay          | 32.1  | 62.2  | 0.1   | 76.1  | 44.8  | 4.4   | 61.7  | 53.5  | 9.7   | 67.3  | 23.2  | 0.1   |
| LOS                  | C   | E   | A   | E   | D   | A   | E   | D   | A   | E   | C   | A   |
| Approach Delay       |   | 43.5  |   |   | 35.9  |   |   | 41.6  |   |   | 41.2  |   |
| Approach LOS         |   | D   |   |   | D   |   |   | D   |   |   | D   |   |

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 125 (96%), Referenced to phase 1:SBL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 39.4

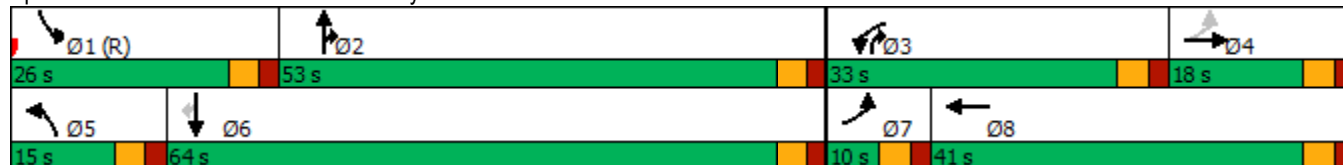
Intersection LOS: D

Intersection Capacity Utilization 93.6%

ICU Level of Service F

Analysis Period (min) 15

























Splits and Phases: 1: Powers & Bradley Rd





# Timings 2: Legacy Dr & Bradley Rd

2040 Total Traffic  
AM Peak Hour

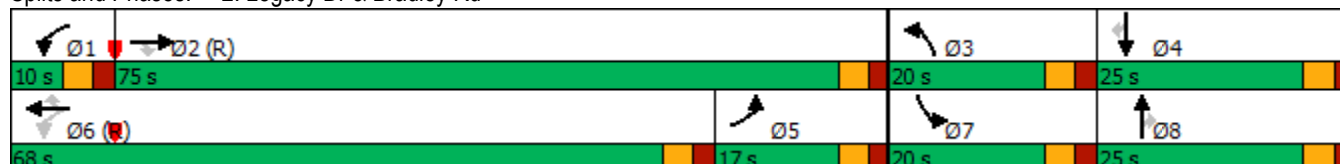
|                      |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group           | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations  |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph) | 233   | 915   | 133   | 94  | 1640  | 182   | 267   | 21  | 123   | 160   | 17  | 252   |
| Future Volume (vph)  | 233   | 915   | 133   | 94  | 1640  | 182   | 267   | 21  | 123   | 160   | 17  | 252   |
| Turn Type            | Prot  | NA  | Perm  | pm+pt   | NA  | Perm  | Prot  | NA  | Perm  | Prot  | NA  | Perm  |
| Protected Phases     | 5   | 2   |   | 1   | 6   |   | 3   | 8   |   | 7   | 4   |   |
| Permitted Phases     |   |   | 2   | 6   |   | 6   |   |   | 8   |   |   | 4   |
| Detector Phase       | 5   | 2   | 2   | 1   | 6   | 6   | 3   | 8   | 8   | 7   | 4   | 4   |
| Switch Phase         |   |   |   |   |   |   |   |   |   |   |   |   |
| Minimum Initial (s)  | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 15.0  | 10.0  | 10.0  | 15.0  | 10.0  | 10.0  |
| Minimum Split (s)    | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  | 20.0  | 15.0  | 15.0  | 20.0  | 15.0  | 15.0  |
| Total Split (s)      | 17.0  | 75.0  | 75.0  | 10.0  | 68.0  | 68.0  | 20.0  | 25.0  | 25.0  | 20.0  | 25.0  | 25.0  |
| Total Split (%)      | 13.1%   | 57.7%   | 57.7%   | 7.7%  | 52.3%   | 52.3%   | 15.4%   | 19.2%   | 19.2%   | 15.4%   | 19.2%   | 19.2%   |
| Yellow Time (s)      | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |
| All-Red Time (s)     | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s) | -1.0  | -1.0  | -1.0  | -1.0  | -1.0  | -1.0  | -1.0  | -1.0  | -1.0  | -1.0  | -1.0  | -1.0  |
| Total Lost Time (s)  | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| Lead/Lag             | Lag   | Lag   | Lag   | Lead  | Lead  | Lead  | Lead  | Lag   | Lag   | Lead  | Lag   | Lag   |
| Lead-Lag Optimize?   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   |
| Recall Mode          | None  | C-Max   | C-Max   | None  | C-Max   | C-Max   | None  | None  | None  | None  | None  | None  |
| Act Effect Green (s) | 13.0  | 74.5  | 74.5  | 69.6  | 69.6  | 69.6  | 16.0  | 15.4  | 15.4  | 16.0  | 15.4  | 15.4  |
| Actuated g/C Ratio   | 0.10  | 0.57  | 0.57  | 0.54  | 0.54  | 0.54  | 0.12  | 0.12  | 0.12  | 0.12  | 0.12  | 0.12  |
| v/c Ratio            | 0.71  | 0.47  | 0.14  | 0.35  | 0.91  | 0.21  | 0.67  | 0.10  | 0.41  | 0.40  | 0.08  | 0.79  |
| Control Delay        | 48.7  | 8.8   | 0.7   | 19.6  | 36.6  | 8.4   | 62.9  | 49.7  | 9.9   | 55.7  | 49.2  | 36.9  |
| Queue Delay          | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay          | 48.7  | 8.8   | 0.7   | 19.6  | 36.6  | 8.4   | 62.9  | 49.7  | 9.9   | 55.7  | 49.2  | 36.9  |
| LOS                  | D   | A   | A   | B   | D   | A   | E   | D   | A   | E   | D   | D   |
| Approach Delay       |   | 15.2  |   |   | 33.1  |   |   | 46.4  |   |   | 44.4  |   |
| Approach LOS         |   | B   |   |   | C   |   |   | D   |   |   | D   |   |

## Intersection Summary

Cycle Length: 130  
 Actuated Cycle Length: 130  
 Offset: 102 (78%), Referenced to phase 2:EBT and 6:WBTL, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.91  
 Intersection Signal Delay: 30.0  
 Intersection Capacity Utilization 79.3%  
 Analysis Period (min) 15

Intersection LOS: C  
 ICU Level of Service D

Splits and Phases: 2: Legacy Dr & Bradley Rd



Intersection

Int Delay, s/veh 1.2

| Movement                 | EBL  | EBT  | EBR  | WBL  | WBT  | WBR  | NBL  | NBT  | NBR  | SBL  | SBT  | SBR  |
|--------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations      |      | ↑↑   | ↑    |      | ↑↑   | ↑    |      |      | ↑    |      |      | ↑    |
| Traffic Vol, veh/h       | 40   | 1143 | 16   | 0    | 1821 | 27   | 0    | 0    | 31   | 0    | 0    | 95   |
| Future Vol, veh/h        | 40   | 1143 | 16   | 0    | 1821 | 27   | 0    | 0    | 31   | 0    | 0    | 95   |
| Conflicting Peds, #/hr   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |
| Sign Control             | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| RT Channelized           | -    | -    | None | -    | -    | None | -    | -    | None | -    | -    | None |
| Storage Length           | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    |
| Veh in Median Storage, # | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Grade, %                 | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    | -    | 0    | -    |
| Peak Hour Factor         | 95   | 95   | 95   | 95   | 95   | 95   | 95   | 95   | 95   | 95   | 95   | 95   |
| Heavy Vehicles, %        | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    | 2    |
| Mvmt Flow                | 42   | 1203 | 17   | 0    | 1917 | 28   | 0    | 0    | 33   | 0    | 0    | 100  |

| Major/Minor          | Major1 | Major2 | Minor1 | Minor2 |
|----------------------|--------|--------|--------|--------|
| Conflicting Flow All | 1945   | 0      | 0      | 959    |
| Stage 1              | -      | -      | -      | -      |
| Stage 2              | -      | -      | -      | -      |
| Critical Hdwy        | 4.14   | -      | -      | 6.94   |
| Critical Hdwy Stg 1  | -      | -      | -      | -      |
| Critical Hdwy Stg 2  | -      | -      | -      | -      |
| Follow-up Hdwy       | 2.22   | -      | -      | 3.32   |
| Pot Cap-1 Maneuver   | 297    | 0      | 0      | 257    |
| Stage 1              | -      | 0      | 0      | -      |
| Stage 2              | -      | 0      | 0      | -      |
| Platoon blocked, %   | -      | -      | -      | -      |
| Mov Cap-1 Maneuver   | 297    | -      | -      | 257    |
| Mov Cap-2 Maneuver   | -      | -      | -      | -      |
| Stage 1              | -      | -      | -      | -      |
| Stage 2              | -      | -      | -      | -      |

| Approach             | EB  | WB | NB   | SB   |
|----------------------|-----|----|------|------|
| HCM Control Delay, s | 0.6 | 0  | 13.8 | 27.7 |
| HCM LOS              |     |    | B    | D    |

| Minor Lane/Major Mvmt | NBLn1 | EBL   | EBT | EBR | WBT | WBR | SBLn1 |
|-----------------------|-------|-------|-----|-----|-----|-----|-------|
| Capacity (veh/h)      | 443   | 297   | -   | -   | -   | -   | 257   |
| HCM Lane V/C Ratio    | 0.074 | 0.142 | -   | -   | -   | -   | 0.389 |
| HCM Control Delay (s) | 13.8  | 19.1  | -   | -   | -   | -   | 27.7  |
| HCM Lane LOS          | B     | C     | -   | -   | -   | -   | D     |
| HCM 95th %tile Q(veh) | 0.2   | 0.5   | -   | -   | -   | -   | 1.8   |

























