



BUILDING A BETTER
State Street

BUS RAPID TRANSIT ALTERNATIVES ANALYSIS

JUNE 2021

BOISE, ID

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All photographs in this document are sourced from VRT.

EXECUTIVE SUMMARY

The State Street Transit Alternatives Analysis identifies a Locally Preferred Alternative for transit service in downtown Boise. This Alternatives Analysis was led by Valley Regional Transit, in partnership with members of the State Street Technical Team: the City of Boise, the City of Eagle, Garden City, the Capital City Development Corporation, Ada County, Ada County Highway District, the Community Planning Association of Southwest Idaho, and the Idaho Transportation Department.

The Locally Preferred Alternative meets goals agreed upon by the State Street Technical Team, which built on previous State Street planning efforts and other regional plans. These goals include improving mobility and access; minimizing negative impacts on key local resources while supporting economic development; and providing cost-effective transit service. The Alternatives Analysis process evaluated four different alignments through a two-tiered process, using criteria tied to the three key goals.

The Locally Preferred Alternative is shown in Figure ES-1. It includes 10- to 15-minute headways in the peak period and 15-minute headways for the remainder of the daily span of service, with upgraded station amenities along State Street between Main Street Station. These improvements can be implemented in the near term.

Demographic projections indicate that household and employment densities along the Main/Fairview corridor will reach transit-supportive levels by 2035. When this occurs, VRT should add service. This service would have up to 10- to 15-minute headways during the peak, and 15-minute headways during the off-peak. When the added service is implemented, VRT should also upgrade the stations along Whitewater Park Boulevard. Stations along Main and Fairview will likely have been upgraded already through a separate Best in Class transit improvement project.



Figure ES-1: Recommendations

INTRODUCTION

STUDY PURPOSE

The purpose of this State Street Transit Alternatives Analysis is to identify a Locally Preferred Alternative for transit service in downtown Boise. The analysis establishes goals, objectives, and evaluation criteria for comparing transit alternatives, and recommends a preferred transit alternative for the corridor as well as next steps.

STUDY PARTNERS AND RESPONSIBILITIES

This Alternatives Analysis was led by Valley Regional Transit (VRT), in partnership with members of the State Street Technical Team: the City of Boise, the City of Eagle, Garden City, the Capital City Development Corporation, Ada County, Ada County Highway District (ACHD), the Community Planning Association of Southwest Idaho (COMPASS), and the Idaho Transportation Department (ITD). The State Street Technical Team (SSTT) provided crucial guidance, information, modeling support, and document review throughout the planning process, without which this analysis would not have been possible.

STATE STREET PLANNING HISTORY

Since 2004, transportation partners in the Treasure Valley have been studying the future of State Street. Past planning efforts served as a critical foundation for this analysis, including the following documents:

- › **The State Street Corridor Strategic Plan Study Final Report**, prepared for ACHD and the City of Boise in 2004;
- › **The State Street Corridor Market Strategy**, prepared for the City of Boise, ACHD, and the State Street Steering Committee in 2007;
- › **The State Street Corridor Transit Oriented Development Guidelines**, led by the City of Boise and with a partnership of regional agencies and local municipalities in 2008;
- › **The State Street Transit and Traffic Operational Plan (TTOP)**, prepared for ACHD, City of Boise, and VRT in 2011;
- › **The State Street Programming and Finance Plan**, prepared for ACHD, the City of Boise, VRT, the State Street Coordinating Committee in 2012; and
- › **The State Street Corridor Transit Oriented Development Plan**, prepared for a partnership of agencies along the corridor in 2019.

These documents provided valuable background context and served as the basis for the goals, objectives, and evaluation criteria for assessing the transit alignments discussed in this study.

STUDY AREA CHARACTERISTICS

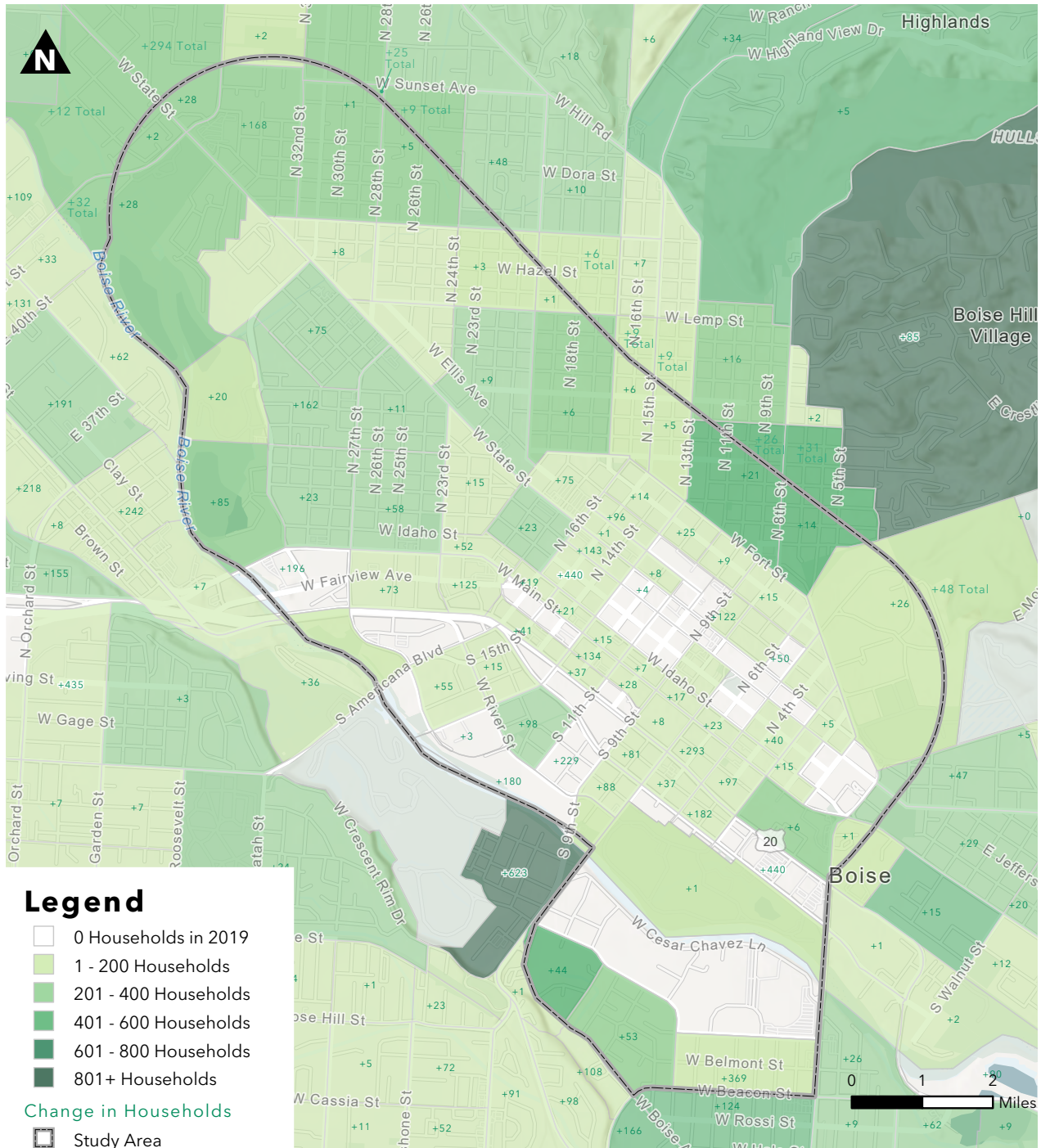
Socioeconomic conditions, transportation networks, and other factors influence the need and demand for transit improvements. This section provides an overview of population and employment projections, as well as a summary of the existing transportation network and available services. More information is available in **Appendix A, Base and Future Year Conditions Technical Memorandum**.

POPULATION AND EMPLOYMENT CONDITIONS

Information on current and projected household and employment totals within the study area was provided by COMPASS, which is the metropolitan planning organization (MPO) for the Treasure Valley. The MPO provides data on the number of households, population, and jobs within small geographic areas called traffic analysis zones (TAZ's), both for existing conditions and several future year horizons. For the purpose of this study, the analysis focused on a base year of 2019, and a future horizon year of 2035, to be consistent with opening-year assumptions contained within the State Street Traffic and Transit Operations Plan.

The number of households along a potential transit corridor influences transit ridership: the more people along a corridor, the more potential riders. Figure 1 shows the current and projected households within each TAZ in the study area. Based on the COMPASS data provided in the TAZ's, there are currently 1,541 households within the study area, and 4,698 households projected to be within the study area by 2035, a total increase of 3,157. Within the study area, some of the most concentrated changes are expected in the neighborhood between 13th-15th Street, from Jefferson Street to Idaho Street. Within these few blocks, an additional 440 housing units are anticipated by 2035. Outside of this area, changes in the number of projected households are somewhat smaller, although additional pockets of growth are dispersed throughout the study area as shown in Figure 1.

