# TRANSPORTATION IMPACT STUDY 

High Point PA 64 in Aurora<br>Prepared for:<br>Prime West Companies<br>700I E. Belleview Avenue, Suite 650<br>Denver, CO 80237<br>Prepared by:<br>Felsburg Holt \& Ullevig<br>6300 South Syracuse Way, Suite 600<br>Centennial, CO 8011I<br>303.72I.I440<br>Project Manager: Christopher J. Fasching, PE, PTOE<br>Project Manager: Philip Dunham, PE<br>

FHU Reference No. I20089-0 I
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## TABLE OF CONTENTS

Page
I. INTRODUCTION ..... I
II. EXISTING CONDITIONS ..... 4
II.A. Surrounding Land Use ..... 4
II.B. Roadway System ..... 4
II.C. Traffic Volumes ..... 4
III. PROPOSED CONDITIONS ..... 5
III.A. Future Road Network ..... 5
III.B. Site Trip Generation ..... 5
III.C. Trip Distribution and Traffic Assignment ..... 5
IV. FUTURE CONDITIONS ..... 7
IV.A. Short Term Future Background ..... 7
IV.B. Long Term Future Background ..... 8
IV.C. Total Traffic Conditions ..... 10
V. SUMMARY AND RECOMMENDATIONS ..... 14

## Appendices

Appendix A. 2040 Background LOS
Appendix B. 2040 Total Traffic LOS

## List of Figures

|  | Page |
| :---: | :---: |
| Figure 1. | Vicinity Map......................................................................................................... 2 |
| Figure 2. | Site Plan................................................................................................................. 3 |
| Figure 3. | Site Generated Traffic and Distribution..................................................................... 6 |
| Figure 4. | Long Term Future (2040) Background Traffic Conditions............................................ 9 |
| Figure 5. | Long Term Future (2040) Total Traffic Conditions.................................................... I I |

## List of Tables

PageTable I. Trip Generation Summary ..... 5
Table 2. Long- term Future High Point PA 64 Queueing. ..... 12

## I. INTRODUCTION

Prime West Companies is proposing to develop an approximate I 3.5 -acre site within the High Point Master Plan. The PA-64 site is located along the east side of the future Lisbon Street approximately onequarter mile north of 64th Avenue. Figure I illustrates the location of the site and the adjacent primary roadway network (existing and future planned roadways).

The proposed residential development would consist of approximately 365 multi-family units. Primary access to the site will be provided onto Lisbon Street along the west side of the site. Local east-west streets are also planned along the north and south sides of the site which will also provide access to the proposed development. Figure $\mathbf{2}$ depicts the current site plan concept.

The purpose of this Transportation Impact Study (TIS) is to estimate the potential impacts specific to the proposed development and to identify any resultant required roadway and/or intersection improvements and traffic control needs. Only a long-term future scenario was explored for this site. This scenario examines the traffic impacts within the context of the year 2040 horizon. An existing or short-term scenario have been omitted as PA-64 is the first site within High Point and represents approximately one percent of the land area to be developed. None of the study area intersections exist under current conditions and the site roadways will only provide access to the site and not carry any background traffic due to lack of connectivity at initial buildout.

This study builds from the High Point Master Plan Traffic Impact Study Analysis, January 2020, prepared by Felsburg Holt \& Ullevig, that addresses transportation needs of the I,I80-acre High Point Framework Development Plan (FDP).



## II. EXISTING CONDITIONS

## II.A. Surrounding Land Use

The area around the High Point FDP is mostly vacant. The Gaylord Rockies Resort is located to the west of the site. The Green Valley Ranch residential development also exists about one mile south in Denver. Denver International Airport (DEN) is located north of the FDP.

## II.B. Roadway System

Very few roadways exist in proximity to the site. $64^{\text {th }}$ Avenue is the one notable roadway which runs east-west and defines part of the FDP's southern boundary. The roadway was recently improved in association with the Gaylord Rockies Resort, and it provides two lanes of through traffic. The roadway extends west to Tower Road and east to E-470.
Lisbon Street extends north of $64^{\text {th }}$ Avenue for approximately I,000 feet as a two-lane roadway but terminates at Aurora Fire Station \#16 approximately 500 feet south of the proposed site.
E-470 exists north of the site, but site access to E-470 is a mile away to the east at the 64 th Avenue interchange.

## II.C. Traffic Volumes

Past data collected along $64^{\text {th }}$ avenue indicate that approximately 2,850 VPD travel $64^{\text {th }}$ Avenue near the site today. This is well below the capacity threshold of a two-lane roadway, so operationally $64{ }^{\text {th }}$ Avenue is not experiencing any functional challenges today in proximity to the PA 64 site.

## III. PROPOSED CONDITIONS

## III.A. Future Road Network

In 2018, the City of Aurora completed the NEATS Refresh study, which provides Year 2040 and regional build-out transportation recommendations for the roadways and a multimodal transportation system. The NEATS Refresh study area encompassed a regional area extending from approximately between Tower Road east to Schumaker Road, and from Jewell Avenue on the south to 72 ${ }^{\text {nd }}$ Avenue on the north. Recommendations with respect to High Point included:

- Constructing 64th Avenue to major arterial standards including six-through lanes plus turn lanes
- Constructing Picadilly Road as a six-lane arterial road through the FDP as far south as I-70 and to the north, crossing over E-470, extending through DEN, and into Commerce City
More recently, the City has retained a consultant to assess adjustment to the ultimate cross-section for $64^{\text {th }}$ Avenue such that it would provide four through lanes of traffic and on-street parallel parking. Potentially, this would be limited to the section of $64^{\text {th }}$ Avenue west of E-470.

Lisbon Street will provide the main access for the site and will ultimately continue as a three-lane collector to the north before bending to the west north of the Gaylord Rockies Resort likely tying in to High Point Boulevard at Dunkirk Street.

## III.B. Site Trip Generation

The current proposed residential development will consist of 365 multi-family units (the FDP master plan traffic study had incorporated 405 units, the proposed PA 64 plan reflects a reduction). Trip generation estimates were developed using average weekday data contained in Trip Generation, $10^{\text {th }}$ Edition, Institute of Transportation Engineers (ITE), 20I7. Table I shows the trip generation for the proposed development.