HCM 6th TWSC  
26: Legacy Dr & South Commercial Access

2040 Total Traffic  
AM Peak Hour

| Intersection             |        |        |       |        |      |      |
|--------------------------|--------|--------|-------|--------|------|------|
| Int Delay, s/veh         | 1.6    |        |       |        |      |      |
| Movement                 | EBL    | EBR    | NBL   | NBT    | SBT  | SBR  |
| Lane Configurations      | ↰      | ↰      | ↰     | ↰↰     | ↰    |      |
| Traffic Vol, veh/h       | 1      | 57     | 94    | 343    | 372  | 1    |
| Future Vol, veh/h        | 1      | 57     | 94    | 343    | 372  | 1    |
| 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      | 0      | 200   | -      | -    | -    |
| Veh in Median Storage, # | 0      | -      | -     | 0      | 0    | -    |
| Grade, %                 | 0      | -      | -     | 0      | 0    | -    |
| Peak Hour Factor         | 95     | 95     | 95    | 95     | 95   | 95   |
| Heavy Vehicles, %        | 2      | 2      | 2     | 2      | 2    | 2    |
| Mvmt Flow                | 1      | 60     | 99    | 361    | 392  | 1    |
| Major/Minor              | Minor2 | Major1 |       | Major2 |      |      |
| Conflicting Flow All     | 772    | 393    | 393   | 0      | -    | 0    |
| Stage 1                  | 393    | -      | -     | -      | -    | -    |
| Stage 2                  | 379    | -      | -     | -      | -    | -    |
| Critical Hdwy            | 6.63   | 6.23   | 4.13  | -      | -    | -    |
| Critical Hdwy Stg 1      | 5.43   | -      | -     | -      | -    | -    |
| Critical Hdwy Stg 2      | 5.83   | -      | -     | -      | -    | -    |
| Follow-up Hdwy           | 3.519  | 3.319  | 2.219 | -      | -    | -    |
| Pot Cap-1 Maneuver       | 467    | 655    | 1164  | -      | -    | -    |
| Stage 1                  | 681    | -      | -     | -      | -    | -    |
| Stage 2                  | 867    | -      | -     | -      | -    | -    |
| Platoon blocked, %       | 1      | -      | -     | -      | -    | -    |
| Mov Cap-1 Maneuver       | 427    | 655    | 1164  | -      | -    | -    |
| Mov Cap-2 Maneuver       | 427    | -      | -     | -      | -    | -    |
| Stage 1                  | 623    | -      | -     | -      | -    | -    |
| Stage 2                  | 867    | -      | -     | -      | -    | -    |
| Approach                 | EB     | NB     |       | SB     |      |      |
| HCM Control Delay, s     | 11.1   | 1.8    |       | 0      |      |      |
| HCM LOS                  | B      |        |       |        |      |      |
| Minor Lane/Major Mvmt    | NBL    | NBT    | EBLn1 | EBLn2  | SBT  | SBR  |
| Capacity (veh/h)         | 1164   | -      | 427   | 655    | -    | -    |
| HCM Lane V/C Ratio       | 0.085  | -      | 0.002 | 0.092  | -    | -    |
| HCM Control Delay (s)    | 8.4    | -      | 13.5  | 11.1   | -    | -    |
| HCM Lane LOS             | A      | -      | B     | B      | -    | -    |
| HCM 95th %tile Q(veh)    | 0.3    | -      | 0     | 0.3    | -    | -    |

Timings  
101: Marksheffel Rd & Bradley Rd

2040 Total Traffic  
AM Peak Hour

|                      |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group           | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations  |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph) | 494   | 378   | 161   | 95  | 547   | 285   | 222   | 600   | 50  | 140   | 275   | 318   |
| Future Volume (vph)  | 494   | 378   | 161   | 95  | 547   | 285   | 222   | 600   | 50  | 140   | 275   | 318   |
| Turn Type            | Prot  | NA  | Free  | pm+pt   | NA  | Free  | pm+pt   | NA  | Free  | pm+pt   | NA  | Free  |
| Protected Phases     | 5   | 2   |   | 1   | 6   |   | 3   | 8   |   | 7   | 4   |   |
| Permitted Phases     |   |   | Free  | 6   |   | Free  | 8   |   | Free  | 4   |   | Free  |
| Detector Phase       | 5   | 2   |   | 1   | 6   |   | 3   | 8   |   | 7   | 4   |   |
| Switch Phase         |   |   |   |   |   |   |   |   |   |   |   |   |
| Minimum Initial (s)  | 5.0   | 4.0   |   | 5.0   | 4.0   |   | 5.0   | 4.0   |   | 5.0   | 4.0   |   |
| Minimum Split (s)    | 10.0  | 21.0  |   | 10.0  | 21.0  |   | 10.0  | 21.0  |   | 10.0  | 21.0  |   |
| Total Split (s)      | 27.0  | 64.4  |   | 10.0  | 47.4  |   | 15.0  | 40.6  |   | 15.0  | 40.6  |   |
| Total Split (%)      | 20.8%   | 49.5%   |   | 7.7%  | 36.5%   |   | 11.5%   | 31.2%   |   | 11.5%   | 31.2%   |   |
| Yellow Time (s)      | 3.0   | 3.0   |   | 3.0   | 3.0   |   | 3.0   | 3.0   |   | 3.0   | 3.0   |   |
| All-Red Time (s)     | 2.0   | 2.0   |   | 2.0   | 2.0   |   | 2.0   | 2.0   |   | 2.0   | 2.0   |   |
| Lost Time Adjust (s) | 0.0   | 0.0   |   | 0.0   | 0.0   |   | 0.0   | 0.0   |   | 0.0   | 0.0   |   |
| Total Lost Time (s)  | 5.0   | 5.0   |   | 5.0   | 5.0   |   | 5.0   | 5.0   |   | 5.0   | 5.0   |   |
| Lead/Lag             | Lead  | Lag   |   | Lead  | Lag   |   | Lead  | Lag   |   | Lead  | Lag   |   |
| Lead-Lag Optimize?   | Yes   | Yes   |   | Yes   | Yes   |   | Yes   | Yes   |   | Yes   | Yes   |   |
| Recall Mode          | None  | C-Max   |   | None  | C-Max   |   | None  | Max   |   | None  | Max   |   |
| Act Effect Green (s) | 21.6  | 59.4  | 130.0   | 47.8  | 42.8  | 130.0   | 45.9  | 35.9  | 130.0   | 45.3  | 35.6  | 130.0   |
| Actuated g/C Ratio   | 0.17  | 0.46  | 1.00  | 0.37  | 0.33  | 1.00  | 0.35  | 0.28  | 1.00  | 0.35  | 0.27  | 1.00  |
| v/c Ratio            | 0.91  | 0.25  | 0.11  | 0.26  | 0.49  | 0.19  | 0.59  | 0.65  | 0.03  | 0.60  | 0.30  | 0.21  |
| Control Delay        | 74.5  | 22.1  | 0.1   | 19.8  | 36.8  | 0.3   | 36.5  | 45.2  | 0.0   | 37.6  | 38.4  | 0.3   |
| Queue Delay          | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay          | 74.5  | 22.1  | 0.1   | 19.8  | 36.8  | 0.3   | 36.5  | 45.2  | 0.0   | 37.6  | 38.4  | 0.3   |
| LOS                  | E   | C   | A   | B   | D   | A   | D   | D   | A   | D   | D   | A   |
| Approach Delay       |   | 43.7  |   |   | 23.9  |   |   | 40.4  |   |   | 21.7  |   |
| Approach LOS         |   | D   |   |   | C   |   |   | D   |   |   | C   |   |

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

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

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 33.2

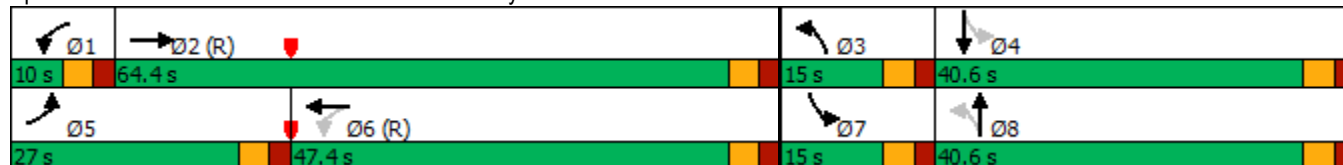
Intersection LOS: C

Intersection Capacity Utilization 70.2%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 101: Marksheffel Rd & Bradley Rd