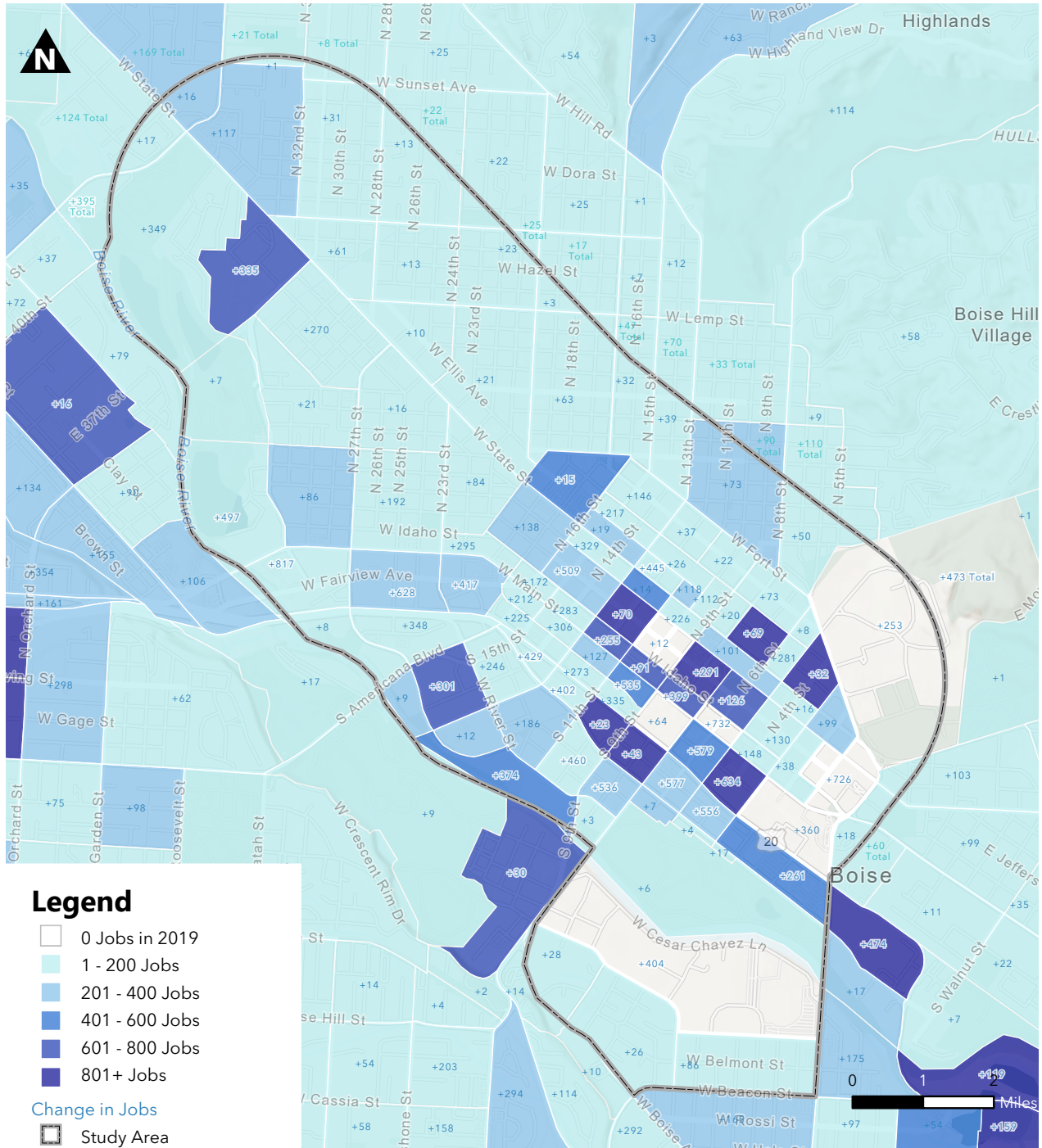
Concentrations of jobs also can be significant contributors to transit ridership, encouraging residents of other parts of the region to take transit to commute to work. The COMPASS data indicated that there are currently 3,829 jobs within the study area, and 12,595 jobs projected to be within the study area by 2035, a total increase of 8,766. Figure 2 provides a map of current and projected employment by TAZ. Future growth patterns in the study area reflect trends already underway: the model data suggests that a significant amount of additional employment growth is expected along the Main Street and Fairview Avenue corridors, especially near their intersections with Whitewater Park Boulevard. Growth is anticipated at the northwest corner of Main Street and Whitewater Park Boulevard as well as the current ITD campus (at the southwest corner of State Street and Whitewater Park Boulevard). Both of these sites have been the focus of high-level planning exercises around future growth, and the ITD campus was identified as a Tier 1 Station Area in the 2019 State Street Corridor Transit-Oriented Development Plan. That plan recommends a mix of land uses at the ITD campus site, including office, single family residential, multi-family residential, and open space. Currently, neither site has active development plans in place, and ITD has no current plans to vacate its campus. However, future employment projections from COMPASS include some level of change in these areas.



Source: Community Planning Association (COMPASS)

Demographics
 Figure 1: Change in Households
 between 2019 and 2035





Source: Community Planning Association (COMPASS)

Demographics
 Figure 2: Change in Employment
 between 2019 and 2035



LAND USE

The study area encapsulates a mostly-built-out section of the City of Boise. Boise's downtown area is in the southeast section of the study area, capturing the region's highest density of jobs as well as areas of high-density housing. Main Street Station is a transit hub in the heart of downtown, creating an anchor along with the Grove Plaza and the CenturyLink arena. In the northeast part of the study area, the State Capitol Building and supporting state office buildings bring a significant number of employees into the downtown area from around the region. West of downtown, land uses gradually transition from high-density housing and intensive commercial development to shorter multi-story office and commercial buildings, shifting more fully to residential development west of 17th Street.

Between State Street and Main Street, from roughly 17th Street west to Whitewater Park Boulevard, single family homes are the predominant land use, with some exceptions. Along the State Street corridor, land uses outside the downtown core tend to be one- and two-story commercial interspersed with single-family residential districts. The Main/Fairview couplets have been the focus of redevelopment in the area, with new residential and commercial growth occurring mostly between 23rd Street and Whitewater Park Boulevard.

Additional near-term development projects are under construction or about to enter the construction phase in the study area. All near-term future development plans discussed by the project team were shared with COMPASS to ensure that future growth projections for households and jobs incorporated anticipated development projects. These include the following residential and commercial projects identified by City of Boise staff:

- **11th and Idaho:** 180,000 square feet of office space to be completed by late 2021
- **5th and Front:** 138-room hotel, completed in 2020
- **6th and Front:** the Vanguard Apartments, 75 units and 2,700 square feet of retail space, to be completed by late 2021
- **512 W. Grove Street:** a mixed-use project with 114 residential units and 8,000 square feet of retail space, to be completed by late 2021
- **116 S. 6th Street:** a mixed-use project with 60 residential units, 9,000 square feet of office space, and 5,000 square feet of retail space, to be completed by late 2021
- **139 E. Main Street:** the Ronald McDonald House, with 47 rooms, completed in 2020
- **529-535 S. 15th Street:** the River Street Lofts, with 10 residential units, completed in 2020
- **323 W. Broad Street:** the Cartee, with 161 residential units, to be completed in late 2021



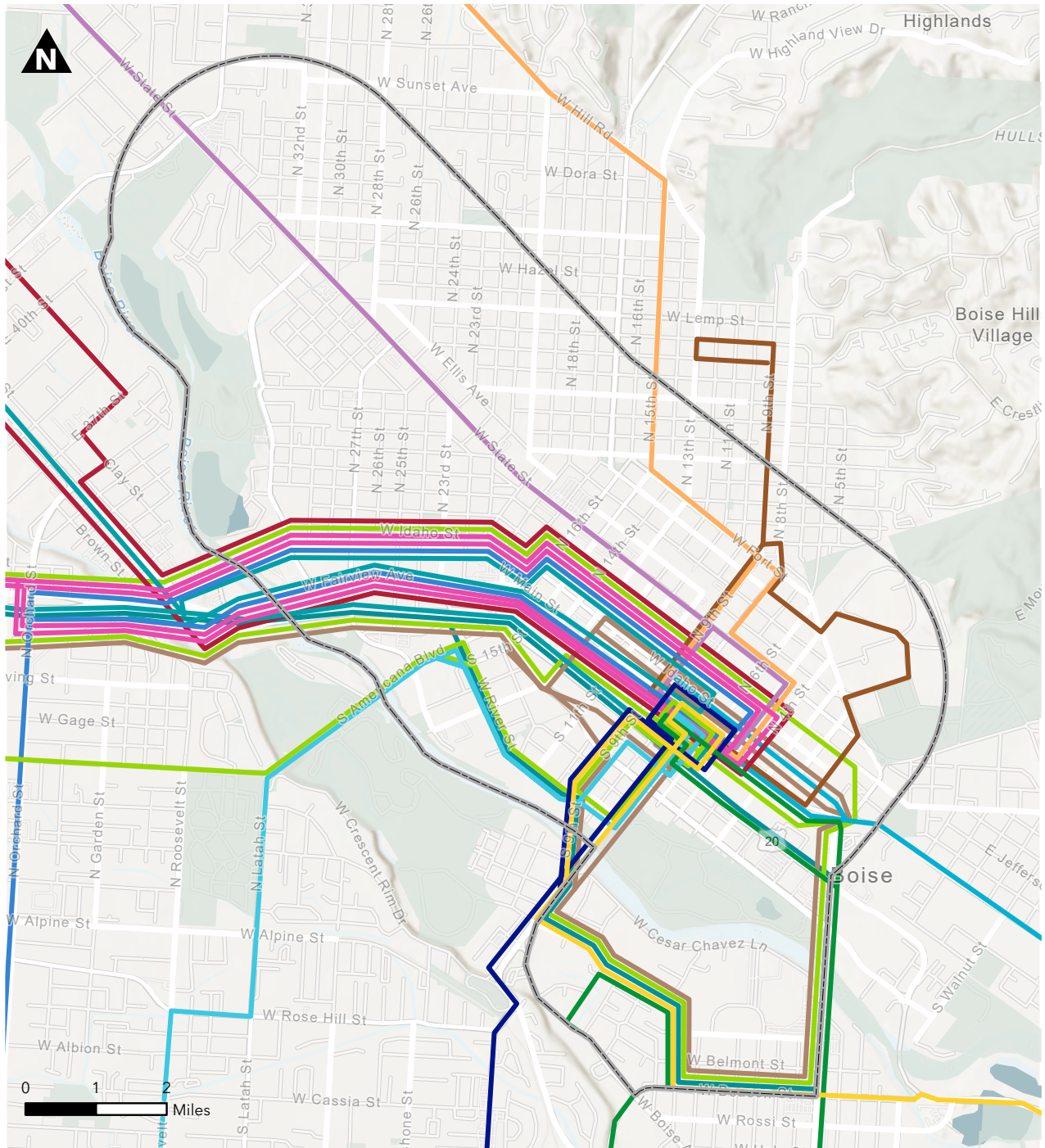
TRANSPORTATION CONDITIONS

TRANSIT

Valley Regional Transit (VRT) provides bus service in Ada and Canyon Counties. VRT operates 23 total routes: 18 fixed routes in Ada County, one in Canyon County, and four intercounty routes between Ada County and Canyon County. In the study area, there are 18 routes in service. All bus routes that travel within the study area are summarized in Figure 3.

VRT provided average weekday transit boardings and alightings for each bus stop in the study area, reflecting a typical day in October 2019. This represents ridership trends prior to the COVID-19 impacts on

transit ridership and overall travel. October also reflects a time of year when people are generally commuting to and from work in a typical pattern, elementary and secondary schools are in session, and students are commuting to colleges and universities in the region as well. As shown in Figure 4, several of the highest-ridership stops in the study area are focused along State Street, serving destinations such as the government complex northeast of downtown, the downtown core, Boise High School, the Downtown Boise YWCA, and other destinations along the commercial sections of State Street west of downtown.