Table I. Trip Generation Summary

| Land Use | Intensity | ITE Code | Daily Trips | AM Peak Hour |  |  | PM Peak Hour |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | In | Out | Total | In | Out | Total |
| Multifamily Housing (Mid-Rise) | 365 DUs | 221 | 1,988 | 32 | 90 | 122 | 94 | 60 | 154 |
|  |  | TOTAL | 1,988 | 32 | 90 | 122 | 94 | 60 | 154 |

The High Point FDP master plan traffic study had estimated 2,200 trips per day from PA 64. The proposed plan reflects a 9.6 percent reduction in PA-64 trip-making, which equates to a 0.3 percent decrease with respect to the entire High Point Master Plan.

## III.C. Trip Distribution and Traffic Assignment

Trip distribution estimates for this site were based on those used in the FDP master plan. The greatest component of site traffic will be toward 64th Avenue and Picadilly Road for more regional connectivity as the roadway network in the area is built out.

Error! Reference source not found. shows the site-trip distribution percentages as well as the trip assignment resulting from applying the percentages for site traffic. As indicated 64th Avenue will see the largest percentage of site traffic.


## IV. FUTURE CONDITIONS

## IV.A. Short Term Future Background

## Roadway System

Very few roadways exist within High Point at this time and that will remain true for a short-term scenario. Additional roadways are planned in the short-term aimed at providing access to the site:

- The construction of Lisbon Street north Aurora Fire Station \#16 approximately I,200 feet to provide access to $66^{\text {th }}$ Avenue and High Point Boulevard
- The construction of 64th Avenue east of Lisbon Street to provide access to the north site driveway
- The construction of High Point Boulevard west of Lisbon Street to provide access to the south site driveway
In addition to the above planned roadways a secondary access will need to be provided to satisfy city requirements for life safety and fire prevention. The most efficient way to achieve this is likely to construct Malta Street to the south and east of the site to provide connectivity between $65^{\text {th }}$ and $66^{\text {th }}$ Avenues. Given that this will serve as an emergency access it does not have to be completed as the full street cross-section.


## Traffic Volumes

Background traffic is the component of roadway volumes that would use the adjacent roadway system regardless of site development. Along the roadways adjacent to the site little to no background traffic is expected as Lisbon Street will only serve the site and Aurora Fire Station \#I6 in a short-term scenario.

## Traffic Control and Operations

Due to the low expected volumes all intersections are anticipated to operate acceptably as side-street stop-controlled intersections in a short-term scenario.

## IV.B. Long Term Future Background

## Roadway System

By the year 2040, High Point is assumed to be built out for the purposes of this analysis. This includes the full roadway network surrounding the site including connectivity into Rockies Village to the west, High Point Boulevard to the north, and Picadilly Road to the east.

## Traffic Volumes

The long-term background traffic has been estimated using traffic volume projections from the High Point Master Traffic Study and Gaylord Rockies Phase 2. Volumes from the two studies were combined and then trips associated with PA 64 were removed as analyzed in the High Point Master Traffic Study.

Figure 4 shows the results of the projected long-term background traffic demands along the study area roadways and intersections. Lisbon Street is estimated to serve the greatest amount of background traffic reaching up to 6,500 VPD south of the site.

## Traffic Control

All study area intersections have been assumed to be under side-street stop-control. The two public street intersections of Lisbon Street/High Point Boulevard and Lisbon Street/66th Avenue have also been evaluated as one lane roundabouts at the request of city staff.

## Traffic Operations

The Long-term Future background traffic volumes were used as the basis for intersection capacity analyses, the results of which are also shown on Figure 4 (Appendix A includes LOS worksheets).

Calculations were carried out to assess operations given long-term background traffic demands. These were conducted using techniques documented in the Highway Capacity Manual (Transportation Research Board, 2016) using the existing traffic volumes and intersection geometry. Level of Service (LOS) is a qualitative measure of traffic operational conditions, based on roadway capacity and vehicle delay. Levels of service are described by a letter designation ranging from $A$ to $F$, with LOS $A$ representing almost free-flow travel, while LOS F represents congested conditions. For signalized intersections, LOS is calculated for the entire intersection while LOS for unsignalized intersections is calculated for movements which must yield right-of-way to other traffic movements.

As indicated, all intersections are projected to operate within acceptable parameters, at LOS C or better, during peak times given the long-term background traffic.


LEGEND


## IV.C. Total Traffic Conditions

## Short-term Future

As mentioned previously in the report a short-term scenario was not explicitly analyzed as PA 64 is the first site developed within High Point and represents approximately one percent of the total development by land area. In a short-term scenario, only the relatively low trip generated traffic would access the roadway network around the site and side-street stop-controlled intersections would operate acceptably.

## Long-Term Future

The site generated traffic volumes illustrated on Figure $\mathbf{3}$ were added to the long-term future background traffic volumes found on Figure 4 to produce the year 2040 total traffic volumes shown on Figure 5. Intersection capacity analyses were conducted using the long-term total peak hour volumes and intersection geometrics. Appendix B includes analysis worksheets. As indicated, traffic operations would remain acceptable at LOS C or better.

City of Aurora Traffic Impact Study Guidelines indicate that the CDOT SHAC be used to determine storage and taper lengths. These values yield overly conservative results and provide storage well in excess 95 th percentile queues (which already incorporate a heavy vehicle percentage), often by a factor of two to three. Rather, our recommendation is that the values in Table $\mathbf{2}$ corresponding to the 95th percentile lengths be used for storage lengths, plus tapers of I20 feet (to provide the required I0:I taper ratio for 12 -foot lanes on streets with a posted speed 35 MPH and an NR-B classification as identified in the CDOT SHAC). In the case of the study area intersections in this report, volumes are relatively low and both the 95 th percentile and CDOT SHAC recommendations remain consistent with one another.