HCM 6th TWSC  
107: Legacy Dr & North Commercial Access/E/W Collector

2040 Total Traffic  
AM Peak Hour

























| Intersection             |        |       |        |       |        |       |        |      |        |       |        |      |
|--------------------------|--------|-------|--------|-------|--------|-------|--------|------|--------|-------|--------|------|
| Int Delay, s/veh         | 7.7    |       |        |       |        |       |        |      |        |       |        |      |
| Movement                 | EBL    | EBT   | EBR    | WBL   | WBT    | WBR   | NBL    | NBT  | NBR    | SBL   | SBT    | SBR  |
| Lane Configurations      | ↰      | ↱     |        | ↰     | ↱      |       | ↰      | ↱    | ↰      | ↱     | ↰      |      |
| Traffic Vol, veh/h       | 3      | 3     | 18     | 300   | 4      | 0     | 31     | 252  | 61     | 0     | 55     | 5    |
| Future Vol, veh/h        | 3      | 3     | 18     | 300   | 4      | 0     | 31     | 252  | 61     | 0     | 55     | 5    |
| Conflicting Peds, #/hr   | 0      | 0     | 0      | 0     | 0      | 0     | 0      | 0    | 0      | 0     | 0      | 0    |
| Sign Control             | Stop   | Stop  | Stop   | Stop  | Stop   | Stop  | Free   | Free | Free   | Free  | Free   | Free |
| RT Channelized           | -      | -     | None   | -     | -      | None  | -      | -    | None   | -     | -      | None |
| Storage Length           | 0      | -     | -      | 155   | -      | -     | 105    | -    | -      | 100   | -      | -    |
| Veh in Median Storage, # | -      | 0     | -      | -     | 0      | -     | -      | 0    | -      | -     | 0      | -    |
| Grade, %                 | -      | 0     | -      | -     | 0      | -     | -      | 0    | -      | -     | 0      | -    |
| Peak Hour Factor         | 92     | 92    | 92     | 92    | 92     | 92    | 92     | 92   | 92     | 92    | 92     | 92   |
| Heavy Vehicles, %        | 2      | 2     | 2      | 2     | 2      | 2     | 2      | 2    | 2      | 2     | 2      | 2    |
| Mvmt Flow                | 3      | 3     | 20     | 326   | 4      | 0     | 34     | 274  | 66     | 0     | 60     | 5    |
| Major/Minor              | Minor2 |       | Minor1 |       | Major1 |       | Major2 |      | Major2 |       | Major2 |      |
| Conflicting Flow All     | 440    | 471   | 63     | 416   | 407    | 274   | 65     | 0    | 0      | 340   | 0      | 0    |
| Stage 1                  | 63     | 63    | -      | 342   | 342    | -     | -      | -    | -      | -     | -      | -    |
| Stage 2                  | 377    | 408   | -      | 74    | 65     | -     | -      | -    | -      | -     | -      | -    |
| Critical Hdwy            | 7.12   | 6.52  | 6.22   | 7.12  | 6.52   | 6.22  | 4.12   | -    | -      | 4.12  | -      | -    |
| Critical Hdwy Stg 1      | 6.12   | 5.52  | -      | 6.12  | 5.52   | -     | -      | -    | -      | -     | -      | -    |
| Critical Hdwy Stg 2      | 6.12   | 5.52  | -      | 6.12  | 5.52   | -     | -      | -    | -      | -     | -      | -    |
| Follow-up Hdwy           | 3.518  | 4.018 | 3.318  | 3.518 | 4.018  | 3.318 | 2.218  | -    | -      | 2.218 | -      | -    |
| Pot Cap-1 Maneuver       | 616    | 539   | 1002   | 643   | 595    | 884   | 1537   | -    | -      | 1239  | -      | -    |
| Stage 1                  | 948    | 842   | -      | 754   | 675    | -     | -      | -    | -      | -     | -      | -    |
| Stage 2                  | 716    | 623   | -      | 935   | 841    | -     | -      | -    | -      | -     | -      | -    |
| Platoon blocked, %       | 1      | 1     |        | 1     | 1      | 1     |        | -    | -      | 1     | -      | -    |
| Mov Cap-1 Maneuver       | 602    | 527   | 1002   | 617   | 582    | 884   | 1537   | -    | -      | 1239  | -      | -    |
| Mov Cap-2 Maneuver       | 602    | 527   | -      | 617   | 582    | -     | -      | -    | -      | -     | -      | -    |
| Stage 1                  | 927    | 842   | -      | 738   | 660    | -     | -      | -    | -      | -     | -      | -    |
| Stage 2                  | 696    | 609   | -      | 913   | 841    | -     | -      | -    | -      | -     | -      | -    |
| Approach                 | EB     |       | WB     |       | NB     |       | SB     |      | SB     |       | SB     |      |
| HCM Control Delay, s     | 9.4    |       | 17.1   |       | 0.7    |       | 0      |      |        |       |        |      |
| HCM LOS                  | A      |       | C      |       |        |       |        |      |        |       |        |      |
| Minor Lane/Major Mvmt    | NBL    | NBT   | NBR    | EBLn1 | EBLn2  | WBLn1 | WBLn2  | SBL  | SBT    | SBR   |        |      |
| Capacity (veh/h)         | 1537   | -     | -      | 602   | 888    | 617   | 582    | 1239 | -      | -     |        |      |
| HCM Lane V/C Ratio       | 0.022  | -     | -      | 0.005 | 0.026  | 0.529 | 0.007  | -    | -      | -     |        |      |
| HCM Control Delay (s)    | 7.4    | -     | -      | 11    | 9.2    | 17.2  | 11.2   | 0    | -      | -     |        |      |
| HCM Lane LOS             | A      | -     | -      | B     | A      | C     | B      | A    | -      | -     |        |      |
| HCM 95th %tile Q(veh)    | 0.1    | -     | -      | 0     | 0.1    | 3.1   | 0      | 0    | -      | -     |        |      |



# Timings

## 1: Powers & Bradley Rd

2040 Total Traffic  
PM Peak Hour

|                      |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group           | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations  |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph) | 71  | 364   | 210   | 671   | 385   | 700   | 175   | 639   | 887   | 691   | 1177  | 110   |
| Future Volume (vph)  | 71  | 364   | 210   | 671   | 385   | 700   | 175   | 639   | 887   | 691   | 1177  | 110   |
| Turn Type            | pm+pt   | NA  | Free  | Prot  | NA  | Free  | Prot  | NA  | pt+ov   | Prot  | NA  | Perm  |
| Protected Phases     | 7   | 4   |   | 3   | 8   |   | 5   | 2   | 2 3   | 1   | 6   |   |
| Permitted Phases     | 4   |   | Free  |   |   | Free  |   |   |   |   |   | 6   |
| Detector Phase       | 7   | 4   |   | 3   | 8   |   | 5   | 2   | 2 3   | 1   | 6   | 6   |
| Switch Phase         |   |   |   |   |   |   |   |   |   |   |   |   |
| Minimum Initial (s)  | 4.0   | 4.0   |   | 4.0   | 4.0   |   | 4.0   | 4.0   |   | 4.0   | 4.0   | 4.0   |
| Minimum Split (s)    | 9.0   | 9.0   |   | 9.0   | 9.0   |   | 9.0   | 9.0   |   | 9.0   | 9.0   | 9.0   |
| Total Split (s)      | 10.0  | 25.0  |   | 35.0  | 50.0  |   | 15.0  | 40.0  |   | 30.0  | 55.0  | 55.0  |
| Total Split (%)      | 7.7%  | 19.2%   |   | 26.9%   | 38.5%   |   | 11.5%   | 30.8%   |   | 23.1%   | 42.3%   | 42.3%   |
| Yellow Time (s)      | 3.0   | 3.0   |   | 3.0   | 3.0   |   | 3.0   | 3.0   |   | 3.0   | 3.0   | 3.0   |
| All-Red Time (s)     | 2.0   | 2.0   |   | 2.0   | 2.0   |   | 2.0   | 2.0   |   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s) | -1.0  | -1.0  |   | -1.0  | -1.0  |   | -1.0  | -1.0  |   | -1.0  | -1.0  | -1.0  |
| Total Lost Time (s)  | 4.0   | 4.0   |   | 4.0   | 4.0   |   | 4.0   | 4.0   |   | 4.0   | 4.0   | 4.0   |
| Lead/Lag             | Lead  | Lag   |   | Lead  | Lag   |   | Lead  | Lag   |   | Lead  | Lag   | Lag   |
| Lead-Lag Optimize?   | Yes   | Yes   |   | Yes   | Yes   |   | Yes   | Yes   |   | Yes   | Yes   | Yes   |
| Recall Mode          | None  | None  |   | None  | None  |   | None  | Max   |   | C-Max   | Max   | Max   |
| Act Effect Green (s) | 25.2  | 19.2  | 130.0   | 30.4  | 45.6  | 130.0   | 11.0  | 36.0  | 69.4  | 28.4  | 53.4  | 53.4  |
| Actuated g/C Ratio   | 0.19  | 0.15  | 1.00  | 0.23  | 0.35  | 1.00  | 0.08  | 0.28  | 0.53  | 0.22  | 0.41  | 0.41  |
| v/c Ratio            | 0.33  | 0.73  | 0.14  | 0.86  | 0.32  | 0.46  | 0.62  | 0.67  | 0.60  | 0.95  | 0.83  | 0.15  |
| Control Delay        | 30.4  | 61.7  | 0.2   | 54.7  | 25.3  | 0.7   | 67.2  | 45.8  | 20.0  | 72.9  | 41.2  | 2.3   |
| Queue Delay          | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay          | 30.4  | 61.7  | 0.2   | 54.7  | 25.3  | 0.7   | 67.2  | 45.8  | 20.0  | 72.9  | 41.2  | 2.3   |
| LOS                  | C   | E   | A   | D   | C   | A   | E   | D   | B   | E   | D   | A   |
| Approach Delay       |   | 38.2  |   |   | 26.7  |   |   | 34.5  |   |   | 50.1  |   |
| Approach LOS         |   | D   |   |   | C   |   |   | C   |   |   | D   |   |

### Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 1 (1%), Referenced to phase 1:SBL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 37.7