Source: Valley Regional Transit (VRT)

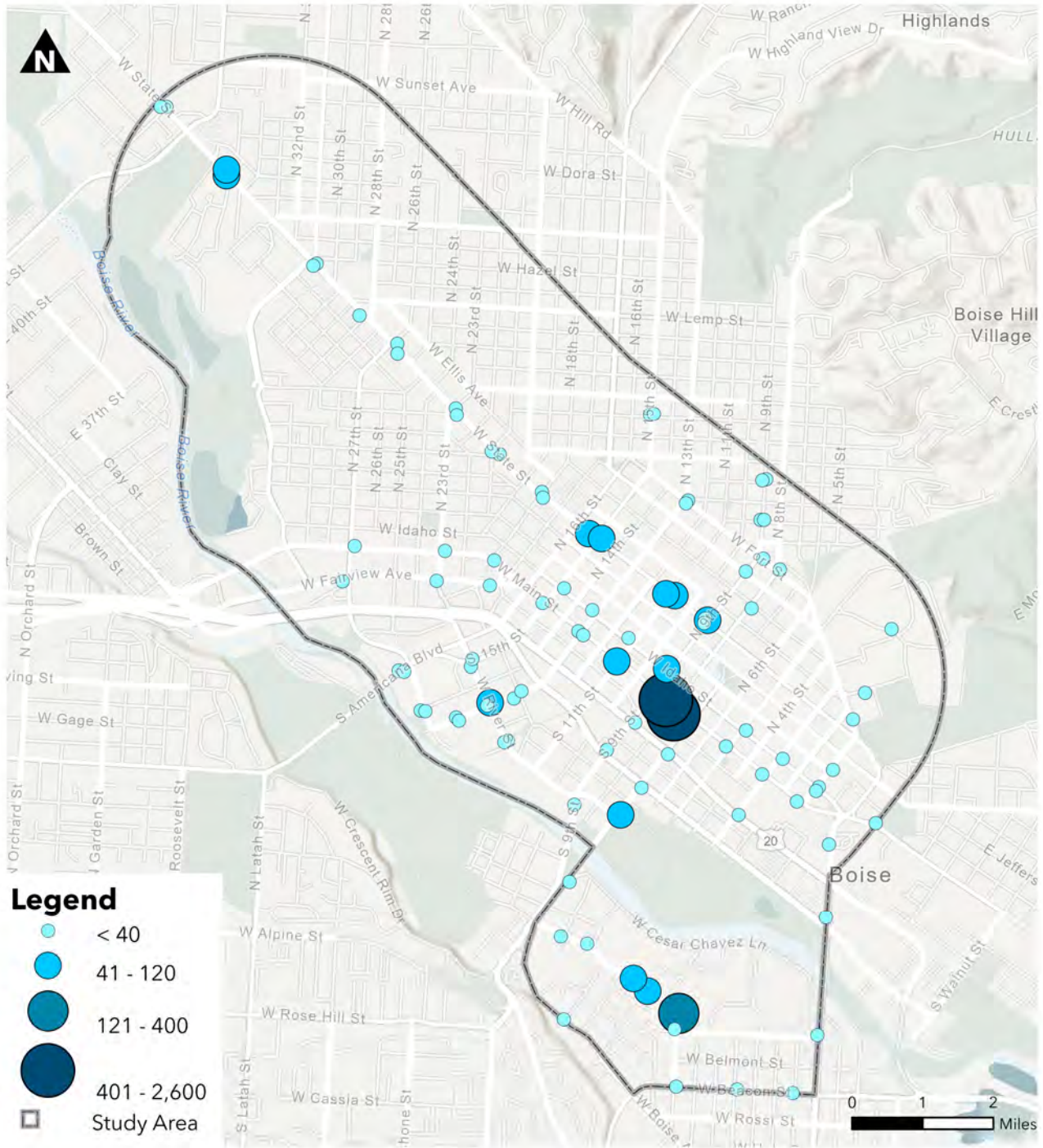
LEGEND

- 01: Harris Ranch via Parkcenter
- 02: Broadway
- 03: Vista
- 04: Roosevelt
- 05: Emerald
- 06: Orchard
- 07A: Fairview Ustick
- 07B: Fairview - Towne Square Mall
- 08x: Five Mile Chinden
- 09: State Street
- 10: Hill Road
- 11: Garden City
- 16: VA/Hyde Park Loop
- 17: Warm Springs
- 29: Overland
- 40: Nampa/Meridian Express
- 43: Caldwell Express
- 45: BSU Express
- Study Area



Transit
Figure 3: Study Area Transit Routes

Layout view only. Many routes overlap.



Source: Valley Regional Transit (VRT). October 2019.



Transit

Figure 4: Average Weekday Transit Boardings and Alightings



WALKING AND BICYCLING

Active transportation conditions vary widely throughout the study area. In the heart of downtown Boise, pedestrian and bicyclist conditions are very good: sidewalks are typically wider than normal, able to accommodate the higher numbers of pedestrians typically seen in urban environments; block sizes are small; high-visibility crosswalks are common; and a range of on-street bicycle facility types

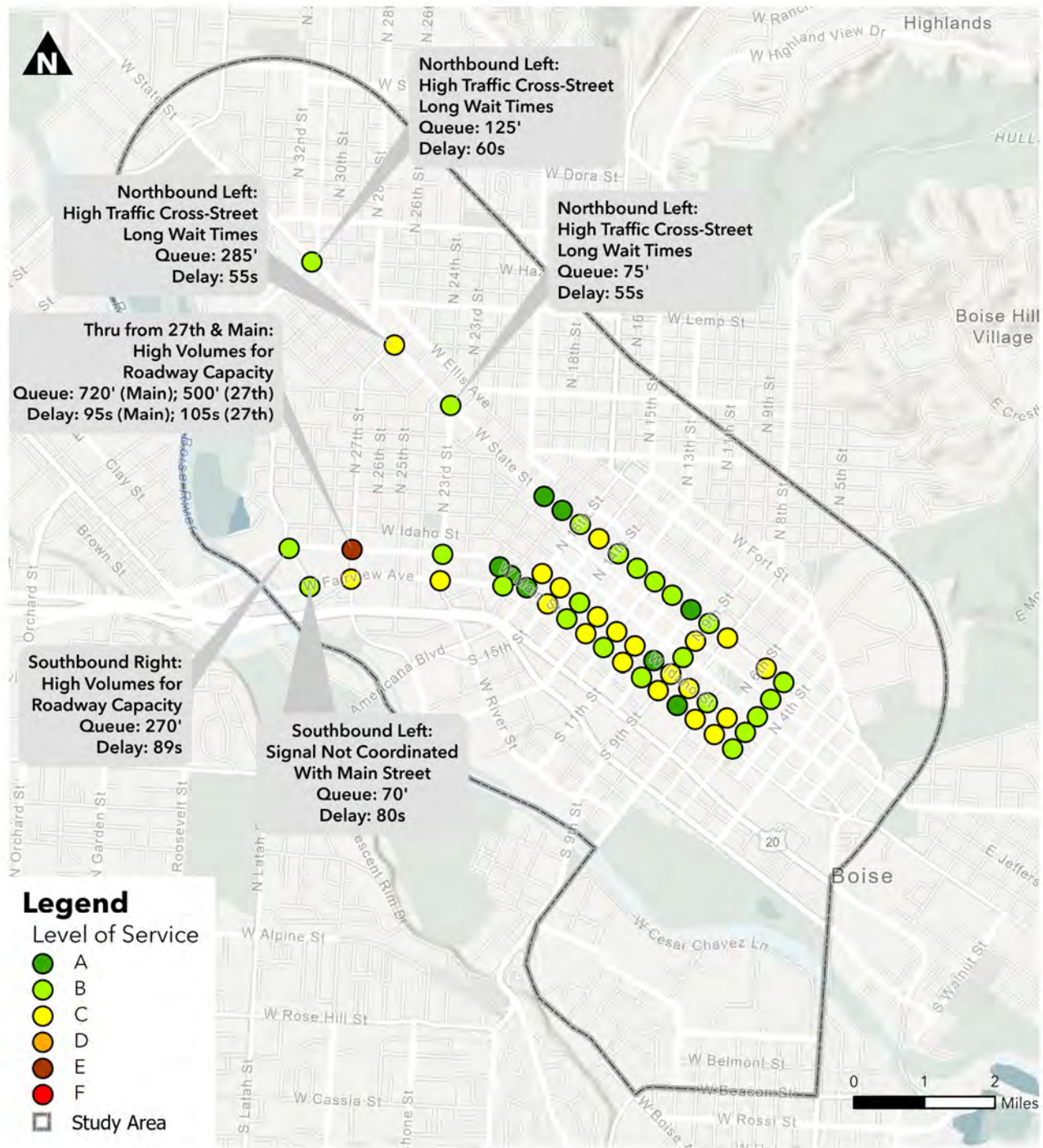
are often available. Outside of downtown, infrastructure conditions are still generally good: high-visibility crosswalks are striped on major corridors like Whitewater Park Boulevard and 27th Street, sidewalks are available and consistent, bike facilities are available on several major corridors, and block sizes are small.



TRAFFIC

Traffic conditions in the study area are generally acceptable today. ACHD's traffic model provided information on traffic level of service, or LOS (a measurement of delay experienced by drivers at intersections), along the study corridors during the morning, midday, and evening peak hours. LOS is represented along a scale of A through F, with "A" representing the best conditions and "F" representing the worst. In Ada County, if drivers along the study routes experience

an average delay of 55 seconds (indicating a LOS "E") or more at a signalized intersection, that intersection is considered as having a failing level of service according to ACHD's standards. Throughout the study area, the evening peak hour experienced the most delay throughout the day. Figure 5 shows current evening peak hour LOS results, which served as a base for the analysis of the impacts of the proposed route alternatives.



All queues shown are 95th Percentile.
Source: Ada County Highway District (ACHD).



Traffic
Figure 5: Level of Service (LOS) at Study Intersections
2019 PM Peak Hour

SCREENING OF ALTERNATIVES

LONG LIST OF ALTERNATIVES

Four alternatives were originally identified for consideration, Main Street Station in downtown Boise. The four alternatives were developed by VRT with input from the SSTT. The initial alternatives followed State Street, 23rd Street, 27th Street, and Whitewater Park Boulevard, and are shown in Figure 6. More information about the alternatives can be found in **Appendix B, Route Descriptions Technical Memorandum**.