LEGEND

| XXX(XXX) | $=$ AM(PM) Peak Hour Traffic Volumes | $\mathbf{x} / \mathbf{x}=$ | AM/PM Peak Hour Unsignalized |
| ---: | :--- | ---: | :--- |
| Intersection Level of Service |  |  |  |

Table 2. Long-term Future High Point PA 64 Queueing

| Intersection | Approach | Movement | 2040 95th <br> Percentile Queue Length (ft) ${ }^{\prime}$ |  | Recommended Storage Length | 2040 SHAC Recommended Storage Length ${ }^{2}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | AM | PM |  |  |
| Lisbon Street/High <br> Point Boulevard <br> (Stop Controlled) | Eastbound | Left-Turn | 0 | 0 | 50 | 50 |
|  |  | Through / Right-Turn | 5 | 8 | Continuous | Continuous |
|  | Westbound | Left-Turn | 5 | 3 | 50 | 50 |
|  |  | Through / Right-Turn | 3 | 3 | Continuous | Continuous |
|  | Northbound | Left-Turn | 3 | 3 | 50 | 50 |
|  |  | Through / Right-Turn | 0 | 0 | Continuous | Continuous |
|  | Southbound | Left-Turn | 0 | 0 | 50 | 50 |
|  |  | Through / Right-Turn | 0 | 0 | Continuous | Continuous |
| Lisbon Street/High Point Boulevard | Eastbound | Left-Turn / <br> Through / <br> Right-Turn | 5 | 8 | Continuous | Continuous |
|  | Westbound | Left-Turn / <br> Through / <br> Right-Turn | 3 | 3 | Continuous | Continuous |
|  | Northbound | Left-Turn / Through / Right-Turn | 28 | 25 | Continuous | Continuous |
|  | Southbound | Left-Turn / <br> Through / <br> Right-Turn | 15 | 38 | Continuous | Continuous |
| Lisbon Street/66th Avenue (Stop Controlled) | Eastbound | Left-Turn | 0 | 3 | 50 | 50 |
|  |  | Through / Right-Turn | 5 | 8 | Continuous | Continuous |
|  | Westbound | Left-Turn | 20 | 15 | 50 | 50 |
|  |  | Through / Right-Turn | 3 | 3 | Continuous | Continuous |
|  | Northbound | Left-Turn | 3 | 3 | 50 | 50 |
|  |  | Through / Right-Turn | 0 | 0 | Continuous | Continuous |
|  | Southbound | Left-Turn | 0 | 0 | 50 | 50 |


| Intersection | Approach | Movement | 2040 95th <br> Percentile <br> Queue <br> Length <br> (ft) | Recommended <br> Storage <br> Length | 2040 SHAC <br> Recommended <br> Storage <br> Length |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | AM | PM |  | Continuous |  |
|  | Eastbound | Through / <br> Right-Turn | 0 | 0 | Continuous | Left-Turn / <br> Through / <br> Right-Turn |

${ }^{\text {I }}$ Calculations based on HCM methodology using a heavy vehicle percentage of 2 percent network wide.
${ }^{2}$ Number shown is based on volume adjustments of 3 PCE per heavy vehicle.

## V. SUMMARY AND RECOMMENDATIONS

Prime West Companies is proposing to develop an approximate 13.5-acre site within the High Point Master Plan. The PA-64 site is located along the east side of the future Lisbon Street approximately onequarter mile north of $64^{\text {th }}$ Avenue. The proposed residential development would consist of approximately 365 multi-family units. The site represents approximately one percent of the High Point Master development by land area.

The proposed development is estimated to generate approximately I,988 trips per day, with an estimated I 22 occurring during the AM peak hour and I54 occurring during the PM peak hour. By comparison to the High Point Master Plan Traffic Impact Study, PA 64 was assumed to generate 2,200 trips per day. The current development proposal represents a 9.6 percent decrease in daily traffic generation as compared to that analyzed in the 2020 master plan study, which equates to a 0.3 percent decrease with respect to the entire High Point Master Plan.

The potential traffic impacts of the development were evaluated under a Long-term Future (2040) conditions. This study assessed two public road intersections and all three of the site access points with respect to peak hour traffic and LOS operations. There are no projected traffic operation issues in the long-term future planning horizon. Intersections are expected to operate acceptably at LOS C or better during peak hours. Lisbon Street will function adequately as a three-lane collector. Side-street stop control is all that is required at the intersections of Lisbon Street/High Point Boulevard, Lisbon Street/ $66^{\text {th }}$ Avenue, and all of the site access points.

## APPENDIX A. 2040 BACKGROUND LOS

| Intersection |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Int Delay, s/veh | 2.1 |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |  |
| Lane Configurations | * | $\uparrow$ |  | ${ }^{7}$ | $\hat{\beta}$ |  | ${ }^{7}$ | $\hat{\beta}$ |  | ${ }^{7}$ | $\hat{\beta}$ |  |  |
| Traffic Vol, veh/h | 5 | 5 | 35 | 10 | 5 | 5 | 35 | 220 | 5 | 5 | 140 | 5 |  |
| Future Vol, veh/h | 5 | 5 | 35 | 10 | 5 | 5 | 35 | 220 | 5 | 5 | 140 | 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 | 50 | - | - | 50 | - | - | 50 | - | - | 50 | - | - |  |
| 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 | 5 | 38 | 11 | 5 | 5 | 38 | 239 | 5 | 5 | 152 | 5 |  |



## LANE SUMMARY

## Site: 101 [High Point Blvd and Lisbon St]

New Site
Site Category: AM 2040 Background
Roundabout

| Lane Use and Performance |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Demand Total veh/h | $\begin{gathered} \text { lows } \\ \text { HV } \\ \% \end{gathered}$ | Cap. veh/h | Deg. Satn v/c | $\begin{aligned} & \text { Lane } \\ & \text { Util. } \\ & \% \end{aligned}$ | Average Delay sec | Level of Service | 95\% Bac <br> Veh | Queue Dist ft | Lane Config | Lane Length ft | Cap. <br> Adj. <br> \% | Prob. Block. \% |
| South: Lisbon St |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane $1^{\text {d }}$ | 283 | 2.0 | 1330 | 0.212 | 100 | 4.5 | LOS A | 1.1 | 27.9 | Full | 1600 | 0.0 | 0.0 |
| Approach | 283 | 2.0 |  | 0.212 |  | 4.5 | LOS A | 1.1 | 27.9 |  |  |  |  |
| East: High Point Blvd |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane $1^{\text {d }}$ | 22 | 2.0 | 1008 | 0.022 | 100 | 3.8 | LOS A | 0.1 | 2.2 | Full | 1600 | 0.0 | 0.0 |
| Approach | 22 | 2.0 |  | 0.022 |  | 3.8 | LOS A | 0.1 | 2.2 |  |  |  |  |
| North: Lisbon St |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane $1^{\text {d }}$ | 163 | 2.0 | 1279 | 0.128 | 100 | 3.9 | LOS A | 0.6 | 15.0 | Full | 1600 | 0.0 | 0.0 |
| Approach | 163 | 2.0 |  | 0.128 |  | 3.9 | LOS A | 0.6 | 15.0 |  |  |  |  |
| West: High Point Blvd |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane $1{ }^{\text {d }}$ | 49 | 2.0 | 1135 | 0.043 | 100 | 3.5 | LOS A | 0.2 | 4.5 | Full | 1600 | 0.0 | 0.0 |
| Approach | 49 | 2.0 |  | 0.043 |  | 3.5 | LOS A | 0.2 | 4.5 |  |  |  |  |
| Intersection | 516 | 2.0 |  | 0.212 |  | 4.2 | LOS A | 1.1 | 27.9 |  |  |  |  |