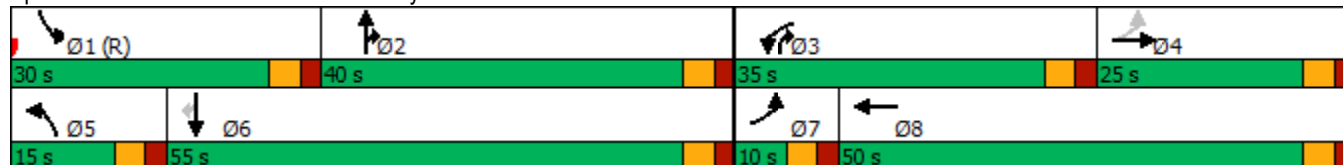
Intersection LOS: D

Intersection Capacity Utilization 80.1%

ICU Level of Service D

























Analysis Period (min) 15

Splits and Phases: 1: Powers & Bradley Rd



# Timings 2: Legacy Dr & Bradley Rd

2040 Total Traffic  
PM Peak Hour

|                      |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group           | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations  |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph) | 378   | 1131  | 433   | 257   | 1036  | 163   | 309   | 25  | 190   | 300   | 29  | 412   |
| Future Volume (vph)  | 378   | 1131  | 433   | 257   | 1036  | 163   | 309   | 25  | 190   | 300   | 29  | 412   |
| Turn Type            | Prot  | NA  | Perm  | pm+pt   | NA  | Perm  | pm+pt   | NA  | Perm  | pm+pt   | NA  | Perm  |
| Protected Phases     | 5   | 2   |   | 1   | 6   |   | 3   | 8   |   | 7   | 4   |   |
| Permitted Phases     |   |   | 2   | 6   |   | 6   | 8   |   | 8   | 4   |   | 4   |
| Detector Phase       | 5   | 2   | 2   | 1   | 6   | 6   | 3   | 8   | 8   | 7   | 4   | 4   |
| Switch Phase         |   |   |   |   |   |   |   |   |   |   |   |   |
| Minimum Initial (s)  | 5.0   | 5.0   | 5.0   | 5.0   | 10.0  | 10.0  | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   | 5.0   |
| Minimum Split (s)    | 10.0  | 10.0  | 10.0  | 10.0  | 15.0  | 15.0  | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  | 10.0  |
| Total Split (s)      | 30.0  | 70.0  | 70.0  | 20.0  | 60.0  | 60.0  | 17.0  | 24.0  | 24.0  | 16.0  | 23.0  | 23.0  |
| Total Split (%)      | 23.1%   | 53.8%   | 53.8%   | 15.4%   | 46.2%   | 46.2%   | 13.1%   | 18.5%   | 18.5%   | 12.3%   | 17.7%   | 17.7%   |
| Yellow Time (s)      | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   | 3.0   |
| All-Red Time (s)     | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   |
| Lost Time Adjust (s) | -1.0  | -1.0  | -1.0  | -1.0  | -1.0  | -1.0  | -1.0  | -1.0  | -1.0  | -1.0  | -1.0  | -1.0  |
| Total Lost Time (s)  | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   | 4.0   |
| Lead/Lag             | Lead  | Lag   | Lag   | Lead  | Lag   | Lag   | Lead  | Lag   | Lag   | Lead  | Lag   | Lag   |
| Lead-Lag Optimize?   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   | Yes   |
| Recall Mode          | None  | C-Max   | C-Max   | None  | C-Max   | C-Max   | None  | None  | None  | None  | None  | None  |
| Act Effect Green (s) | 21.2  | 69.4  | 69.4  | 77.6  | 62.9  | 62.9  | 30.9  | 17.9  | 17.9  | 28.9  | 16.9  | 16.9  |
| Actuated g/C Ratio   | 0.16  | 0.53  | 0.53  | 0.60  | 0.48  | 0.48  | 0.24  | 0.14  | 0.14  | 0.22  | 0.13  | 0.13  |
| v/c Ratio            | 0.71  | 0.63  | 0.43  | 0.80  | 0.64  | 0.21  | 0.47  | 0.10  | 0.51  | 0.48  | 0.13  | 0.94  |
| Control Delay        | 49.4  | 33.4  | 8.1   | 37.3  | 28.3  | 5.9   | 41.3  | 48.5  | 11.4  | 41.5  | 49.9  | 46.8  |
| Queue Delay          | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay          | 49.4  | 33.4  | 8.1   | 37.3  | 28.3  | 5.9   | 41.3  | 48.5  | 11.4  | 41.5  | 49.9  | 46.8  |
| LOS                  | D   | C   | A   | D   | C   | A   | D   | D   | B   | D   | D   | D   |
| Approach Delay       |   | 30.9  |   |   | 27.4  |   |   | 30.8  |   |   | 44.7  |   |
| Approach LOS         |   | C   |   |   | C   |   |   | C   |   |   | D   |   |

## Intersection Summary

Cycle Length: 130  
 Actuated Cycle Length: 130  
 Offset: 67 (52%), Referenced to phase 2:EBT and 6:WBTL, Start of Green  
 Natural Cycle: 70  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.94  
 Intersection Signal Delay: 32.0  
 Intersection Capacity Utilization 73.0%  
 Analysis Period (min) 15

Intersection LOS: C  
 ICU Level of Service C







Splits and Phases: 2: Legacy Dr & Bradley Rd



| Intersection             |        |       |      |        |      |      |        |      |      |        |      |      |
|--------------------------|--------|-------|------|--------|------|------|--------|------|------|--------|------|------|
| Int Delay, s/veh         | 1.1    |       |      |        |      |      |        |      |      |        |      |      |
| Movement                 | EBL    | EBT   | EBR  | WBL    | WBT  | WBR  | NBL    | NBT  | NBR  | SBL    | SBT  | SBR  |
| Lane Configurations      |        | ↑↑    | ↑    |        | ↑↑   | ↑    |        |      | ↑    |        |      | ↑    |
| Traffic Vol, veh/h       | 130    | 1437  | 54   | 0      | 1398 | 89   | 0      | 0    | 20   | 0      | 0    | 58   |
| Future Vol, veh/h        | 130    | 1437  | 54   | 0      | 1398 | 89   | 0      | 0    | 20   | 0      | 0    | 58   |
| Conflicting Peds, #/hr   | 0      | 0     | 0    | 0      | 0    | 0    | 0      | 0    | 0    | 0      | 0    | 0    |
| Sign Control             | Free   | Free  | Free | Free   | Free | Free | Stop   | Stop | Stop | Stop   | Stop | Stop |
| RT Channelized           | -      | -     | None | -      | -    | None | -      | -    | None | -      | -    | None |
| Storage Length           | -      | -     | 0    | -      | -    | 0    | -      | -    | 0    | -      | -    | 0    |
| Veh in Median Storage, # | -      | 0     | -    | -      | 0    | -    | -      | 0    | -    | -      | 0    | -    |
| Grade, %                 | -      | 0     | -    | -      | 0    | -    | -      | 0    | -    | -      | 0    | -    |
| Peak Hour Factor         | 95     | 95    | 95   | 95     | 95   | 95   | 95     | 95   | 95   | 95     | 95   | 95   |
| Heavy Vehicles, %        | 2      | 2     | 2    | 2      | 2    | 2    | 2      | 2    | 2    | 2      | 2    | 2    |
| Mvmt Flow                | 137    | 1513  | 57   | 0      | 1472 | 94   | 0      | 0    | 21   | 0      | 0    | 61   |
| Major/Minor              | Major1 |       |      | Major2 |      |      | Minor1 |      |      | Minor2 |      |      |
| Conflicting Flow All     | 1566   | 0     | 0    | -      | -    | 0    | -      | -    | 757  | -      | -    | 736  |
| Stage 1                  | -      | -     | -    | -      | -    | -    | -      | -    | -    | -      | -    | -    |
| Stage 2                  | -      | -     | -    | -      | -    | -    | -      | -    | -    | -      | -    | -    |
| Critical Hdwy            | 4.14   | -     | -    | -      | -    | -    | -      | -    | 6.94 | -      | -    | 6.94 |
| Critical Hdwy Stg 1      | -      | -     | -    | -      | -    | -    | -      | -    | -    | -      | -    | -    |
| Critical Hdwy Stg 2      | -      | -     | -    | -      | -    | -    | -      | -    | -    | -      | -    | -    |
| Follow-up Hdwy           | 2.22   | -     | -    | -      | -    | -    | -      | -    | 3.32 | -      | -    | 3.32 |
| Pot Cap-1 Maneuver       | 418    | -     | -    | 0      | -    | -    | 0      | 0    | 350  | 0      | 0    | 361  |
| Stage 1                  | -      | -     | -    | 0      | -    | -    | 0      | 0    | -    | 0      | 0    | -    |
| Stage 2                  | -      | -     | -    | 0      | -    | -    | 0      | 0    | -    | 0      | 0    | -    |
| Platoon blocked, %       | -      | -     | -    | -      | -    | -    | -      | -    | -    | -      | -    | -    |
| Mov Cap-1 Maneuver       | 418    | -     | -    | -      | -    | -    | -      | -    | 350  | -      | -    | 361  |
| Mov Cap-2 Maneuver       | -      | -     | -    | -      | -    | -    | -      | -    | -    | -      | -    | -    |
| Stage 1                  | -      | -     | -    | -      | -    | -    | -      | -    | -    | -      | -    | -    |
| Stage 2                  | -      | -     | -    | -      | -    | -    | -      | -    | -    | -      | -    | -    |
| Approach                 | EB     |       |      | WB     |      |      | NB     |      |      | SB     |      |      |
| HCM Control Delay, s     | 1.4    |       |      | 0      |      |      | 15.9   |      |      | 17     |      |      |
| HCM LOS                  |        |       |      |        |      |      | C      |      |      | C      |      |      |
| Minor Lane/Major Mvmt    | NBLn1  | EBL   | EBT  | EBR    | WBT  | WBR  | SBLn1  |      |      |        |      |      |
| Capacity (veh/h)         | 350    | 418   | -    | -      | -    | -    | 361    |      |      |        |      |      |
| HCM Lane V/C Ratio       | 0.06   | 0.327 | -    | -      | -    | -    | 0.169  |      |      |        |      |      |
| HCM Control Delay (s)    | 15.9   | 17.7  | -    | -      | -    | -    | 17     |      |      |        |      |      |
| HCM Lane LOS             | C      | C     | -    | -      | -    | -    | C      |      |      |        |      |      |
| HCM 95th %tile Q(veh)    | 0.2    | 1.4   | -    | -      | -    | -    | 0.6    |      |      |        |      |      |