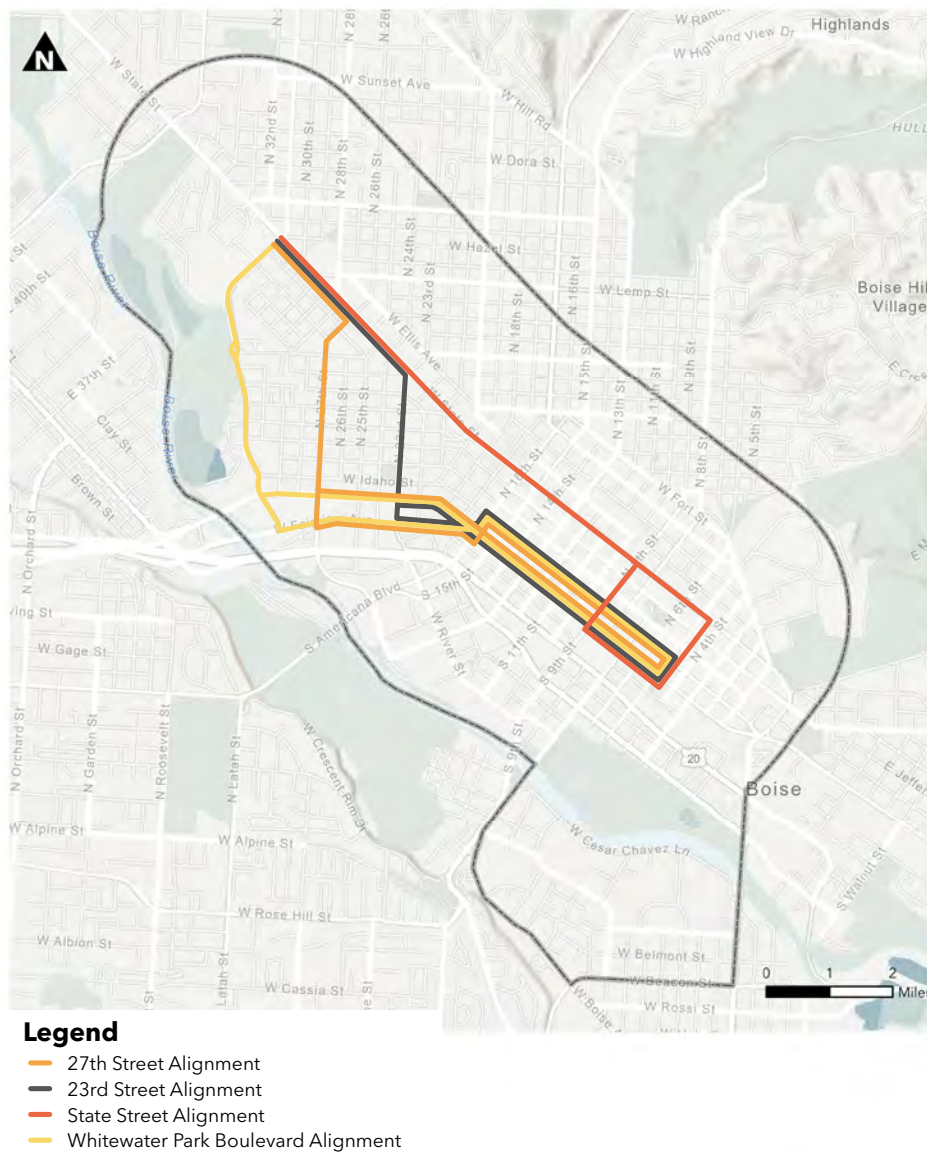


Figure 6: Initial Alternatives

Layout view only. All routes have some overlap.



TIER 1 SCREENING

The initial alternatives were screened based on goals derived from previous studies and work efforts. These goals reflected work completed as part of multiple State Street corridor studies from 2004 through 2019, ACHD roadway and bikeway plans, several City of Boise land use and transportation plans, district plans prepared by CCDC, and transit plans prepared by VRT. The goals and objectives for the corridor included the following:

GOAL: IMPROVE MOBILITY AND ACCESS

- Objective:** Create transportation choices that are convenient, safe, and affordable for people of all ages and abilities
- Objective:** Increase transit ridership and service while balancing traffic and transit needs
- Objective:** Improve multi-modal connections and access to existing transit systems

GOAL: MINIMIZE NEGATIVE IMPACTS ON KEY LOCAL RESOURCES WHILE SUPPORTING ECONOMIC DEVELOPMENT

- Objective:** Avoid, minimize, and mitigate negative impacts to key local resources, including neighborhood, land use, and environmentally-sensitive areas
- Objective:** Build public support for transit and complete street concepts

GOAL: PROVIDE COST-EFFECTIVE TRANSIT SERVICE

- Objective:** Match transportation investment to level of travel demand in study area

These goals and objectives were the foundation for a Tier 1 screening process, intended to narrow the field of alignments to three potential candidates. The initial set of alignments were screened based on the following criteria, which were tied to the goals and objectives:

Operational criteria including:

- Transit travel time from Whitewater Park Boulevard to Main Street Station, for morning inbound buses and evening outbound buses;
- The number of traffic signals along each alignment;
- Impacted corridors (calculated as the miles of alignment operating at greater than 75% capacity, using volume/capacity ratios from the 2019 COMPASS travel demand model);

Land use criteria including:

- Population density (using population per acre calculations from COMPASS travel demand model input data);
- Employment density (using jobs per acre calculations from COMPASS travel demand model input data); and
- Number of major destinations served.

The 23rd Street alignment was screened out based on its performance on these criteria, and the State Street, 27th Street, and Whitewater Park Boulevard alignments moved forward to Tier 2 screening.



TIER 2 SCREENING CRITERIA

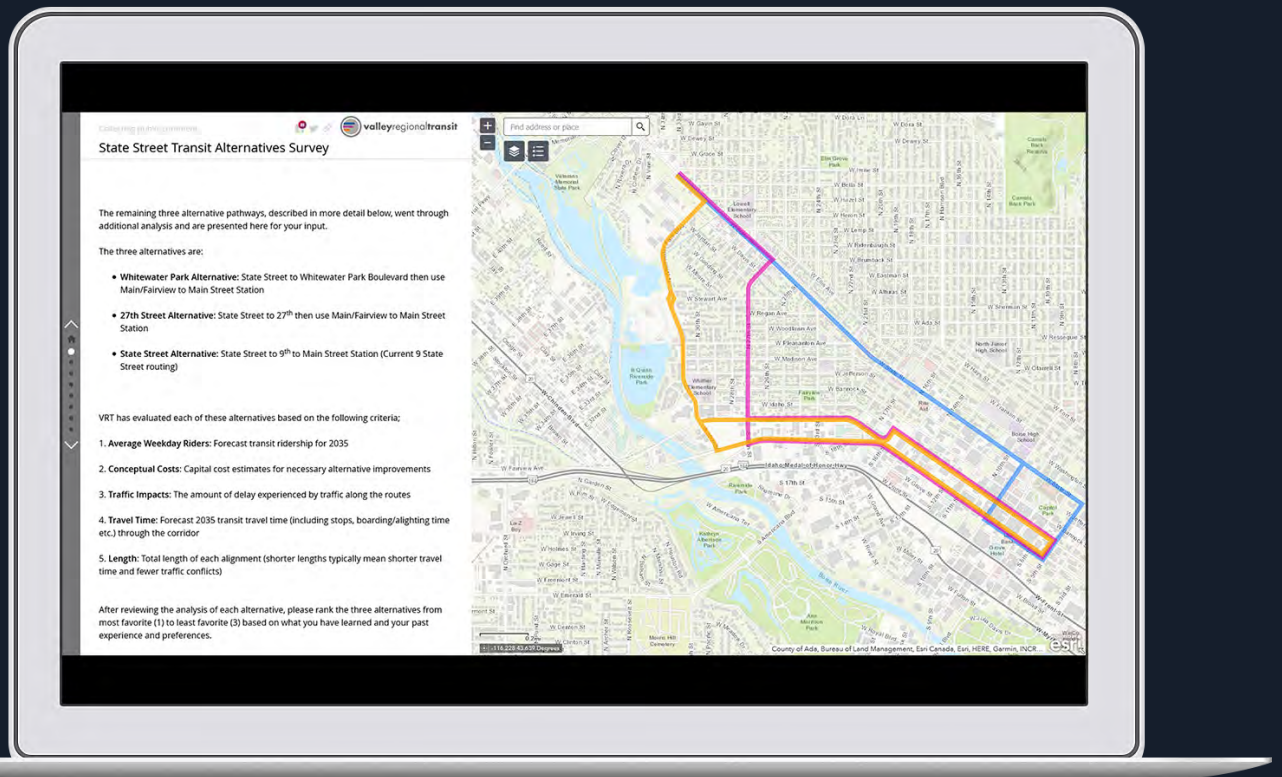
The Tier 2 screening process included a more in-depth analysis of the three remaining alternatives and ultimately identified a locally preferred alternative for further planning and design purposes. The Tier 2 process focused on the following criteria:

- › **Intersection LOS**, using ACHD's Synchro traffic microsimulation model adapted to 2035 conditions;
- › **Average weekday transit ridership in 2035**, from the COMPASS travel demand model;
- › **One-way trip distance and travel time in 2035**, from the route's western terminus in Star to Main Street Station, from the COMPASS travel demand model;
- › **Conceptual cost estimates** for infrastructure improvements associated with the alignments;
- › **Households and jobs in 2035** that will be accessible within a 10-minute walking distance from station areas for each alignment; and
- › **Level of public support**, as indicated in public outreach activities conducted in late 2020 through early 2021.

Table 1 shows the results of the Tier 2 screening process. As shown in the table, the State Street alignment ranked the highest based on the Tier 2 screening criteria.

TABLE 1. TIER 2 PROCESS SCREENING RESULTS

| SCORING CRITERIA | | ALIGNMENT SCORES | | |
|---|---|------------------|-------------------------|----------------------|
| Criteria | Definition and Scoring of Criteria | State Street | 27 th Street | Whitewater Park Blvd |
| Traffic Level of Service | <i>Number of intersections at LOS E or F in 2035 with this build alternative</i> | 3 | 3 | 4 |
| Traffic Level of Service Score | 3 = best 1 = worst | 3 | 3 | 2 |
| Ridership | <i>Average weekday daily ridership in 2035</i> | 1,110 | 1,510 | 1,440 |
| Ridership Score | 3 = highest 1 = lowest | 1 | 3 | 2 |
| Distance | <i>One-way trip distance from Star to Main Street Station</i> | 17.2 | 17.4 | 17.6 |
| Distance Score | 3 = shortest 1 = longest | 3 | 2 | 1 |
| Time | <i>Minutes to complete one-way trip</i> | 41.1 | 42.6 | 42.2 |
| Time Score | 3 = fastest 1 = slowest | 3 | 1 | 2 |
| Conceptual Costs | <i>Estimated cost of infrastructure improvements</i> | \$40,400 | \$112,980 | \$1,630,580 |
| Conceptual Costs Score | 3 = least expensive 1 = most expensive | 3 | 2 | 1 |
| Household Accessibility | <i>Number of households accessible within a 10-minute walking distance of stops</i> | 6,391 | 7,126 | 6,829 |
| Household Accessibility Score | 3 = most households accessible 1 = least households accessible | 1 | 3 | 2 |
| Job Accessibility | <i>Number of jobs accessible within a 10-minute walking distance of stops</i> | 41,253 | 43,204 | 43,171 |
| Job Accessibility Score | 3 = most jobs accessible 1 = least jobs accessible | 1 | 3 | 2 |
| SUM OF TIER 2 TECHNICAL CRITERIA SCORES | | 15 | 17 | 12 |
| Public Support (General Public) | <i>Number of respondents ranking alignment as first choice</i> | 78 | 55 | 58 |
| Public Support (General Public) Score | 3 = most support 1 = least support | 3 | 1 | 2 |
| Public Support (Transit Riders) | <i>Number of transit rider respondents ranking alignment first choice</i> | 31 | 25 | 21 |
| Public Support (Transit Riders) Score | 3 = most support 1 = least support | 3 | 2 | 1 |
| SUM OF TIER 2 PUBLIC SUPPORT CRITERIA SCORES | | 6 | 3 | 3 |
| OVERALL TIER 2 CRITERIA SCORES | | 21 | 20 | 15 |



PUBLIC OUTREACH

This Alternatives Analysis took place during the COVID-19 pandemic, which limited the opportunities for in-person public engagement activities. To gauge support for the transit alignments, VRT led an **online public outreach campaign** from late November 2020 through mid-February 2021. This involved VRT's first-ever online GIS survey, which was similar to a public open house and helped to inform the public and solicit feedback on the transit alternatives. The survey presented information about the three route alignments and their Tier 2 screening scores. Participants ranked each alignment in order of preference and provided open-ended comments. The survey asked respondents to note their current level of transit activity: whether they were frequent riders, occasional riders, or rode infrequently or not at all.