Site Level of Service (LOS) Method: Delay \& v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS $F$ will result if $\mathrm{v} / \mathrm{c}>1$ irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies. Gap-Acceptance Capacity: Traditional M1.
HV (\%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
d Dominant lane on roundabout approach

| Intersection |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Int Delay, s/veh | 2.4 |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |  |
| Lane Configurations | * | $\hat{\beta}$ |  | * | $\uparrow$ |  | * | 4 | 「 | * | $\uparrow$ |  |  |
| Traffic Vol, veh/h | 5 | 5 | 35 | 30 | 5 | 5 | 35 | 250 | 10 | 5 | 175 | 5 |  |
| Future Vol, veh/h | 5 | 5 | 35 | 30 | 5 | 5 | 35 | 250 | 10 | 5 | 175 | 5 |  |
| Conflicting Peds, \#/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |
| Sign Control Star | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |  |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |  |
| Storage Length | 50 | - | - | 50 | - | - | 50 | - | 50 | 50 | - | - |  |
| 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 | 5 | 38 | 33 | 5 | 5 | 38 | 272 | 11 | 5 | 190 | 5 |  |



## LANE SUMMARY

## O Site: 101 [66th Ave and Lisbon St]

New Site
Site Category: AM 2040 Background
Roundabout

| Lane Use and Performance |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Demand Total veh/h | $\begin{aligned} & \text { lows } \\ & \text { HV } \\ & \% \end{aligned}$ | Cap. veh/h | Deg. Satn v/c | $\begin{aligned} & \text { Lane } \\ & \text { Util. } \\ & \% \end{aligned}$ | Average Delay sec | Level of Service | 95\% Bac <br> Veh | $\begin{array}{r} \text { Queue } \\ \text { Dist } \\ \text { ft } \end{array}$ | Lane Config | Lane Length ft | Cap. <br> Adj. <br> \% | Prob. Block. \% |
| South: Lisbon St |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane $1^{\text {d }}$ | 321 | 2.0 | 1330 | 0.241 | 100 | 4.8 | LOS A | 1.3 | 32.7 | Full | 1600 | 0.0 | 0.0 |
| Approach | 321 | 2.0 |  | 0.241 |  | 4.8 | LOS A | 1.3 | 32.7 |  |  |  |  |
| East: 66th Ave |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane $1^{\text {d }}$ | 43 | 2.0 | 975 | 0.045 | 100 | 4.1 | LOS A | 0.2 | 4.6 | Full | 1600 | 0.0 | 0.0 |
| Approach | 43 | 2.0 |  | 0.045 |  | 4.1 | LOS A | 0.2 | 4.6 |  |  |  |  |
| North: Lisbon St |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane $1^{\text {d }}$ | 201 | 2.0 | 1250 | 0.161 | 100 | 4.2 | LOS A | 0.8 | 19.5 | Full | 1600 | 0.0 | 0.0 |
| Approach | 201 | 2.0 |  | 0.161 |  | 4.2 | LOS A | 0.8 | 19.5 |  |  |  |  |
| West: 66th Ave |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane $1^{\text {d }}$ | 49 | 2.0 | 1067 | 0.046 | 100 | 3.8 | LOS A | 0.2 | 4.8 | Full | 1600 | 0.0 | 0.0 |
| Approach | 49 | 2.0 |  | 0.046 |  | 3.8 | LOS A | 0.2 | 4.8 |  |  |  |  |
| Intersection | 614 | 2.0 |  | 0.241 |  | 4.5 | LOS A | 1.3 | 32.7 |  |  |  |  |

Site Level of Service (LOS) Method: Delay \& v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS $F$ will result if $\mathrm{v} / \mathrm{c}>1$ irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies. Gap-Acceptance Capacity: Traditional M1.
HV (\%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
d Dominant lane on roundabout approach

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| Intersection |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Int Delay, s/veh | 2.1 |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |  |
| Lane Configurations | * | $\hat{\beta}$ |  | * | $\uparrow$ |  | ${ }^{7}$ | $\hat{\beta}$ |  | * | $\uparrow$ |  |  |
| Traffic Vol, veh/h | 5 | 5 | 45 | 5 | 5 | 5 | 50 | 170 | 10 | 5 | 310 | 5 |  |
| Future Vol, veh/h | 5 | 5 | 45 | 5 | 5 | 5 | 50 | 170 | 10 | 5 | 310 | 5 |  |
| Conflicting Peds, \#/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |
| Sign Control Star | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |  |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |  |
| Storage Length | 50 | - | - | 50 | - | - | 50 | - | - | 50 | - | - |  |
| 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 | 5 | 49 | 5 | 5 | 5 | 54 | 185 | 11 | 5 | 337 | 5 |  |



## LANE SUMMARY

## 7 Site: 101 [High Point Blvd and Lisbon St]

New Site
Site Category: PM 2040 Backgound
Roundabout

| Lane Use and Performance |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Demand Total veh/h | $\begin{gathered} \text { lows } \\ \text { HV } \\ \% \end{gathered}$ | Cap. veh/h | Deg. Satn v/c | $\begin{gathered} \text { Lane } \\ \text { Util. } \\ \% \end{gathered}$ | Average Delay sec | Level of Service | 95\% Bac Veh | $\begin{array}{r} \text { 2ueue } \\ \text { Dist } \\ \mathrm{ft} \end{array}$ | Lane Config | Lane Length ft | Cap. Adj. \% | Prob. Block. \% |
| South: Lisbon St |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane $1^{\text {d }}$ | 250 | 2.0 | 1330 | 0.188 | 100 | 4.3 | LOS A | 0.9 | 23.9 | Full | 1600 | 0.0 | 0.0 |
| Approach | 250 | 2.0 |  | 0.188 |  | 4.3 | LOS A | 0.9 | 23.9 |  |  |  |  |
| East: High Point Blvd |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane $1^{\text {d }}$ | 16 | 2.0 | 1049 | 0.016 | 100 | 3.6 | LOS A | 0.1 | 1.6 | Full | 1600 | 0.0 | 0.0 |
| Approach | 16 | 2.0 |  | 0.016 |  | 3.6 | LOS A | 0.1 | 1.6 |  |  |  |  |
| North: Lisbon St |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane $1^{\text {d }}$ | 348 | 2.0 | 1264 | 0.275 | 100 | 5.3 | LOS A | 1.5 | 38.1 | Full | 1600 | 0.0 | 0.0 |
| Approach | 348 | 2.0 |  | 0.275 |  | 5.3 | LOS A | 1.5 | 38.1 |  |  |  |  |
| West: High Point Blvd |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane $1^{\text {d }}$ | 60 | 2.0 | 942 | 0.063 | 100 | 4.4 | LOS A | 0.3 | 6.6 | Full | 1600 | 0.0 | 0.0 |
| Approach | 60 | 2.0 |  | 0.063 |  | 4.4 | LOS A | 0.3 | 6.6 |  |  |  |  |
| Intersection | 674 | 2.0 |  | 0.275 |  | 4.8 | LOS A | 1.5 | 38.1 |  |  |  |  |