HCM 6th TWSC  
26: Legacy Dr & South Commercial Access

2040 Total Traffic  
PM Peak Hour

























| Intersection             |   |   |   |   |   |   |
|--------------------------|---|---|---|---|---|---|
| Int Delay, s/veh         | 4.9   |   |   |   |   |   |
| Movement                 | EBL   | EBR   | NBL   | NBT   | SBT   | SBR   |
| Lane Configurations      |  |  |  |  |  |  |
| Traffic Vol, veh/h       | 2   | 236   | 224   | 342   | 505   | 4   |
| Future Vol, veh/h        | 2   | 236   | 224   | 342   | 505   | 4   |
| Conflicting Peds, #/hr   | 0   | 0   | 0   | 0   | 0   | 0   |
| Sign Control             | Stop  | Stop  | Free  | Free  | Free  | Free  |
| RT Channelized           | -   | None  | -   | None  | -   | None  |
| Storage Length           | 0   | 0   | 200   | -   | -   | -   |
| 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                | 2   | 257   | 243   | 372   | 549   | 4   |
|                          |   |   |   |   |   |   |
| Major/Minor              | Minor2  | Major1  |   | Major2  |   |   |
| Conflicting Flow All     | 1223  | 551   | 553   | 0   | -   | 0   |
| Stage 1                  | 551   | -   | -   | -   | -   | -   |
| Stage 2                  | 672   | -   | -   | -   | -   | -   |
| Critical Hdwy            | 6.63  | 6.23  | 4.13  | -   | -   | -   |
| Critical Hdwy Stg 1      | 5.43  | -   | -   | -   | -   | -   |
| Critical Hdwy Stg 2      | 5.83  | -   | -   | -   | -   | -   |
| Follow-up Hdwy           | 3.519   | 3.319   | 2.219   | -   | -   | -   |
| Pot Cap-1 Maneuver       | 228   | 533   | 1015  | -   | -   | -   |
| Stage 1                  | 576   | -   | -   | -   | -   | -   |
| Stage 2                  | 592   | -   | -   | -   | -   | -   |
| Platoon blocked, %       | 1   |   |   | -   | -   | -   |
| Mov Cap-1 Maneuver       | 173   | 533   | 1015  | -   | -   | -   |
| Mov Cap-2 Maneuver       | 173   | -   | -   | -   | -   | -   |
| Stage 1                  | 438   | -   | -   | -   | -   | -   |
| Stage 2                  | 592   | -   | -   | -   | -   | -   |
|                          |   |   |   |   |   |   |
| Approach                 | EB  | NB  |   | SB  |   |   |
| HCM Control Delay, s     | 18  | 3.8   |   | 0   |   |   |
| HCM LOS                  | C   |   |   |   |   |   |
|                          |   |   |   |   |   |   |
| Minor Lane/Major Mvmt    | NBL   | NBT   | EBLn1   | EBLn2   | SBT   | SBR   |
| Capacity (veh/h)         | 1015  | -   | 173   | 533   | -   | -   |
| HCM Lane V/C Ratio       | 0.24  | -   | 0.013   | 0.481   | -   | -   |
| HCM Control Delay (s)    | 9.7   | -   | 26.1  | 17.9  | -   | -   |
| HCM Lane LOS             | A   | -   | D   | C   | -   | -   |
| HCM 95th %tile Q(veh)    | 0.9   | -   | 0   | 2.6   | -   | -   |

# Timings

## 101: Marksheffel Rd & Bradley Rd

2040 Total Traffic

PM Peak Hour

|                      |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Lane Group           | EBL   | EBT   | EBR   | WBL   | WBT   | WBR   | NBL   | NBT   | NBR   | SBL   | SBT   | SBR   |
| Lane Configurations  |  |  |  |  |  |  |  |  |  |  |  |  |
| Traffic Volume (vph) | 607   | 727   | 306   | 195   | 590   | 215   | 215   | 500   | 100   | 300   | 650   | 515   |
| Future Volume (vph)  | 607   | 727   | 306   | 195   | 590   | 215   | 215   | 500   | 100   | 300   | 650   | 515   |
| Turn Type            | Prot  | NA  | Free  | pm+pt   | NA  | Free  | pm+pt   | NA  | Free  | pm+pt   | NA  | Free  |
| Protected Phases     | 5   | 2   |   | 1   | 6   |   | 3   | 8   |   | 7   | 4   |   |
| Permitted Phases     |   |   | Free  | 6   |   | Free  | 8   |   | Free  | 4   |   | Free  |
| Detector Phase       | 5   | 2   |   | 1   | 6   |   | 3   | 8   |   | 7   | 4   |   |
| Switch Phase         |   |   |   |   |   |   |   |   |   |   |   |   |
| Minimum Initial (s)  | 5.0   | 4.0   |   | 5.0   | 4.0   |   | 5.0   | 4.0   |   | 5.0   | 4.0   |   |
| Minimum Split (s)    | 10.0  | 21.0  |   | 10.0  | 21.0  |   | 10.0  | 21.0  |   | 10.0  | 21.0  |   |
| Total Split (s)      | 35.0  | 55.0  |   | 15.0  | 35.0  |   | 30.0  | 30.0  |   | 30.0  | 30.0  |   |
| Total Split (%)      | 26.9%   | 42.3%   |   | 11.5%   | 26.9%   |   | 23.1%   | 23.1%   |   | 23.1%   | 23.1%   |   |
| Yellow Time (s)      | 3.0   | 3.0   |   | 3.0   | 3.0   |   | 3.0   | 3.0   |   | 3.0   | 3.0   |   |
| All-Red Time (s)     | 2.0   | 2.0   |   | 2.0   | 2.0   |   | 2.0   | 2.0   |   | 2.0   | 2.0   |   |
| Lost Time Adjust (s) | 0.0   | 0.0   |   | 0.0   | 0.0   |   | 0.0   | 0.0   |   | 0.0   | 0.0   |   |
| Total Lost Time (s)  | 5.0   | 5.0   |   | 5.0   | 5.0   |   | 5.0   | 5.0   |   | 5.0   | 5.0   |   |
| Lead/Lag             | Lead  | Lag   |   | Lead  | Lag   |   | Lead  | Lag   |   | Lead  | Lag   |   |
| Lead-Lag Optimize?   | Yes   | Yes   |   | Yes   | Yes   |   | Yes   | Yes   |   | Yes   | Yes   |   |
| Recall Mode          | None  | C-Max   |   | None  | C-Max   |   | None  | Max   |   | None  | Max   |   |
| Act Effect Green (s) | 27.8  | 50.0  | 130.0   | 42.1  | 32.2  | 130.0   | 46.2  | 28.6  | 130.0   | 53.8  | 32.4  | 130.0   |
| Actuated g/C Ratio   | 0.21  | 0.38  | 1.00  | 0.32  | 0.25  | 1.00  | 0.36  | 0.22  | 1.00  | 0.41  | 0.25  | 1.00  |
| v/c Ratio            | 0.87  | 0.56  | 0.20  | 0.68  | 0.71  | 0.14  | 0.72  | 0.68  | 0.07  | 0.81  | 0.78  | 0.34  |
| Control Delay        | 62.6  | 33.4  | 0.3   | 35.9  | 50.4  | 0.2   | 41.6  | 52.3  | 0.1   | 45.0  | 53.0  | 0.6   |
| Queue Delay          | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Total Delay          | 62.6  | 33.4  | 0.3   | 35.9  | 50.4  | 0.2   | 41.6  | 52.3  | 0.1   | 45.0  | 53.0  | 0.6   |
| LOS                  | E   | C   | A   | D   | D   | A   | D   | D   | A   | D   | D   | A   |
| Approach Delay       |   | 38.0  |   |   | 36.8  |   |   | 43.1  |   |   | 32.9  |   |
| Approach LOS         |   | D   |   |   | D   |   |   | D   |   |   | C   |   |

### Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

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

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 37.1

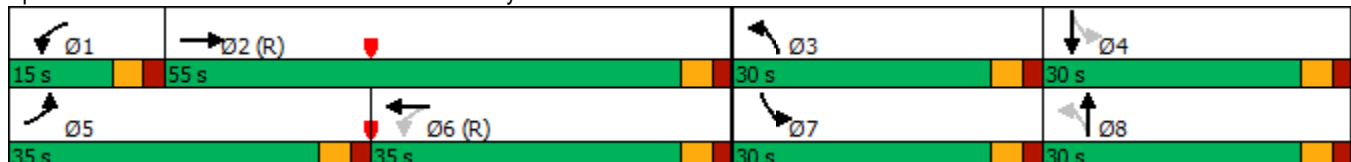
Intersection LOS: D

Intersection Capacity Utilization 80.7%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 101: Marksheffel Rd & Bradley Rd