VRT also distributed paper copies of the survey to human service agencies, which gathered survey responses from individuals who were unable to access the online survey. As part of this effort, VRT requested the help of volunteers from the refugee community, relying on their knowledge and relationships to overcome language and cultural barriers.

VRT also specifically reached out to neighborhood organizations to ensure they knew about the project and the online outreach campaign, and to solicit their feedback. The West End Neighborhood Association, a neighborhood group affected by the various alternatives, requested that VRT representatives prepare a presentation to their constituents, which was held in January 2021. The West End Neighborhood Association also distributed 150 flyers to neighborhood residents letting them know about the study and the survey, and provided paper copies of the survey to those who needed them.

As a result of these efforts, VRT received 164 responses online, and 28 paper copies of the survey. The tabulated results from the public outreach process are noted in Table 2.

TABLE 2. SURVEY RESPONDENTS PREFERRED ALIGNMENTS

| ALIGNMENT | RANKED 1 ST CHOICE | RANKED 2 ND CHOICE | RANKED 3 RD CHOICE |
|---------------------------------------|----------------------------------|----------------------------------|----------------------------------|
| All Survey Responses | | | |
| Whitewater Park Boulevard | 58 | 79 | 53 |
| 27 th Street | 55 | 63 | 72 |
| State Street | 78 | 48 | 65 |
| Frequent or Occasional Transit Riders | | | |
| Whitewater Park Boulevard | 21 | 37 | 23 |
| 27 th Street | 25 | 28 | 26 |
| State Street | 31 | 15 | 31 |

Source: VRT

As the table indicates, survey respondents preferred State Street over the other alignments, regardless of whether they were transit riders or not. Common themes heard from survey respondents included:

- The State Street alignment provides good access to a range of services and destinations.
- Respondents wanted to preserve existing transit service on State Street.
- Whitewater Park Boulevard would be a good way to access parks and community amenities, as well as planned future growth along the Main/Fairview couplet.
- Previous investments by ACHD added capacity on Whitewater to lessen the burden on 27th, which then received a road diet. Respondents were concerned that this would negate that investment.

More information about the analysis of alternatives can be found in **Appendix C, Alternatives Screening Technical Memorandum**.



LOCALLY PREFERRED ALTERNATIVE

DESCRIPTION

The SSTT recommends a two-phased approach to implementing a locally preferred alternative. This approach includes the recommendations described below.

NEAR-TERM RECOMMENDATIONS

In the near-term, VRT should increase transit service headways and upgrade station amenities along the State Street alignment between Main Street Station. This transit route will offer 10- to 15-minute headways in the peak period and 15-minute headways for the remainder of the daily span of service. VRT could implement several prioritization measures to facilitate faster transit movement along the State Street alignment, such as:

- › Installing southbound transit signage on 9th Street between State and Main, indicating that the on-street parking lane is a bus-only bypass lane during the weekday peak hours
- › Restriping lanes on 9th Street between State and Main to make space for a peak-hour bus bypass lane
- › Restricting southbound east-side parking during peak hours to accommodate the bus bypass lane

LONG-TERM RECOMMENDATIONS

When household and employment densities along the Main and Fairview corridors reach appropriate levels, and after State Street frequencies and investments described above are met, VRT should consider meeting the increased travel demand by. This service would connect riders from communities west of Boise to destinations along those routes. This would be supplemental to the proposed service on State Street, which would retain the frequencies described above. The Whitewater Park Boulevard and Main/Fairview service could have service frequencies as high as 10-15 minutes during the peak and 15-minute headways in the off peak. It is recommended that this additional service be scheduled with the service on State Street such that transit headways west of State Street/Whitewater Park Boulevard would be 5-7.5 minutes during the peak and 7.5 minutes in the off-peak. Final service recommendations should be developed within the context of the transit network needs at that time and review other options which may be available at that time including micro-transit. It is anticipated that household and employment densities would reach the appropriate levels by 2035, as indicated in this analysis, although it is possible that densities could increase to anticipated levels prior to 2035.

The long-term recommendations are shown in Figure 7 and could include the following measures to prioritize transit movements:

Whitewater Park Boulevard and State Street

- Widen Whitewater Park Boulevard to provide bus bypass lane and install northbound left turn transit signal (this could be an optional improvement, as an alternate to signal priority alone)
- Reprogram pre-emption equipment to provide transit pre-emption

Whitewater Park Boulevard and Main Street

- Install southbound through transit signal
- Replace southbound raised median with a bus-only lane

Whitewater Park Boulevard and Fairview Avenue

- Install southbound left turn transit signal
- Replace southbound raised median with a bus-only lane

While the 27th Street also scored highly, the project team and the SSTT opted to remove the 27th Street alternative from consideration following the Tier 2 screening process. This is because previous transportation investments by ACHD as well as CCDC local district plans emphasized other priorities on 27th Street, through a lane reduction and striping a bike lane. While traffic analyses indicated that there was still adequate capacity to serve transit investments on that corridor, SSTT members and neighborhood representatives indicated that a 27th Street alignment would be inconsistent with previous commitments made along that corridor. Furthermore, survey respondents (including those who currently use transit) indicated that 27th Street was their least preferred alignment. This suggests that larger public and political support for this alignment may be limited. In addition, while the Whitewater Park Boulevard alignment does not yet have significant transit-supportive land use, the planned high density and intensity development along that corridor is projected to eventually support more ridership.

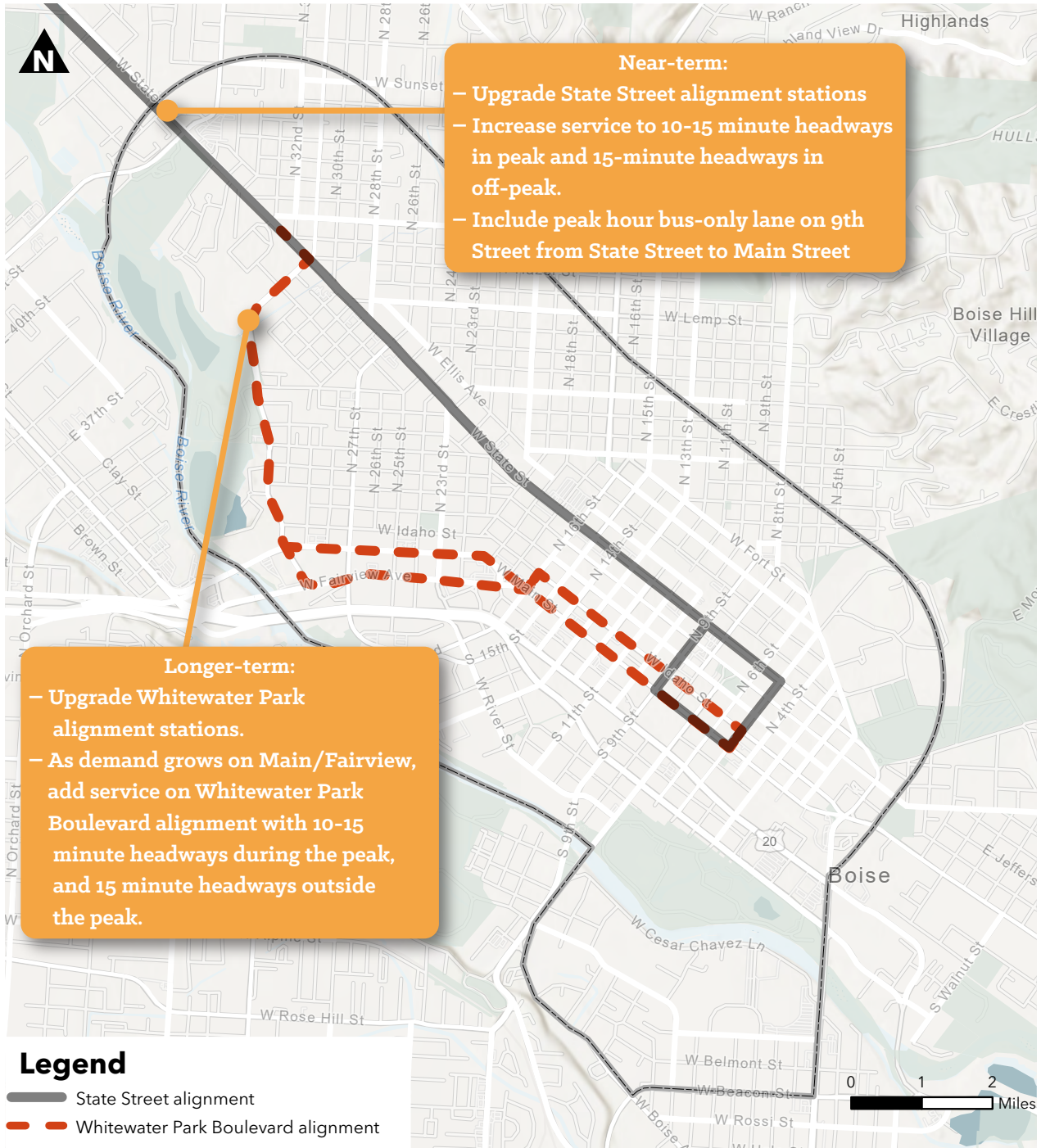


Figure 7: Recommendations

CONCEPTUAL COST ESTIMATES

The infrastructure improvement costs associated with the Locally Preferred Alternative are relatively minimal: roughly \$30,000 in 2021 dollars to provide signage and striping indicating transit-only lanes during peak periods. This does not include costs for station area improvements or for the additional vehicles necessary to provide the proposed headways.

If and when the Whitewater Park Boulevard alignment is implemented, additional infrastructure investment will be needed to prioritize transit movements through the Whitewater, Main, and Fairview corridors, which may be more congested in the future. The cost for these improvements is estimated to be \$1.6 million in 2021 dollars. This includes the following improvements:

- A bus-only left turn lane for outbound buses at the intersection of Whitewater Park Boulevard and State Street, which could require widening the west corner of the intersection and will necessitate adding signal infrastructure pertaining to the transit-only lane;
- A bus-only lane for inbound buses at the intersection of Whitewater Park Boulevard and Main Street, created by converting the existing raised concrete median at the southbound leg of that intersection and adding transit-specific signal heads to the intersection; and
- A bus-only left turn lane at the intersection of Whitewater Park Boulevard and Fairview Avenue, created by converting the existing raised concrete median at the southbound leg of that intersection and adding transit-specific signal heads to the intersection.