Site Level of Service (LOS) Method: Delay \& v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS $F$ will result if $\mathrm{v} / \mathrm{c}>1$ irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies. Gap-Acceptance Capacity: Traditional M1.
HV (\%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
d Dominant lane on roundabout approach

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| Intersection |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Int Delay, s/veh | 2 |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |  |
| Lane Configurations | \% | $\uparrow$ |  | ${ }^{1}$ | $\uparrow$ |  | ${ }^{1}$ | 4 | 「' | $\cdots$ | $\uparrow$ |  |  |
| Traffic Vol, veh/h | 5 | 5 | 45 | 10 | 5 | 5 | 50 | 220 | 30 | 5 | 350 | 5 |  |
| Future Vol, veh/h | 5 | 5 | 45 | 10 | 5 | 5 | 50 | 220 | 30 | 5 | 350 | 5 |  |
| Conflicting Peds, \#/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |
| Sign Control Star | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |  |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |  |
| Storage Length | 50 | - | - | 50 | - | - | 50 | - | 50 | 50 | - | - |  |
| 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 | 5 | 49 | 11 | 5 | 5 | 54 | 239 | 33 | 5 | 380 | 5 |  |



## LANE SUMMARY

## $\nabla$ Site: 101 [66th Ave and Lisbon St]

New Site
Site Category: PM 2040 Background
Roundabout

| Lane Use and Performance |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Demand Total veh/h | $\begin{aligned} & \text { lows } \\ & \text { HV } \\ & \% \end{aligned}$ | Cap. veh/h | Deg. Satn v/c | $\begin{aligned} & \text { Lane } \\ & \text { Util. } \\ & \% \end{aligned}$ | Average Delay sec | Level of Service | 95\% Bac <br> Veh | $\begin{array}{r} \text { Queue } \\ \text { Dist } \\ \text { ft } \end{array}$ | Lane Config | Lane Length ft | Cap. <br> Adj. <br> \% | Prob. Block. \% |
| South: Lisbon St |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane $1^{\text {d }}$ | 326 | 2.0 | 1330 | 0.245 | 100 | 4.8 | LOS A | 1.3 | 33.5 | Full | 1600 | 0.0 | 0.0 |
| Approach | 326 | 2.0 |  | 0.245 |  | 4.8 | LOS A | 1.3 | 33.5 |  |  |  |  |
| East: 66th Ave |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane $1^{\text {d }}$ | 22 | 2.0 | 991 | 0.022 | 100 | 3.8 | LOS A | 0.1 | 2.2 | Full | 1600 | 0.0 | 0.0 |
| Approach | 22 | 2.0 |  | 0.022 |  | 3.8 | LOS A | 0.1 | 2.2 |  |  |  |  |
| North: Lisbon St |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane $1^{\text {d }}$ | 391 | 2.0 | 1257 | 0.311 | 100 | 5.7 | LOS A | 1.8 | 44.9 | Full | 1600 | 0.0 | 0.0 |
| Approach | 391 | 2.0 |  | 0.311 |  | 5.7 | LOS A | 1.8 | 44.9 |  |  |  |  |
| West: 66th Ave |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane $1^{\text {d }}$ | 60 | 2.0 | 895 | 0.067 | 100 | 4.6 | LOS A | 0.3 | 6.9 | Full | 1600 | 0.0 | 0.0 |
| Approach | 60 | 2.0 |  | 0.067 |  | 4.6 | LOS A | 0.3 | 6.9 |  |  |  |  |
| Intersection | 799 | 2.0 |  | 0.311 |  | 5.2 | LOS A | 1.8 | 44.9 |  |  |  |  |

Site Level of Service (LOS) Method: Delay \& v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS $F$ will result if $\mathrm{v} / \mathrm{c}>1$ irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies. Gap-Acceptance Capacity: Traditional M1.
HV (\%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
d Dominant lane on roundabout approach

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## APPENDIX B. 2040 TOTAL TRAFFIC LOS

| Intersection |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Int Delay, s/veh | 2.3 |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |  |
| Lane Configurations | * | $\uparrow$ |  | ${ }^{*}$ | $\hat{\beta}$ |  | ${ }^{7}$ | $\hat{\beta}$ |  | ${ }^{7}$ | $\hat{\beta}$ |  |  |
| Traffic Vol, veh/h | 5 | 5 | 35 | 20 | 5 | 6 | 35 | 224 | 9 | 5 | 141 | 5 |  |
| Future Vol, veh/h | 5 | 5 | 35 | 20 | 5 | 6 | 35 | 224 | 9 | 5 | 141 | 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 | 50 | - | - | 50 | - | - | 50 | - | - | 50 | - | - |  |
| 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 | 5 | 38 | 22 | 5 | 7 | 38 | 243 | 10 | 5 | 153 | 5 |  |