HCM 6th TWSC  
107: Legacy Dr & North Commercial Access/E/W Collector

2040 Total Traffic  
PM Peak Hour

| Intersection             |        |       |        |       |        |       |        |      |        |       |        |      |
|--------------------------|--------|-------|--------|-------|--------|-------|--------|------|--------|-------|--------|------|
| Int Delay, s/veh         | 7.2    |       |        |       |        |       |        |      |        |       |        |      |
| Movement                 | EBL    | EBT   | EBR    | WBL   | WBT    | WBR   | NBL    | NBT  | NBR    | SBL   | SBT    | SBR  |
| Lane Configurations      | ↰      | ↱     |        | ↰     | ↱      |       | ↰      | ↱    | ↰      | ↱     | ↰      |      |
| Traffic Vol, veh/h       | 5      | 9     | 79     | 184   | 3      | 0     | 74     | 64   | 206    | 0     | 246    | 13   |
| Future Vol, veh/h        | 5      | 9     | 79     | 184   | 3      | 0     | 74     | 64   | 206    | 0     | 246    | 13   |
| Conflicting Peds, #/hr   | 0      | 0     | 0      | 0     | 0      | 0     | 0      | 0    | 0      | 0     | 0      | 0    |
| Sign Control             | Stop   | Stop  | Stop   | Stop  | Stop   | Stop  | Free   | Free | Free   | Free  | Free   | Free |
| RT Channelized           | -      | -     | None   | -     | -      | None  | -      | -    | None   | -     | -      | None |
| Storage Length           | 0      | -     | -      | 155   | -      | -     | 105    | -    | -      | 100   | -      | -    |
| Veh in Median Storage, # | -      | 0     | -      | -     | 0      | -     | -      | 0    | -      | -     | 0      | -    |
| Grade, %                 | -      | 0     | -      | -     | 0      | -     | -      | 0    | -      | -     | 0      | -    |
| Peak Hour Factor         | 92     | 92    | 92     | 92    | 92     | 92    | 92     | 92   | 92     | 92    | 92     | 92   |
| Heavy Vehicles, %        | 2      | 2     | 2      | 2     | 2      | 2     | 2      | 2    | 2      | 2     | 2      | 2    |
| Mvmt Flow                | 5      | 10    | 86     | 200   | 3      | 0     | 80     | 70   | 224    | 0     | 267    | 14   |
| Major/Minor              | Minor2 |       | Minor1 |       | Major1 |       | Major2 |      | Major2 |       | Major2 |      |
| Conflicting Flow All     | 618    | 728   | 274    | 552   | 511    | 70    | 281    | 0    | 0      | 294   | 0      | 0    |
| Stage 1                  | 274    | 274   | -      | 230   | 230    | -     | -      | -    | -      | -     | -      | -    |
| Stage 2                  | 344    | 454   | -      | 322   | 281    | -     | -      | -    | -      | -     | -      | -    |
| Critical Hdwy            | 7.12   | 6.52  | 6.22   | 7.12  | 6.52   | 6.22  | 4.12   | -    | -      | 4.12  | -      | -    |
| Critical Hdwy Stg 1      | 6.12   | 5.52  | -      | 6.12  | 5.52   | -     | -      | -    | -      | -     | -      | -    |
| Critical Hdwy Stg 2      | 6.12   | 5.52  | -      | 6.12  | 5.52   | -     | -      | -    | -      | -     | -      | -    |
| Follow-up Hdwy           | 3.518  | 4.018 | 3.318  | 3.518 | 4.018  | 3.318 | 2.218  | -    | -      | 2.218 | -      | -    |
| Pot Cap-1 Maneuver       | 406    | 350   | 765    | 450   | 470    | 1016  | 1282   | -    | -      | 1268  | -      | -    |
| Stage 1                  | 732    | 683   | -      | 785   | 720    | -     | -      | -    | -      | -     | -      | -    |
| Stage 2                  | 680    | 571   | -      | 690   | 678    | -     | -      | -    | -      | -     | -      | -    |
| Platoon blocked, %       | 1      | 1     |        | 1     | 1      | 1     |        | -    | -      | 1     | -      | -    |
| Mov Cap-1 Maneuver       | 384    | 328   | 765    | 372   | 441    | 1016  | 1282   | -    | -      | 1268  | -      | -    |
| Mov Cap-2 Maneuver       | 384    | 328   | -      | 372   | 441    | -     | -      | -    | -      | -     | -      | -    |
| Stage 1                  | 687    | 683   | -      | 736   | 675    | -     | -      | -    | -      | -     | -      | -    |
| Stage 2                  | 634    | 536   | -      | 604   | 678    | -     | -      | -    | -      | -     | -      | -    |
| Approach                 | EB     |       | WB     |       | NB     |       | SB     |      | SB     |       | SB     |      |
| HCM Control Delay, s     | 11.4   |       | 25.2   |       | 1.7    |       | 0      |      | 0      |       | 0      |      |
| HCM LOS                  | B      |       | D      |       |        |       |        |      |        |       |        |      |
| Minor Lane/Major Mvmt    | NBL    | NBT   | NBR    | EBLn1 | EBLn2  | WBLn1 | WBLn2  | SBL  | SBT    | SBR   |        |      |
| Capacity (veh/h)         | 1282   | -     | -      | 384   | 673    | 372   | 441    | 1268 | -      | -     |        |      |
| HCM Lane V/C Ratio       | 0.063  | -     | -      | 0.014 | 0.142  | 0.538 | 0.007  | -    | -      | -     |        |      |
| HCM Control Delay (s)    | 8      | -     | -      | 14.5  | 11.2   | 25.4  | 13.2   | 0    | -      | -     |        |      |
| HCM Lane LOS             | A      | -     | -      | B     | B      | D     | B      | A    | -      | -     |        |      |
| HCM 95th %tile Q(veh)    | 0.2    | -     | -      | 0     | 0.5    | 3.1   | 0      | 0    | -      | -     |        |      |

# Queuing Reports

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## Queuing and Blocking Report

## Intersection: 1: Powers &amp; Bradley Rd

| Movement              | EB  | EB  | EB  | WB  | WB  | WB  | WB  | NB  | NB  | NB   | NB   | SB   |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| Directions Served     | L   | T   | T   | L   | L   | T   | T   | L   | L   | T    | T    | L    |
| Maximum Queue (ft)    | 71  | 179 | 156 | 592 | 604 | 590 | 307 | 86  | 643 | 950  | 958  | 666  |
| Average Queue (ft)    | 21  | 106 | 61  | 399 | 413 | 129 | 125 | 31  | 104 | 595  | 604  | 448  |
| 95th Queue (ft)       | 54  | 168 | 135 | 628 | 640 | 326 | 225 | 72  | 413 | 959  | 967  | 779  |
| Link Distance (ft)    |     | 968 | 968 |     |     | 926 | 926 |     |     | 4075 | 4075 |      |
| Upstream Blk Time (%) |     |     |     |     |     |     |     |     |     |      |      |      |
| Queuing Penalty (veh) |     |     |     |     |     |     |     |     |     |      |      |      |
| Storage Bay Dist (ft) | 500 |     |     | 625 | 625 |     |     | 750 | 750 |      |      | 1000 |
| Storage Blk Time (%)  |     |     |     | 0   | 1   | 0   |     |     | 0   | 8    |      | 0    |
| Queuing Penalty (veh) |     |     |     | 1   | 2   | 0   |     |     | 0   | 8    |      | 0    |

## Intersection: 1: Powers &amp; Bradley Rd

| Movement              | SB   | SB   | SB   |
|-----------------------|------|------|------|
| Directions Served     | L    | T    | T    |
| Maximum Queue (ft)    | 688  | 504  | 485  |
| Average Queue (ft)    | 468  | 221  | 213  |
| 95th Queue (ft)       | 806  | 578  | 520  |
| Link Distance (ft)    |      | 2266 | 2266 |
| Upstream Blk Time (%) |      |      |      |
| Queuing Penalty (veh) |      |      |      |
| Storage Bay Dist (ft) | 1000 |      |      |
| Storage Blk Time (%)  | 0    | 0    | 0    |
| Queuing Penalty (veh) | 2    | 0    | 0    |

## Queuing and Blocking Report

## Intersection: 2: Legacy Dr &amp; Bradley Rd

| Movement              | EB  | EB  | EB  | EB  | EB  | WB  | WB   | WB   | WB  | NB  | NB  | NB  |
|-----------------------|-----|-----|-----|-----|-----|-----|------|------|-----|-----|-----|-----|
| Directions Served     | L   | L   | T   | T   | R   | L   | T    | T    | R   | L   | L   | T   |
| Maximum Queue (ft)    | 215 | 184 | 188 | 175 | 40  | 325 | 925  | 1074 | 225 | 206 | 266 | 140 |
| Average Queue (ft)    | 116 | 78  | 89  | 96  | 2   | 109 | 422  | 543  | 128 | 86  | 155 | 22  |
| 95th Queue (ft)       | 194 | 155 | 157 | 161 | 19  | 283 | 793  | 940  | 283 | 165 | 230 | 58  |
| Link Distance (ft)    |     |     | 926 | 926 | 926 |     | 1231 | 1231 |     |     |     | 592 |
| Upstream Blk Time (%) |     |     |     |     |     |     |      |      |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |      |      |     |     |     |     |
| Storage Bay Dist (ft) | 450 | 450 |     |     |     | 300 |      |      | 200 | 300 | 300 |     |
| Storage Blk Time (%)  |     |     |     |     |     |     | 12   | 31   | 0   | 0   | 0   |     |
| Queuing Penalty (veh) |     |     |     |     |     |     | 11   | 57   | 0   | 0   | 0   |     |

## Intersection: 2: Legacy Dr &amp; Bradley Rd

| Movement              | NB  | SB  | SB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|-----|
| Directions Served     | R   | L   | L   | T   | R   |
| Maximum Queue (ft)    | 95  | 116 | 134 | 72  | 248 |
| Average Queue (ft)    | 9   | 53  | 73  | 15  | 135 |
| 95th Queue (ft)       | 55  | 101 | 117 | 44  | 224 |
| Link Distance (ft)    |     |     |     | 601 | 601 |
| Upstream Blk Time (%) |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |
| Storage Bay Dist (ft) | 300 | 300 | 300 |     |     |
| Storage Blk Time (%)  |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |

## Intersection: 26: Legacy Dr &amp; South Commercial Access

| Movement              | EB  | EB  | NB  |
|-----------------------|-----|-----|-----|
| Directions Served     | L   | R   | L   |
| Maximum Queue (ft)    | 6   | 60  | 51  |
| Average Queue (ft)    | 0   | 28  | 19  |
| 95th Queue (ft)       | 4   | 49  | 47  |
| Link Distance (ft)    | 256 | 256 |     |
| Upstream Blk Time (%) |     |     |     |
| Queuing Penalty (veh) |     |     |     |
| Storage Bay Dist (ft) |     |     | 200 |
| Storage Blk Time (%)  |     |     |     |
| Queuing Penalty (veh) |     |     |     |

## Zone Summary

Zone wide Queuing Penalty: 82

## Queuing and Blocking Report

## Intersection: 1: Powers &amp; Bradley Rd

| Movement              | EB  | EB  | EB  | WB  | WB  | WB  | WB  | NB  | NB  | NB   | NB   | NB   |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| Directions Served     | L   | T   | T   | L   | L   | T   | T   | L   | L   | T    | T    | R    |
| Maximum Queue (ft)    | 119 | 281 | 253 | 335 | 340 | 126 | 133 | 139 | 140 | 292  | 306  | 101  |
| Average Queue (ft)    | 45  | 169 | 133 | 229 | 241 | 63  | 74  | 62  | 78  | 187  | 200  | 5    |
| 95th Queue (ft)       | 93  | 241 | 211 | 339 | 351 | 111 | 120 | 120 | 131 | 274  | 287  | 51   |
| Link Distance (ft)    |     | 968 | 968 |     |     | 926 | 926 |     |     | 4075 | 4075 | 4075 |
| Upstream Blk Time (%) |     |     |     |     |     |     |     |     |     |      |      |      |
| Queuing Penalty (veh) |     |     |     |     |     |     |     |     |     |      |      |      |
| Storage Bay Dist (ft) | 500 |     |     | 625 | 625 |     |     | 750 | 750 |      |      |      |
| Storage Blk Time (%)  |     |     |     |     |     |     |     |     |     |      |      |      |
| Queuing Penalty (veh) |     |     |     |     |     |     |     |     |     |      |      |      |