However, these costs could be reduced substantially if VRT opts to apply transit signal priority strategies at the Whitewater Park Boulevard intersection with State Street instead of queue bypass lanes. The cost estimates and their underlying assumptions are provided in **Appendix D, Cost Estimates Technical Memorandum**.



NEXT STEPS

VRT and the SSTT should continue working towards implementation. This can include updating the Federal Transit Administration Region 10 office on the results of this analysis and the desired path forward. The administration's officials may be able to offer funding resources or grant opportunities that are most appropriate to the scale of this project.

In addition, VRT and the SSTT should keep collaborating as partners to implement the Locally Preferred Alternative. VRT should continue working with ACHD to identify and address transportation concerns, and to explore the application of transit signal priority along the State Street corridor. VRT should also continue facilitating discussions with ACHD, COMPASS, and jurisdictions along the State Street corridor to clarify plans for lanes on State Street, and ensure understanding of assumptions contained within the Regional Transportation Plan, COMPASS's travel demand model, and ACHD's traffic models regarding lanes and their operation. This could result in a Memorandum of Understanding that would be signed by all parties with jurisdiction over parts of the corridor.

APPENDICES

- A. Base and Future Conditions Technical Memorandum
- B. Route Descriptions Technical Memorandum
- C. Alternatives Screening Technical Memorandum
- D. Cost Estimate Technical Memorandum

A. BASE AND FUTURE CONDITIONS TECHNICAL MEMORANDUM



MEMORANDUM

Date: May 13, 2021
To: Stephen Hunt, Valley Regional Transit
From: Fehr & Peers
Subject: State Street Transit Alternatives Analysis: Base and Future Year Conditions

UT20-2200

Introduction

This technical memorandum summarizes the base and future year transportation conditions in the study area for the State Street Transit Alternatives Analysis. This memorandum includes the following information:

- Study area demographics and land use
- Transit routes and ridership
- Active transportation routes both existing and planned
- Current traffic level of service
- Projected background traffic level of service (2035)
- Projected traffic level of service for the transit alternatives (2035)

The project study area includes Downtown Boise, West Downtown, and West End neighborhoods, as well as the surrounding neighborhoods. The study area is generally bound by the southern portions of the North End and Sunset neighborhoods to the north, Boise State University and adjacent neighborhoods to the south, the western portion of the East End neighborhood to the east, and the Boise River to the west.



Study Area Land Use and Demographics

Existing Land Use, Key Activity Centers, and Near-Term Development

The study area encapsulates a mostly-built-out section of the City of Boise. Boise's downtown area is in the southeast section of the study area, capturing the region's highest density of jobs as well as areas of high-density housing. Main Street Station is a transit hub in the heart of downtown, creating an anchor along with the Grove Plaza and the CenturyLink arena. In the northeast part of the study area, the State Capitol Building and supporting state office buildings bring a significant number of employees into the downtown area from around the region. West of downtown, land uses gradually transition from high-density housing and intensive commercial development to shorter multi-story office and commercial buildings, shifting more fully to residential development west of 17th Street.

Between State Street and Main Street, from roughly 17th Street west to Whitewater Park Boulevard, single family homes are the predominant land use, with some exceptions. Along the State Street corridor, land uses outside the downtown core tend to be one- and two-story commercial interspersed with single-family residential districts. The Main/Fairview couplets have been the focus of redevelopment in the area, with new residential and commercial growth occurring mostly between 23rd Street and Whitewater Park Boulevard.

Additional near-term development projects are under construction or about to enter the construction phase in the study area. All near-term future development plans discussed by the project team were shared with COMPASS, the Treasure Valley metropolitan planning organization (MPO), to ensure that future growth projections for households and jobs incorporated anticipated development projects. These include the following residential and commercial projects identified by City of Boise staff:

- 11th & Idaho: 180,000 square feet of office space to be completed by late 2021
- 5th & Front: 138-room hotel, completed in 2020
- 6th & Front: the Vanguard Apartments, 75 units and 2,700 square feet of retail space, to be completed by late 2021
- 512 W. Grove Street: a mixed-use project with 114 residential units and 8,000 square feet of retail space, to be completed by late 2021



- 116 S. 6th Street: a mixed-use project with 60 residential units, 9,000 square feet of office space, and 5,000 square feet of retail space, to be completed by late 2021
- 139 E. Main Street: the Ronald McDonald House, with 47 rooms, completed in 2020
- 529-535 S. 15th Street: the River Street Lofts, with 10 residential units, completed in 2020
- 323 W. Broad Street: the Cartee, with 161 residential units, to be completed in late 2021

Current and Future Household and Employment Totals

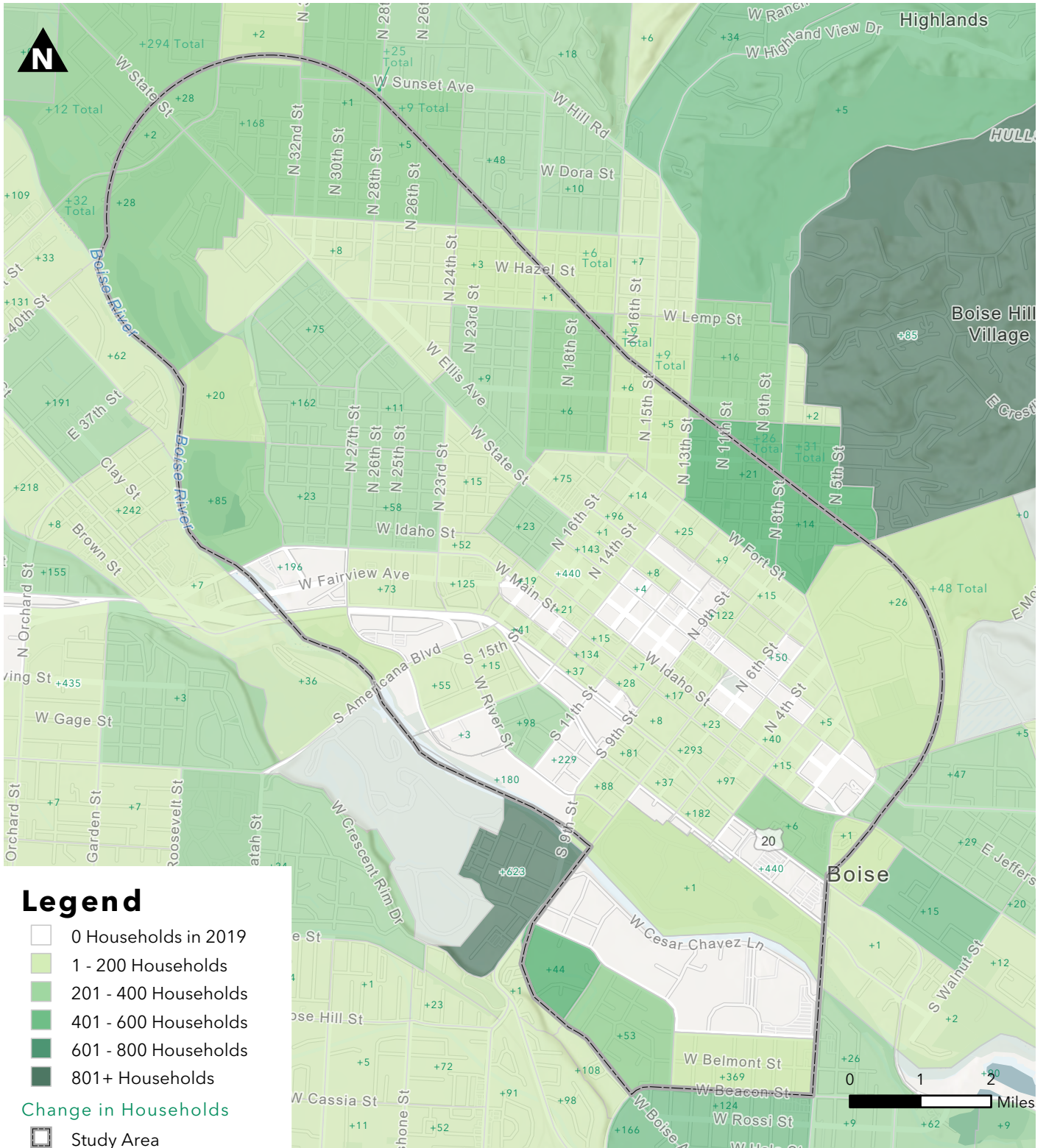
Information on current and projected household and employment totals within the study area was provided by COMPASS. The MPO provides data on the number of households, population, and jobs within small geographic areas called traffic analysis zones (TAZ's), both for existing conditions and several future year horizons. For the purpose of this study, the analysis focused on a "base year" of 2019, and a future horizon year of 2035, to be consistent with opening-year assumptions contained within the State Street Traffic and Transit Operations Plan.

The number of households along a potential transit corridor influences transit ridership: the more people along a corridor, the more potential riders. Based on the COMPASS data provided in the TAZ's, there are currently 1,541 households within the study area, and 4,698 households projected to be within the study area by 2035, a total increase of 3,157. Within the study area, some of the most concentrated changes are expected in the neighborhood between 13th-15th Street, from Jefferson Street to Idaho Street. Within these few blocks, an additional 440 housing units are anticipated by 2035. Outside of this area, changes in the number of projected households are somewhat smaller, although additional pockets of growth are dispersed throughout the study area as shown in Figure 1.