## LANE SUMMARY

## Site: 101 [High Point Blvd and Lisbon St]

New Site
Site Category: AM 2040 Total
Roundabout

| Lane Use and Performance |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Demand Total veh/h | $\begin{array}{r} \text { lows } \\ \text { HV } \\ \% \\ \hline \end{array}$ | Cap. veh/h | Deg. Satn v/c | $\begin{gathered} \text { Lane } \\ \text { Util. } \\ \% \end{gathered}$ | Average Delay sec | Level of Service | 95\% Back Veh | $\begin{aligned} & \text { Queue } \\ & \text { Dist } \end{aligned}$ | Lane Config | Lane Length ft | $\begin{aligned} & \text { Cap. } \\ & \text { Adj. } \\ & \% \end{aligned}$ | Prob. Block. \% |
| South: Lisbon St |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane $1^{\text {d }}$ | 291 | 2.0 | 1330 | 0.219 | 100 | 4.6 | LOS A | 1.1 | 28.9 | Full | 1600 | 0.0 | 0.0 |
| Approach | 291 | 2.0 |  | 0.219 |  | 4.6 | LOS A | 1.1 | 28.9 |  |  |  |  |
| East: High Point Blvd |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane $1^{\text {d }}$ | 34 | 2.0 | 1004 | 0.034 | 100 | 3.9 | LOS A | 0.1 | 3.4 | Full | 1600 | 0.0 | 0.0 |
| Approach | 34 | 2.0 |  | 0.034 |  | 3.9 | LOS A | 0.1 | 3.4 |  |  |  |  |
| North: Lisbon St |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane $1^{\text {d }}$ | 164 | 2.0 | 1264 | 0.130 | 100 | 3.9 | LOS A | 0.6 | 15.3 | Full | 1600 | 0.0 | 0.0 |
| Approach | 164 | 2.0 |  | 0.130 |  | 3.9 | LOS A | 0.6 | 15.3 |  |  |  |  |
| West: High Point Blvd |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane $1^{\text {d }}$ | 49 | 2.0 | 1121 | 0.044 | 100 | 3.6 | LOS A | 0.2 | 4.6 | Full | 1600 | 0.0 | 0.0 |
| Approach | 49 | 2.0 |  | 0.044 |  | 3.6 | LOS A | 0.2 | 4.6 |  |  |  |  |
| Intersection | 538 | 2.0 |  | 0.219 |  | 4.2 | LOS A | 1.1 | 28.9 |  |  |  |  |

Site Level of Service (LOS) Method: Delay \& v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if $\mathrm{v} / \mathrm{c}>1$ irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies. Gap-Acceptance Capacity: Traditional M1.
HV (\%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
d Dominant lane on roundabout approach

| Intersection |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Int Delay, s/veh | 3.2 |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |  |
| Lane Configurations | * | $\hat{\beta}$ |  | * | $\uparrow$ |  | ${ }^{*}$ | 4 | 「 | ${ }^{*}$ | $\uparrow$ |  |  |
| Traffic Vol, veh/h | 5 | 5 | 35 | 70 | 5 | 8 | 35 | 262 | 24 | 6 | 206 | 5 |  |
| Future Vol, veh/h | 5 | 5 | 35 | 70 | 5 | 8 | 35 | 262 | 24 | 6 | 206 | 5 |  |
| Conflicting Peds, \#/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |
| Sign Control Star | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |  |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |  |
| Storage Length | 50 | - | - | 50 | - | - | 50 | - | 50 | 50 | - | - |  |
| 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 | 5 | 38 | 76 | 5 | 9 | 38 | 285 | 26 | 7 | 224 | 5 |  |



## LANE SUMMARY

## $\theta$ Site: 101 [66th Ave and Lisbon St]

New Site
Site Category: AM 2040 Total
Roundabout

| Lane Use and Performance |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Demand Total veh/h | $\begin{gathered} \text { lows } \\ \text { HV } \\ \% \end{gathered}$ | Cap. veh/h | Deg. Satn v/c | $\begin{aligned} & \text { Lane } \\ & \text { Util. } \\ & \% \end{aligned}$ | Average Delay sec | Level of Service | 95\% Bac <br> Veh | $\begin{array}{r} \text { Queue } \\ \text { Dist } \\ \text { ft } \end{array}$ | Lane Config | Lane Length ft | Cap. <br> Adj. <br> \% | Prob. Block. \% |
| South: Lisbon St |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane $1^{\text {d }}$ | 349 | 2.0 | 1329 | 0.263 | 100 | 5.0 | LOS A | 1.4 | 36.6 | Full | 1600 | 0.0 | 0.0 |
| Approach | 349 | 2.0 |  | 0.263 |  | 5.0 | LOS A | 1.4 | 36.6 |  |  |  |  |
| East: 66th Ave |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane $1^{\text {d }}$ | 90 | 2.0 | 962 | 0.094 | 100 | 4.6 | LOS A | 0.4 | 10.0 | Full | 1600 | 0.0 | 0.0 |
| Approach | 90 | 2.0 |  | 0.094 |  | 4.6 | LOS A | 0.4 | 10.0 |  |  |  |  |
| North: Lisbon St |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane $1^{\text {d }}$ | 236 | 2.0 | 1195 | 0.197 | 100 | 4.7 | LOS A | 1.0 | 24.4 | Full | 1600 | 0.0 | 0.0 |
| Approach | 236 | 2.0 |  | 0.197 |  | 4.7 | LOS A | 1.0 | 24.4 |  |  |  |  |
| West: 66th Ave |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane $1^{\text {d }}$ | 49 | 2.0 | 984 | 0.050 | 100 | 4.1 | LOS A | 0.2 | 5.1 | Full | 1600 | 0.0 | 0.0 |
| Approach | 49 | 2.0 |  | 0.050 |  | 4.1 | LOS A | 0.2 | 5.1 |  |  |  |  |
| Intersection | 724 | 2.0 |  | 0.263 |  | 4.8 | LOS A | 1.4 | 36.6 |  |  |  |  |

Site Level of Service (LOS) Method: Delay \& v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS $F$ will result if $\mathrm{v} / \mathrm{c}>1$ irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies. Gap-Acceptance Capacity: Traditional M1.
HV (\%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
d Dominant lane on roundabout approach