## Intersection: 1: Powers &amp; Bradley Rd

| Movement              | SB   | SB   | SB   | SB   | SB  |
|-----------------------|------|------|------|------|-----|
| Directions Served     | L    | L    | T    | T    | R   |
| Maximum Queue (ft)    | 945  | 963  | 1120 | 1071 | 105 |
| Average Queue (ft)    | 578  | 593  | 504  | 474  | 7   |
| 95th Queue (ft)       | 1022 | 1045 | 1053 | 968  | 110 |
| Link Distance (ft)    |      |      | 2266 | 2266 |     |
| Upstream Blk Time (%) |      |      |      |      |     |
| Queuing Penalty (veh) |      |      |      |      |     |
| Storage Bay Dist (ft) | 1000 | 1000 |      |      | 500 |
| Storage Blk Time (%)  | 0    | 3    | 2    | 1    | 0   |
| Queuing Penalty (veh) | 2    | 20   | 13   | 1    | 0   |

## Queuing and Blocking Report

## Intersection: 2: Legacy Dr &amp; Bradley Rd

| Movement              | EB  | EB  | EB  | EB  | EB  | WB  | WB   | WB   | WB  | NB  | NB  | NB  |
|-----------------------|-----|-----|-----|-----|-----|-----|------|------|-----|-----|-----|-----|
| Directions Served     | L   | L   | T   | T   | R   | L   | T    | T    | R   | L   | L   | T   |
| Maximum Queue (ft)    | 239 | 330 | 451 | 444 | 433 | 323 | 406  | 442  | 225 | 228 | 253 | 165 |
| Average Queue (ft)    | 143 | 132 | 314 | 325 | 209 | 147 | 237  | 247  | 104 | 110 | 153 | 32  |
| 95th Queue (ft)       | 221 | 256 | 419 | 426 | 416 | 281 | 367  | 390  | 255 | 208 | 250 | 118 |
| Link Distance (ft)    |     |     | 926 | 926 | 926 |     | 1231 | 1231 |     |     |     | 592 |
| Upstream Blk Time (%) |     |     |     |     |     |     |      |      |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |     |      |      |     |     |     |     |
| Storage Bay Dist (ft) | 450 | 450 |     |     |     | 300 |      |      | 200 | 300 | 300 |     |
| Storage Blk Time (%)  |     |     | 0   |     |     | 0   | 2    | 12   | 0   | 0   | 1   |     |
| Queuing Penalty (veh) |     |     | 0   |     |     | 2   | 5    | 19   | 0   | 0   | 1   |     |

## Intersection: 2: Legacy Dr &amp; Bradley Rd

| Movement              | NB  | SB  | SB  | SB  | SB  |
|-----------------------|-----|-----|-----|-----|-----|
| Directions Served     | R   | L   | L   | T   | R   |
| Maximum Queue (ft)    | 127 | 166 | 185 | 392 | 529 |
| Average Queue (ft)    | 33  | 91  | 108 | 37  | 283 |
| 95th Queue (ft)       | 96  | 153 | 162 | 180 | 535 |
| Link Distance (ft)    |     |     |     | 601 | 601 |
| Upstream Blk Time (%) |     |     |     | 0   | 1   |
| Queuing Penalty (veh) |     |     |     | 0   | 4   |
| Storage Bay Dist (ft) | 300 | 300 | 300 |     |     |
| Storage Blk Time (%)  |     |     |     |     |     |
| Queuing Penalty (veh) |     |     |     |     |     |

## Intersection: 26: Legacy Dr &amp; South Commercial Access

| Movement              | EB  | EB  | NB  | SB  |
|-----------------------|-----|-----|-----|-----|
| Directions Served     | L   | R   | L   | TR  |
| Maximum Queue (ft)    | 22  | 172 | 160 | 48  |
| Average Queue (ft)    | 2   | 63  | 61  | 5   |
| 95th Queue (ft)       | 13  | 126 | 125 | 37  |
| Link Distance (ft)    | 256 | 256 |     | 347 |
| Upstream Blk Time (%) |     | 0   |     |     |
| Queuing Penalty (veh) |     | 0   |     |     |
| Storage Bay Dist (ft) |     |     | 200 |     |
| Storage Blk Time (%)  |     |     | 0   |     |
| Queuing Penalty (veh) |     |     | 0   |     |

## Zone Summary

Zone wide Queuing Penalty: 69



## Appendix Table 1

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**Appendix Table 1  
Area Traffic Impact Studies  
Villages at Waterview North**

| <b>Study</b>  | <b>Consultant</b>                    | <b>Date</b>        |
|---|--------------------------------------|--------------------|
| Bradley Heights Trip Generation Letter  | LSC Transportation Consultants, Inc. | September 11, 2014 |
| Springs at Waterview East Preliminary Plan Traffic Impact and Access Analysis         | LSC Transportation Consultants, Inc. | August 24, 2018    |
| Trails as Aspen Ridge Filing No. 1 and PUD Updated Traffic Impact and Access Analysis | LSC Transportation Consultants, Inc. | December 12, 2019  |
| Redemption Hill Church Traffic Impact Study   | LSC Transportation Consultants, Inc. | April 13, 2020     |
| Peak Innovation Park  | Kimley Horn and Associates, Inc.     | April 2020         |
| Waterview North Sketch Plan Amendment and RM-12 Rezone Master Traffic Impact Analysis | LSC Transportation Consultants, Inc. | November 17, 2020  |
| Bradley Heights Filing #1 Traffic Impact Analysis                                     | LSC Transportation Consultants, Inc. | May 19, 2021       |
| <i>Source: LSC Transportation Consultants, Inc. (September 2021)</i>                  |                                      |                    |

# NCHRP Report 684 Internal Trip Capture Estimation Tool

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| NCHRP 684 Internal Trip Capture Estimation Tool |                             |  |  |               |                                      |
|---|-----------------------------|--|--|---------------|--------------------------------------|
| Project Name:                                   | Villages at Waterview North |  |  | Organization: | LSC Transportation Consultants, Inc. |
| Project Location:                               | Powers/Bradley              |  |  | Performed By: | KDF                                  |
| Scenario Description:                           | Buildout                    |  |  | Date:         | 10/18/2022                           |
| Analysis Year:                                  | 2040                        |  |  | Checked By:   |                                      |
| Analysis Period:                                | AM Street Peak Hour         |  |  | Date:         |                                      |

| Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate) |   |          |       |                                      |          |         |
|--|---|----------|-------|--------------------------------------|----------|---------|
| Land Use   | Development Data (For Information Only) |          |       | Estimated Vehicle-Trips <sup>3</sup> |          |         |
|  | ITE LUCs <sup>1</sup>                   | Quantity | Units | Total                                | Entering | Exiting |
| Office   |   |          |       | 121                                  | 101      | 20      |
| Retail   |   |          |       | 216                                  | 134      | 82      |
| Restaurant   |   |          |       | 0                                    |          |         |
| Cinema/Entertainment   |   |          |       | 0                                    |          |         |
| Residential  |   |          |       | 533                                  | 131      | 402     |
| Hotel  |   |          |       | 0                                    |          |         |
| All Other Land Uses <sup>2</sup>   |   |          |       | 111                                  | 90       | 21      |
|  |   |          |       | 981                                  | 456      | 525     |

| Table 2-A: Mode Split and Vehicle Occupancy Estimates |                        |           |                 |                        |           |                 |
|---|------------------------|-----------|-----------------|------------------------|-----------|-----------------|
| Land Use  | Entering Trips         |           |                 | Exiting Trips          |           |                 |
|   | Veh. Occ. <sup>4</sup> | % Transit | % Non-Motorized | Veh. Occ. <sup>4</sup> | % Transit | % Non-Motorized |
| Office  |                        |           |                 |                        |           |                 |
| Retail  |                        |           |                 |                        |           |                 |
| Restaurant  |                        |           |                 |                        |           |                 |
| Cinema/Entertainment                                  |                        |           |                 |                        |           |                 |
| Residential   |                        |           |                 |                        |           |                 |
| Hotel   |                        |           |                 |                        |           |                 |
| All Other Land Uses <sup>2</sup>                      |                        |           |                 |                        |           |                 |

| Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance) |                  |        |            |                      |             |       |
|---|------------------|--------|------------|----------------------|-------------|-------|
| Origin (From)   | Destination (To) |        |            |                      |             |       |
|   | Office           | Retail | Restaurant | Cinema/Entertainment | Residential | Hotel |
| Office  |                  |        |            |                      |             |       |
| Retail  |                  |        |            |                      |             |       |
| Restaurant  |                  |        |            |                      |             |       |
| Cinema/Entertainment  |                  |        |            |                      |             |       |
| Residential   |                  |        |            |                      |             |       |
| Hotel   |                  |        |            |                      |             |       |

| Table 4-A: Internal Person-Trip Origin-Destination Matrix* |                  |        |            |                      |             |       |
|--|------------------|--------|------------|----------------------|-------------|-------|
| Origin (From)  | Destination (To) |        |            |                      |             |       |
|  | Office           | Retail | Restaurant | Cinema/Entertainment | Residential | Hotel |
| Office   |                  | 6      | 0          | 0                    | 0           | 0     |
| Retail   | 4                |        | 0          | 0                    | 3           | 0     |
| Restaurant   | 0                | 0      |            | 0                    | 0           | 0     |
| Cinema/Entertainment                                       | 0                | 0      | 0          |                      | 0           | 0     |
| Residential  | 3                | 4      | 0          | 0                    |             | 0     |
| Hotel  | 0                | 0      | 0          | 0                    | 0           |       |

| Table 5-A: Computations Summary           |       |          |         |
|---|-------|----------|---------|
|   | Total | Entering | Exiting |
| All Person-Trips                          | 981   | 456      | 525     |
| Internal Capture Percentage               | 4%    | 4%       | 4%      |
| External Vehicle-Trips <sup>5</sup>       | 941   | 436      | 505     |
| External Transit-Trips <sup>6</sup>       | 0     | 0        | 0       |
| External Non-Motorized Trips <sup>6</sup> | 0     | 0        | 0       |

| Table 6-A: Internal Trip Capture Percentages by Land Use |                |               |
|--|----------------|---------------|
| Land Use   | Entering Trips | Exiting Trips |
| Office   | 7%             | 30%           |
| Retail   | 7%             | 9%            |
| Restaurant   | N/A            | N/A           |
| Cinema/Entertainment                                     | N/A            | N/A           |
| Residential  | 2%             | 2%            |
| Hotel  | N/A            | N/A           |

<sup>1</sup>Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

<sup>2</sup>Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

<sup>3</sup>Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

<sup>4</sup>Enter vehicle occupancy assumed in Table 1-A vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-A, 9-A (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.