Concentrations of jobs also can be significant contributors to transit ridership, encouraging residents of other parts of the region to take transit to commute to work. The COMPASS data indicated that there are currently 3,829 jobs within the study area, and 12,595 jobs projected to be within the study area by 2035, a total increase of 8,766. Future growth patterns in the study area reflect trends already underway: the model data suggests that a significant amount of additional employment growth is expected along the Main Street and Fairview Avenue corridors, especially near their intersections with Whitewater Park Boulevard. Growth is anticipated at the northwest corner of Main Street and Whitewater Park Boulevard as well as the current Idaho Transportation Department (ITD) campus (at the southwest corner of State Street and Whitewater Park Boulevard). Both of these sites have been the focus of high-level planning exercises around future growth, and



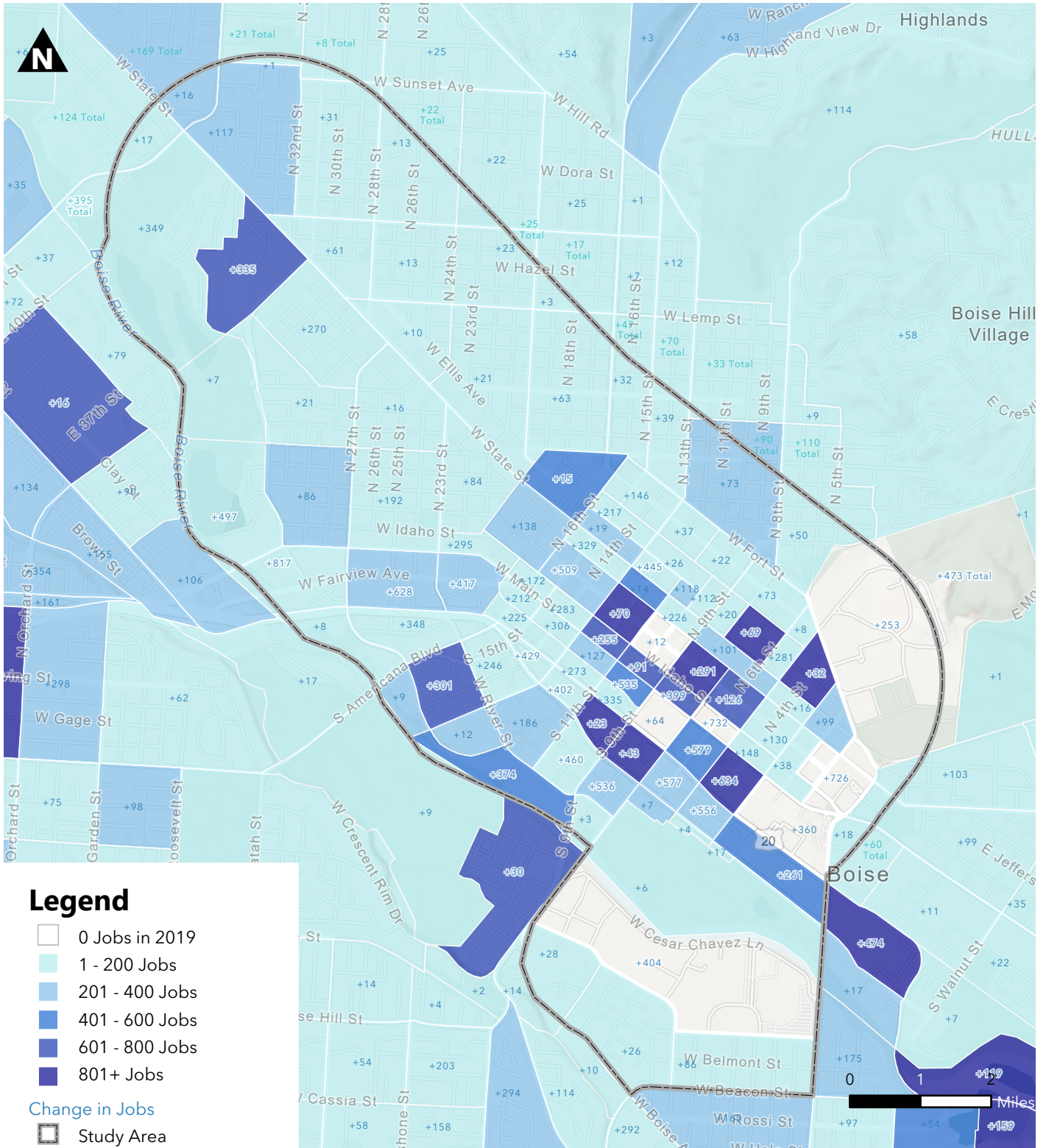
the ITD campus was identified as a Tier 1 Station Area in the 2019 State Street Corridor Transit-Oriented Development Plan. That plan recommends a mix of land uses at the ITD campus site, including office, single family residential, multi-family residential, and open space. Currently, neither site has active development plans in place, and ITD has no current plans to vacate its campus. However, future employment projections from COMPASS include some level of change in these areas.



Source: Community Planning Association (COMPASS)

Demographics
 Figure 1: Change in Households between 2019 and 2035





Source: Community Planning Association (COMPASS)

Demographics
 Figure 2: Change in Employment
 between 2019 and 2035





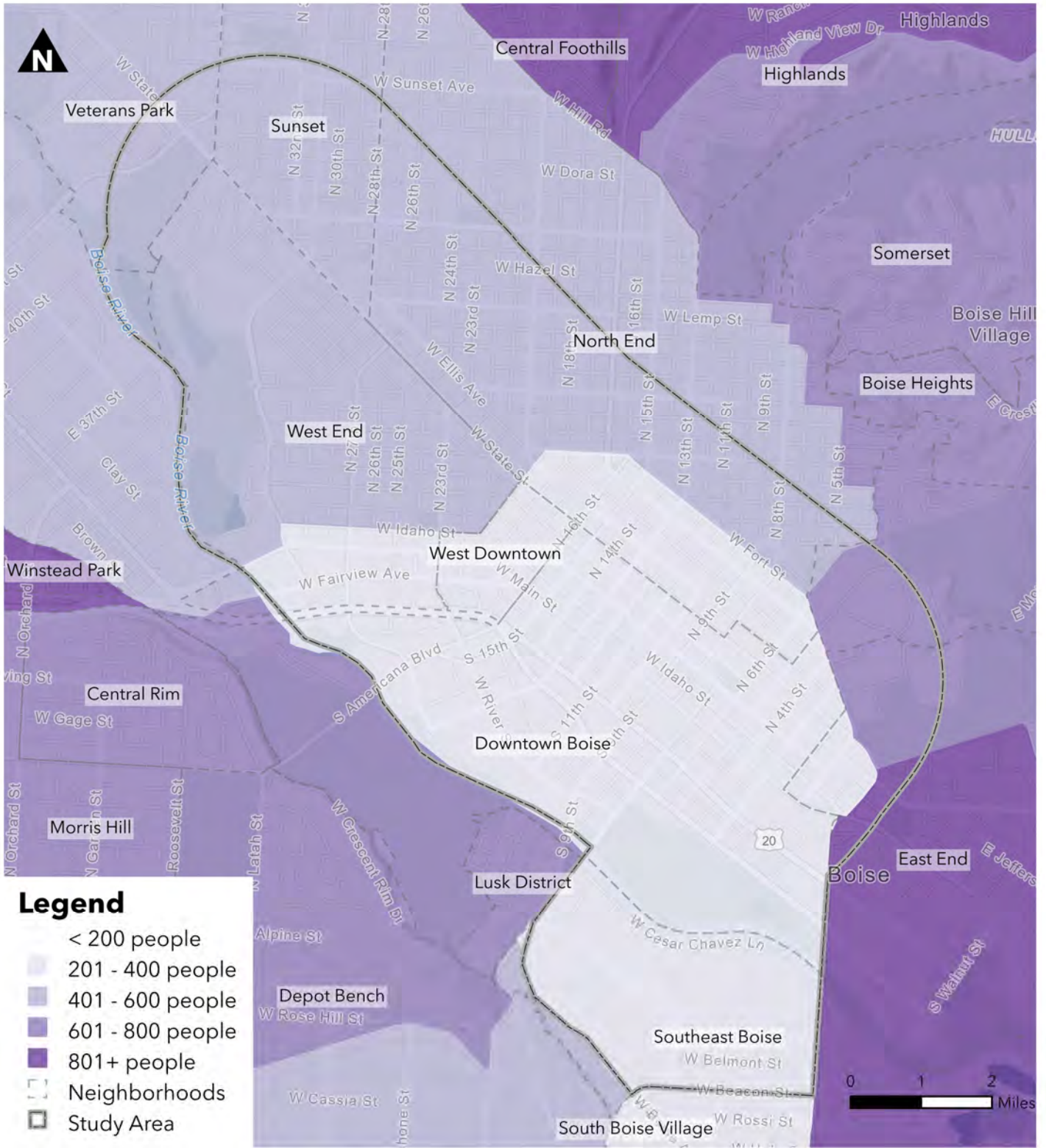
Transit Dependent Populations

The American Community Survey (ACS), from the U.S. Census Bureau, helps identify and track populations that may be at a disproportionately high risk of facing constraints and challenges relating to transportation, healthcare, finances, and access to basic goods and services, and would therefore be more reliant on transit to meet their daily needs. These include people that are 65 or over, 18 or younger, have no vehicles, or are of low-income. The sections below and accompanying maps describe information obtained from the U.S. Census Bureau, 2019 ACS data.

Residents who are over 65 or less than 18 years old are more likely to rely on transit, friends or family to meet their transportation needs. In Boise, there are more people 65 years old and older east of downtown, and south of the Boise River, but less so within the study area. Boise residents 18 years old or younger are more concentrated west of 18th Street, in the West End neighborhood within the study area, and in the neighborhoods north of State Street, west of 18th Street. Residents over 65 or under 18 years old are shown in Figures 3 and 4.

Households without vehicles in the study area are mostly concentrated in downtown Boise, with lower concentrations north of downtown, west of State Street. Zero-vehicle households are often common in areas of higher density (like downtown Boise), where they have increased access to employment opportunities and other amenities within walking, biking, or a reasonable transit distance from home. In comparison, zero vehicle households outside of downtown cores often are farther away from key opportunities and destinations, often without adequate transit coverage. Within the study area, the neighborhoods around downtown Boise and the West End also have a higher count of low-income households¹ compared to the surrounding areas, indicating that there may be more transit-dependent people living in these areas. Households without vehicles and low-income households are shown in Figures 5 and 6.