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| Intersection |  |  |  |  |  |  |
| :--- | ---: | ---: | ---: | ---: | ---: | ---: |
| Int Delay, s/veh | 0.5 |  |  |  |  |  |
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
| Lane Configurations | Mr |  | $\uparrow$ |  | 1 | 4 |
| Traffic Vol, veh/h | 21 | 1 | 267 | 8 | 0 | 196 |
| Future Vol, veh/h | 21 | 1 | 267 | 8 | 0 | 196 |
| 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 | - | - | - | 50 | - |
| 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 | 23 | 1 | 290 | 9 | 0 | 213 |


| Major/Minor M | Minor1 |  | Major1 |  | Major2 |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Conflicting Flow All | 508 | 295 | 0 | 0 | 299 | 0 |
| Stage 1 | 295 | - | - | - | - | - |
| Stage 2 | 213 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.12 | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.218 | - |
| Pot Cap-1 Maneuver | 525 | 744 | - | - | 1262 | - |
| Stage 1 | 755 | - | - | - | - | - |
| Stage 2 | 823 | - | - | - | - | - |
| Platoon blocked, \% |  |  | - | - |  | - |
| Mov Cap-1 Maneuver | 525 | 744 | - | - | 1262 | - |
| Mov Cap-2 Maneuver | 525 | - | - | - | - | - |
| Stage 1 | 755 | - | - | - | - | - |
| Stage 2 | 823 | - | - | - | - | - |
|  |  |  |  |  |  |  |
| Approach | WB |  | NB |  | SB |  |
| HCM Control Delay, s | 12.1 |  | 0 |  | 0 |  |
| HCM LOS | B |  |  |  |  |  |
|  |  |  |  |  |  |  |
| Minor Lane/Major Mvmt |  | NBT | NBRWBLn1 |  | SBL | SBT |
| Capacity (veh/h) |  | - | - | 532 | 1262 | - |
| HCM Lane V/C Ratio |  | - | - | 0.045 | - | - |
| HCM Control Delay (s) |  | - | - | 12.1 | 0 | - |
| HCM Lane LOS |  | - | - | B | A | - |
| HCM 95th \%tile Q(veh) |  | - | - | 0.1 | 0 | - |




| Intersection |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Int Delay, s/veh | 2.2 |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |  |
| Lane Configurations | * | $\uparrow$ |  | ${ }^{7}$ | $\hat{\beta}$ |  | ${ }^{7}$ | $\hat{\beta}$ |  | ${ }^{7}$ | $\hat{\beta}$ |  |  |
| Traffic Vol, veh/h | 5 | 5 | 45 | 12 | 5 | 5 | 50 | 173 | 20 | 6 | 314 | 5 |  |
| Future Vol, veh/h | 5 | 5 | 45 | 12 | 5 | 5 | 50 | 173 | 20 | 6 | 314 | 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 | 50 | - | - | 50 | - | - | 50 | - | - | 50 | - | - |  |
| 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 | 5 | 49 | 13 | 5 | 5 | 54 | 188 | 22 | 7 | 341 | 5 |  |



## LANE SUMMARY

## 7 Site: 101 [High Point Blvd and Lisbon St]

New Site
Site Category: PM 2040 Total
Roundabout

| Lane Use and Performance |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Demand Total veh/h | $\begin{gathered} \text { lows } \\ \text { HV } \\ \% \end{gathered}$ | Cap. veh/h | Deg. Satn v/c | $\begin{gathered} \text { Lane } \\ \text { Util. } \\ \% \end{gathered}$ | Average Delay sec | Level of Service | 95\% Bac Veh | $\begin{array}{r} \text { Lueue } \\ \text { Dist } \\ \mathrm{ft} \end{array}$ | Lane Config | Lane Length | Cap. Adj. \% | Prob. Block. \% |
| South: Lisbon St |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane $1^{\text {d }}$ | 264 | 2.0 | 1329 | 0.199 | 100 | 4.4 | LOS A | 1.0 | 25.6 | Full | 1600 | 0.0 | 0.0 |
| Approach | 264 | 2.0 |  | 0.199 |  | 4.4 | LOS A | 1.0 | 25.6 |  |  |  |  |
| East: High Point Blvd |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane $1^{\text {d }}$ | 24 | 2.0 | 1045 | 0.023 | 100 | 3.6 | LOS A | 0.1 | 2.3 | Full | 1600 | 0.0 | 0.0 |
| Approach | 24 | 2.0 |  | 0.023 |  | 3.6 | LOS A | 0.1 | 2.3 |  |  |  |  |
| North: Lisbon St |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane $1^{\text {d }}$ | 353 | 2.0 | 1254 | 0.282 | 100 | 5.4 | LOS A | 1.5 | 39.1 | Full | 1600 | 0.0 | 0.0 |
| Approach | 353 | 2.0 |  | 0.282 |  | 5.4 | LOS A | 1.5 | 39.1 |  |  |  |  |
| West: High Point Blvd |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane $1^{\text {d }}$ | 60 | 2.0 | 929 | 0.064 | 100 | 4.5 | LOS A | 0.3 | 6.6 | Full | 1600 | 0.0 | 0.0 |
| Approach | 60 | 2.0 |  | 0.064 |  | 4.5 | LOS A | 0.3 | 6.6 |  |  |  |  |
| Intersection | 701 | 2.0 |  | 0.282 |  | 4.9 | LOS A | 1.5 | 39.1 |  |  |  |  |

Site Level of Service (LOS) Method: Delay \& v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and $\mathrm{v} / \mathrm{c}$ ratio (degree of saturation) per lane.
LOS $F$ will result if $\mathrm{v} / \mathrm{c}>1$ irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies. Gap-Acceptance Capacity: Traditional M1.
HV (\%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
d Dominant lane on roundabout approach

| Intersection |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Int Delay, s/veh | 2.5 |  |  |  |  |  |  |  |  |  |  |  |  |
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |  |
| Lane Configurations | * | $\hat{\beta}$ |  | * | $\uparrow$ |  | ${ }^{7}$ | 4 | 「 | ${ }^{*}$ | $\uparrow$ |  |  |
| Traffic Vol, veh/h | 5 | 5 | 45 | 37 | 5 | 7 | 50 | 253 | 72 | 8 | 371 | 5 |  |
| Future Vol, veh/h | 5 | 5 | 45 | 37 | 5 | 7 | 50 | 253 | 72 | 8 | 371 | 5 |  |
| Conflicting Peds, \#/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  |
| Sign Control Star | Stop | Stop | Stop | Stop | Stop | Stop | Free | Free | Free | Free | Free | Free |  |
| RT Channelized | - | - | None | - | - | None | - | - | None | - | - | None |  |
| Storage Length | 50 | - | - | 50 | - | - | 50 | - | 50 | 50 | - | - |  |
| 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 | 5 | 49 | 40 | 5 | 8 | 54 | 275 | 78 | 9 | 403 | 5 |  |