<sup>5</sup>Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A.

<sup>6</sup>Person-Trips

\*Indicates computation that has been rounded to the nearest whole number.

| NCHRP 684 Internal Trip Capture Estimation Tool |                             |                      |                                      |  |  |
|---|-----------------------------|----------------------|--------------------------------------|--|--|
| <b>Project Name:</b>                            | Villages at Waterview North | <b>Organization:</b> | LSC Transportation Consultants, Inc. |  |  |
| <b>Project Location:</b>                        | Powers/Bradley              | <b>Performed By:</b> | KDF                                  |  |  |
| <b>Scenario Description:</b>                    | Buildout                    | <b>Date:</b>         | 10/18/2022                           |  |  |
| <b>Analysis Year:</b>                           | 2040                        | <b>Checked By:</b>   |                                      |  |  |
| <b>Analysis Period:</b>                         | PM Street Peak Hour         | <b>Date:</b>         |                                      |  |  |

| Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate) |   |          |       |                                      |          |         |
|--|---|----------|-------|--------------------------------------|----------|---------|
| Land Use   | Development Data (For Information Only) |          |       | Estimated Vehicle-Trips <sup>3</sup> |          |         |
|  | ITE LUCs <sup>1</sup>                   | Quantity | Units | Total                                | Entering | Exiting |
| Office   |   |          |       | 147                                  | 36       | 111     |
| Retail   |   |          |       | 649                                  | 318      | 331     |
| Restaurant   |   |          |       | 0                                    |          |         |
| Cinema/Entertainment   |   |          |       | 0                                    |          |         |
| Residential  |   |          |       | 689                                  | 434      | 255     |
| Hotel  |   |          |       | 0                                    |          |         |
| All Other Land Uses <sup>2</sup>   |   |          |       | 110                                  | 24       | 86      |
|  |   |          |       | 1,595                                | 812      | 783     |

| Table 2-P: Mode Split and Vehicle Occupancy Estimates |                        |           |                 |                        |           |                 |
|---|------------------------|-----------|-----------------|------------------------|-----------|-----------------|
| Land Use  | Entering Trips         |           |                 | Exiting Trips          |           |                 |
|   | Veh. Occ. <sup>4</sup> | % Transit | % Non-Motorized | Veh. Occ. <sup>4</sup> | % Transit | % Non-Motorized |
| Office  |                        |           |                 |                        |           |                 |
| Retail  |                        |           |                 |                        |           |                 |
| Restaurant  |                        |           |                 |                        |           |                 |
| Cinema/Entertainment                                  |                        |           |                 |                        |           |                 |
| Residential   |                        |           |                 |                        |           |                 |
| Hotel   |                        |           |                 |                        |           |                 |
| All Other Land Uses <sup>2</sup>                      |                        |           |                 |                        |           |                 |

| Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance) |                  |        |            |                      |             |       |
|---|------------------|--------|------------|----------------------|-------------|-------|
| Origin (From)   | Destination (To) |        |            |                      |             |       |
|   | Office           | Retail | Restaurant | Cinema/Entertainment | Residential | Hotel |
| Office  |                  | 1000   |            |                      | 5280        |       |
| Retail  |                  |        |            |                      | 5280        |       |
| Restaurant  |                  |        |            |                      |             |       |
| Cinema/Entertainment  |                  |        |            |                      |             |       |
| Residential   |                  | 5280   |            |                      |             |       |
| Hotel   |                  |        |            |                      |             |       |

| Table 4-P: Internal Person-Trip Origin-Destination Matrix* |                  |        |            |                      |             |       |
|--|------------------|--------|------------|----------------------|-------------|-------|
| Origin (From)  | Destination (To) |        |            |                      |             |       |
|  | Office           | Retail | Restaurant | Cinema/Entertainment | Residential | Hotel |
| Office   |                  | 17     | 0          | 0                    | 0           | 0     |
| Retail   | 7                |        | 0          | 0                    | 9           | 0     |
| Restaurant   | 0                | 0      |            | 0                    | 0           | 0     |
| Cinema/Entertainment                                       | 0                | 0      | 0          |                      | 0           | 0     |
| Residential  | 10               | 3      | 0          | 0                    |             | 0     |
| Hotel  | 0                | 0      | 0          | 0                    | 0           |       |

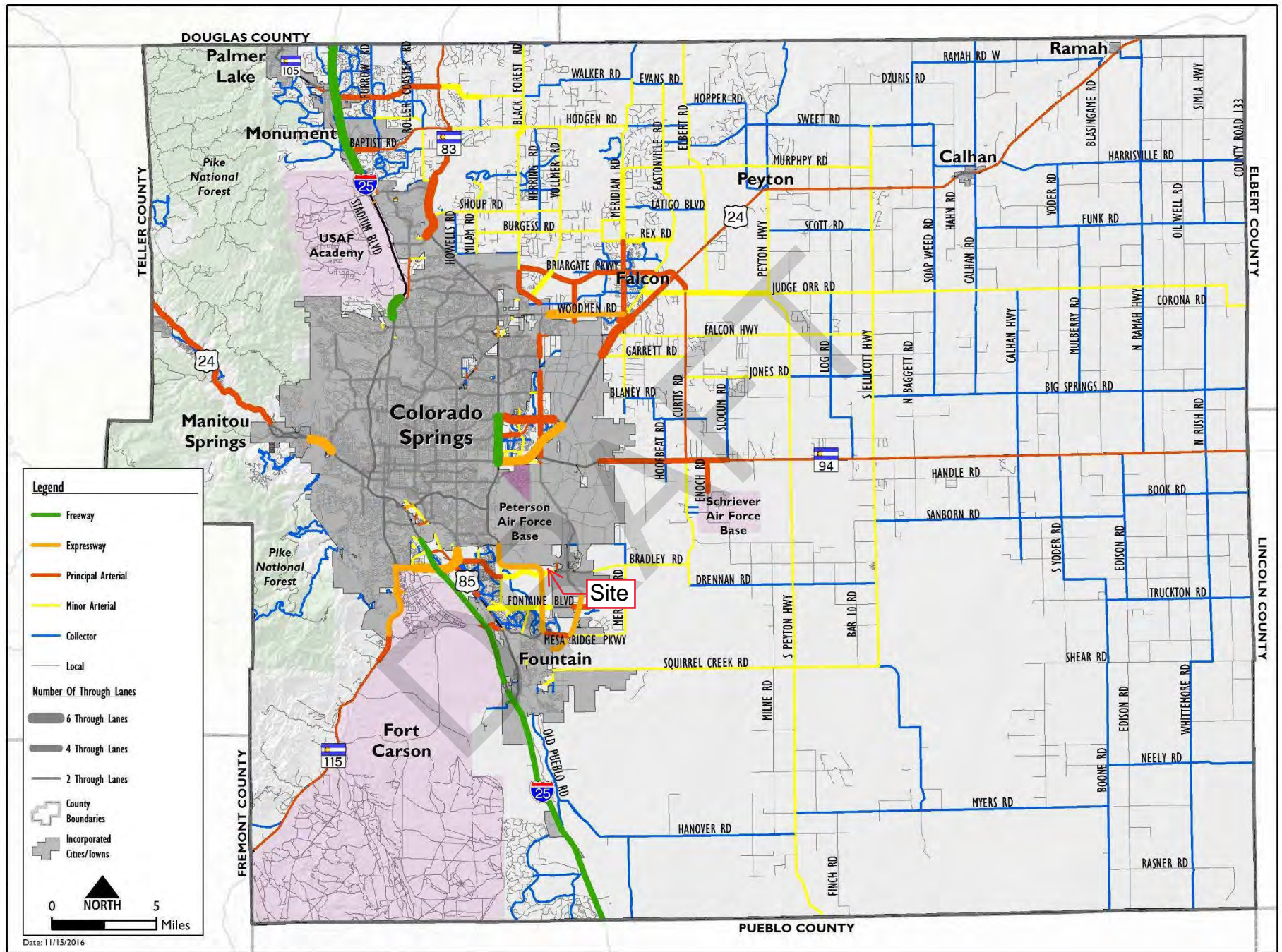
| Table 5-P: Computations Summary           |       |          |         |
|---|-------|----------|---------|
|   | Total | Entering | Exiting |
| All Person-Trips                          | 1,595 | 812      | 783     |
| Internal Capture Percentage               | 6%    | 6%       | 6%      |
| External Vehicle-Trips <sup>5</sup>       | 1,503 | 766      | 737     |
| External Transit-Trips <sup>6</sup>       | 0     | 0        | 0       |
| External Non-Motorized Trips <sup>6</sup> | 0     | 0        | 0       |

| Table 6-P: Internal Trip Capture Percentages by Land Use |                |               |
|--|----------------|---------------|
| Land Use   | Entering Trips | Exiting Trips |
| Office   | 47%            | 15%           |
| Retail   | 6%             | 5%            |
| Restaurant   | N/A            | N/A           |
| Cinema/Entertainment                                     | N/A            | N/A           |
| Residential  | 2%             | 5%            |
| Hotel  | N/A            | N/A           |

|   |
|---|
| <sup>1</sup> Land Use Codes (LUCs) from <i>Trip Generation Manual</i> , published by the Institute of Transportation Engineers.   |
| <sup>2</sup> Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.   |
| <sup>3</sup> Enter trips assuming no transit or non-motorized trips (as assumed in ITE <i>Trip Generation Manual</i> ).   |
| <sup>4</sup> Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-P, 6-P, 7-P, and 8-P. Enter transit, non-motorized percentages that will result with proposed mixed-use project complete. |
| <sup>5</sup> Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.  |
| <sup>6</sup> Person-Trips   |
| *Indicates computation that has been rounded to the nearest whole number.   |
| Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1  |

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Map 14: 2040 Roadway Plan (Classification and Lanes)



# Map 17: 2060 Corridor Preservation