## LANE SUMMARY

## O Site: 101 [66th Ave and Lisbon St]

New Site
Site Category: PM 2040 Total
Roundabout

| Lane Use and Performance |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Demand Total veh/h | $\begin{gathered} \text { lows } \\ \text { HV } \\ \% \end{gathered}$ | Cap. veh/h | Deg. Satn v/c | $\begin{aligned} & \text { Lane } \\ & \text { Util. } \\ & \% \end{aligned}$ | Average Delay sec | Level of Service | 95\% Bac Veh | $\begin{array}{r} \text { Queue } \\ \text { Dist } \\ \mathrm{ft} \end{array}$ | Lane Config | Lane Length | $\begin{array}{r} \text { Cap. } \\ \text { Adj. } \\ \% \end{array}$ | Prob. Block. \% |
| South: Lisbon St |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane $1^{\text {d }}$ | 408 | 2.0 | 1214 | 0.336 | 100 | 6.1 | LOS A | 1.9 | 49.0 | Full | 1600 | 0.0 | 0.0 |
| Approach | 408 | 2.0 |  | 0.336 |  | 6.1 | LOS A | 1.9 | 49.0 |  |  |  |  |
| East: 66th Ave |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane $1^{\text {d }}$ | 53 | 2.0 | 955 | 0.056 | 100 | 4.3 | LOS A | 0.2 | 5.8 | Full | 1600 | 0.0 | 0.0 |
| Approach | 53 | 2.0 |  | 0.056 |  | 4.3 | LOS A | 0.2 | 5.8 |  |  |  |  |
| North: Lisbon St |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane $1^{\text {d }}$ | 502 | 2.0 | 1219 | 0.412 | 100 | 7.1 | LOS A | 2.6 | 66.7 | Full | 1600 | 0.0 | 0.0 |
| Approach | 502 | 2.0 |  | 0.412 |  | 7.1 | LOS A | 2.6 | 66.7 |  |  |  |  |
| West: 66th Ave |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Lane $1^{\text {d }}$ | 60 | 2.0 | 774 | 0.077 | 100 | 5.4 | LOS A | 0.3 | 7.8 | Full | 1600 | 0.0 | 0.0 |
| Approach | 60 | 2.0 |  | 0.077 |  | 5.4 | LOS A | 0.3 | 7.8 |  |  |  |  |
| Intersection | 1023 | 2.0 |  | 0.412 |  | 6.5 | LOS A | 2.6 | 66.7 |  |  |  |  |

Site Level of Service (LOS) Method: Delay \& v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab). Roundabout LOS Method: Same as Sign Control.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS $F$ will result if $\mathrm{v} / \mathrm{c}>1$ irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies. Gap-Acceptance Capacity: Traditional M1.
HV (\%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
d Dominant lane on roundabout approach

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| Intersection |  |  |  |  |  |  |
| :--- | ---: | ---: | ---: | ---: | ---: | ---: |
| Int Delay, s/veh | 1.8 |  |  |  |  |  |
| Movement | EBT | EBR | WBL | WBT | NBL | NBR |
| Lane Configurations | $\uparrow$ |  |  | $\mathbf{T}$ | Mr |  |
| Traffic Vol, veh/h | 20 | 11 | 3 | 15 | 7 | 3 |
| Future Vol, veh/h | 20 | 11 | 3 | 15 | 7 | 3 |
| Conflicting Peds, \#/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | - | - | - | - | 0 | - |
| Veh in Median Storage, \# | 0 | - | - | 0 | 0 | - |
| Grade, \% | 0 | - | - | 0 | 0 | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, \% | 2 | 2 | 2 | 2 | 2 | 2 |
| Mvmt Flow | 22 | 12 | 3 | 16 | 8 | 3 |



| Intersection |  |  |  |  |  |  |
| :--- | ---: | ---: | ---: | ---: | ---: | ---: |
| Int Delay, s/veh | 0.3 |  |  |  |  |  |
| Movement | WBL | WBR | NBT | NBR | SBL | SBT |
| Lane Configurations | M |  | F |  | a | 个 |
| Traffic Vol, veh/h | 14 | 1 | 242 | 23 | 1 | 370 |
| Future Vol, veh/h | 14 | 1 | 242 | 23 | 1 | 370 |
| 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 | - | - | - | 50 | - |
| 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 | 15 | 1 | 263 | 25 | 1 | 402 |


| Major/Minor M | Minor1 |  | Major1 |  | Major2 |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Conflicting Flow All | 680 | 276 | 0 | 0 | 288 | 0 |
| Stage 1 | 276 | - | - | - | - | - |
| Stage 2 | 404 | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | 4.12 | - |
| Critical Hdwy Stg 1 | 5.42 |  | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - |
| Follow-up Hdwy | 3.518 | 3.318 | - | - | 2.218 | - |
| Pot Cap-1 Maneuver | 417 | 763 | - | - | 1274 | - |
| Stage 1 | 771 | - | - | - | - | - |
| Stage 2 | 674 | - | - | - | - | - |
| Platoon blocked, \% |  |  | - | - |  | - |
| Mov Cap-1 Maneuver | 417 | 763 | - | - | 1274 | - |
| Mov Cap-2 Maneuver | 417 | - | - | - | - | - |
| Stage 1 | 771 | - | - | - | - | - |
| Stage 2 | 673 | - | - | - | - | - |
|  |  |  |  |  |  |  |
| Approach | WB |  | NB |  | SB |  |
| HCM Control Delay, s | 13.7 |  | 0 |  | 0 |  |
| HCM LOS | B |  |  |  |  |  |
|  |  |  |  |  |  |  |
| Minor Lane/Major Mvmt |  | NB | NBRWBLn1 |  | SBL | SBT |
| Capacity (veh/h) |  | - | - | 430 | 1274 | - |
| HCM Lane V/C Ratio |  | - | - | 0.038 | 0.001 | - |
| HCM Control Delay (s) |  | - | - | 13.7 | 7.8 | - |
| HCM Lane LOS |  | - | - | B | A | - |
| HCM 95th \%tile Q(veh) |  | - | - | 0.1 | 0 | - |


| Intersection |  |  |  |  |  |  |
| :--- | ---: | ---: | ---: | ---: | ---: | ---: |
| Int Delay, s/veh | 4.3 |  |  |  |  |  |
| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
| Lane Configurations | 1 | A | $\uparrow$ |  | Mr |  |
| Traffic Vol, veh/h | 45 | 40 | 20 | 11 | 7 | 29 |
| Future Vol, veh/h | 45 | 40 | 20 | 11 | 7 | 29 |
| Conflicting Peds, \#/hr | 0 | 0 | 0 | 0 | 0 | 0 |
| Sign Control | Free | Free | Free | Free | Stop | Stop |
| RT Channelized | - | None | - | None | - | None |
| Storage Length | 50 | - | - | - | - | - |
| 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 | 49 | 43 | 22 | 12 | 8 | 32 |