¹ Low-income households are a measure of the population whose income in the past 12 months is below federal poverty level, a measure of income issued by the U.S. Department of Health and Human Services. More information can be found here: <https://www.census.gov/topics/income-poverty/poverty/about.html>

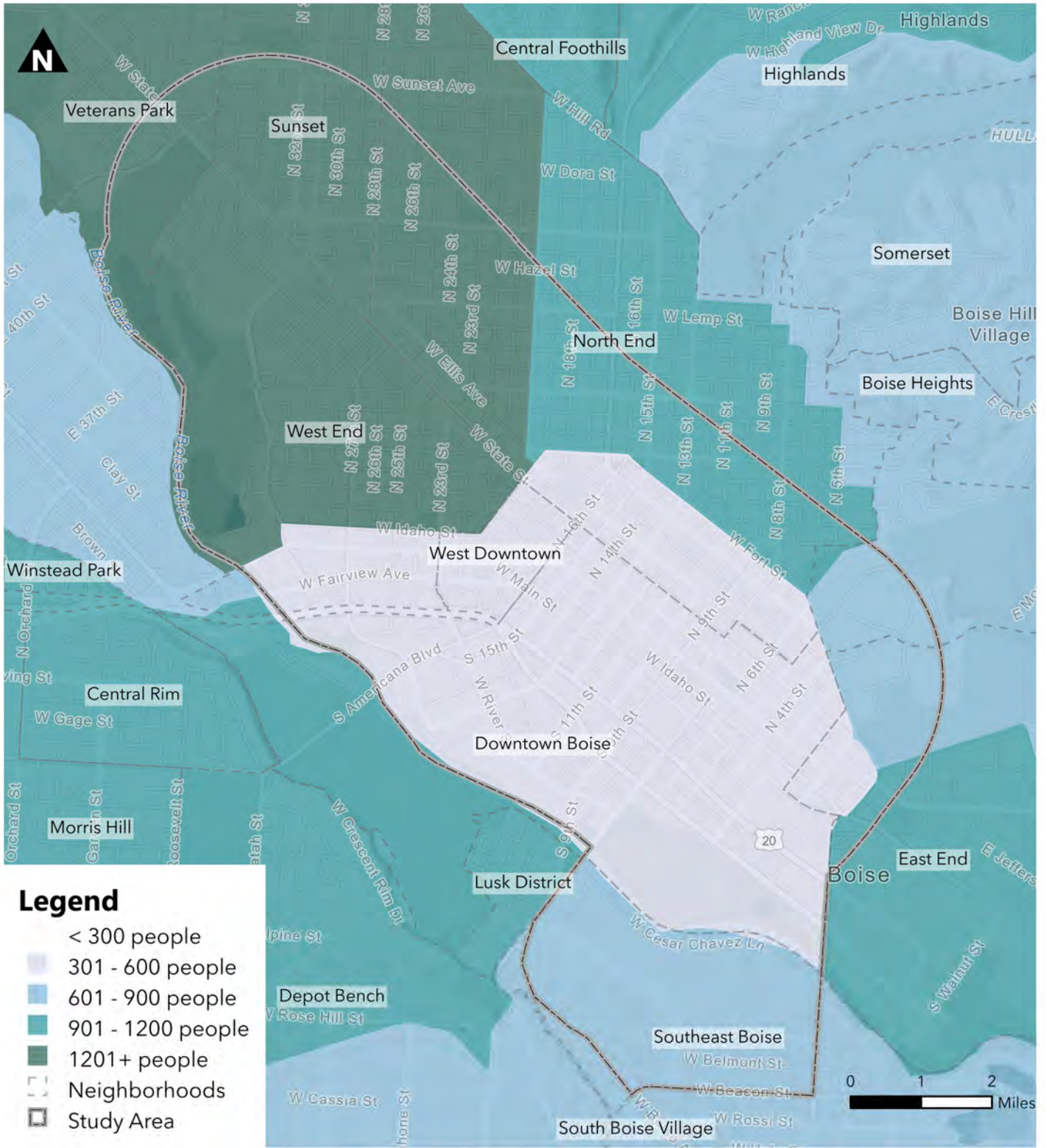


Source: U.S. Census Bureau; American Community Survey, 2019 American Community Survey 1-Year Estimates

Demographics

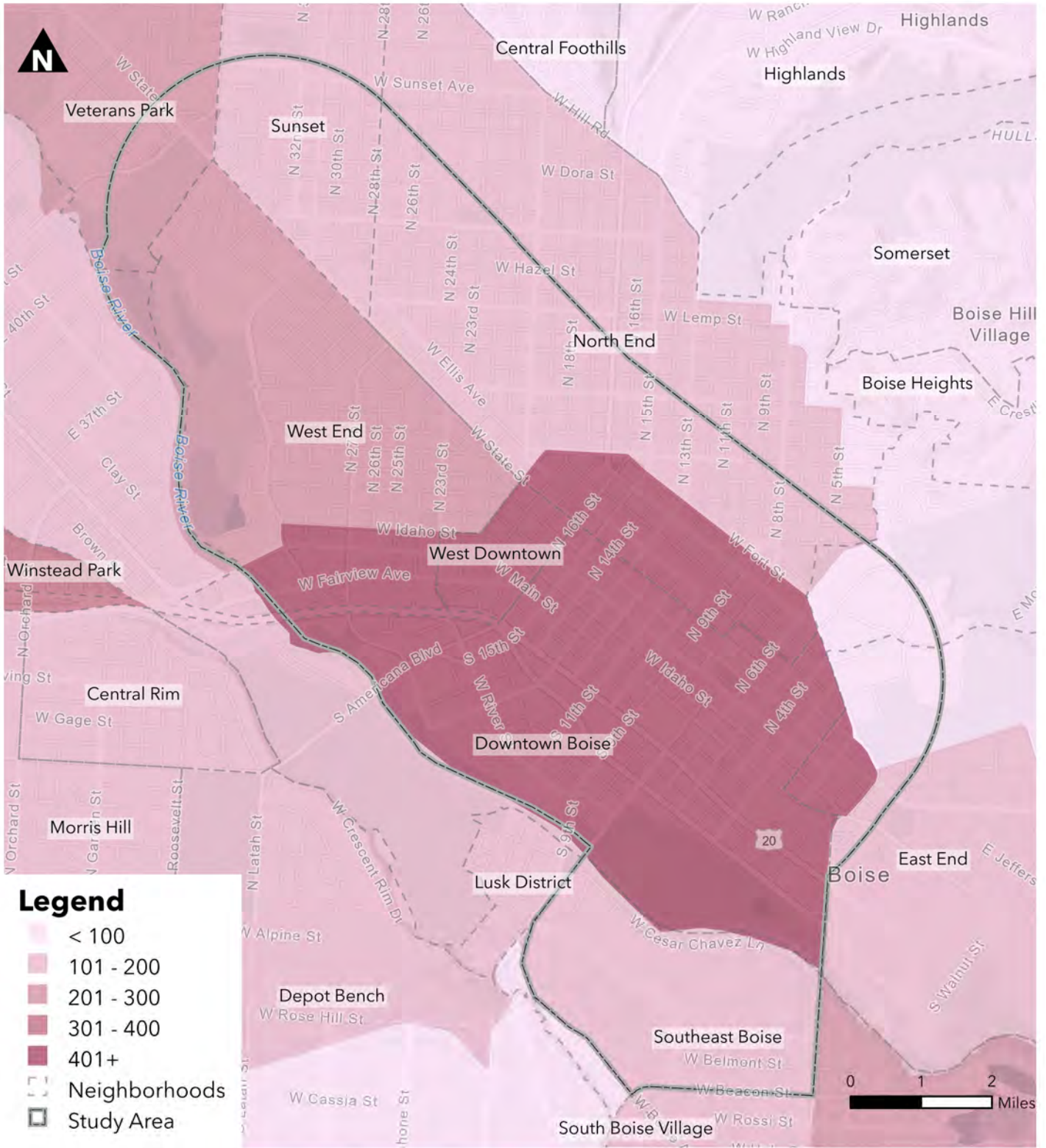
Figure 3: Residents Over 65 Years Old





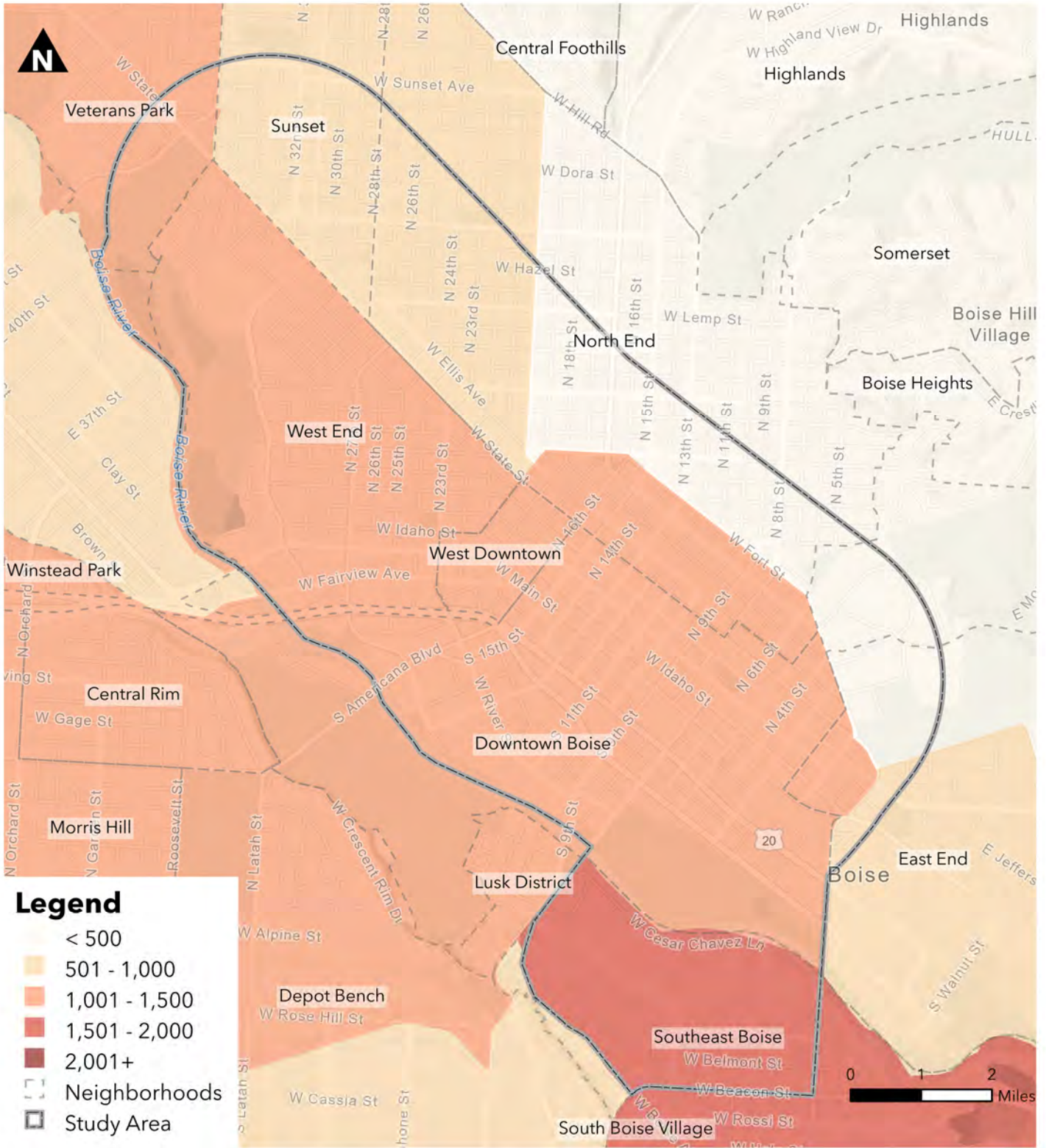
Source: U.S. Census Bureau; American Community Survey, 2019 American Community Survey 1-Year Estimates

Figure 4: Residents 18 Years Old or Younger



Source: U.S. Census Bureau; American Community Survey, 2019 American Community Survey 1-Year Estimates

Figure 5: Households Without Vehicles



Source: U.S. Census Bureau; American Community Survey, 2019 American Community Survey 1-Year Estimates

Figure 6: Low-Income Households



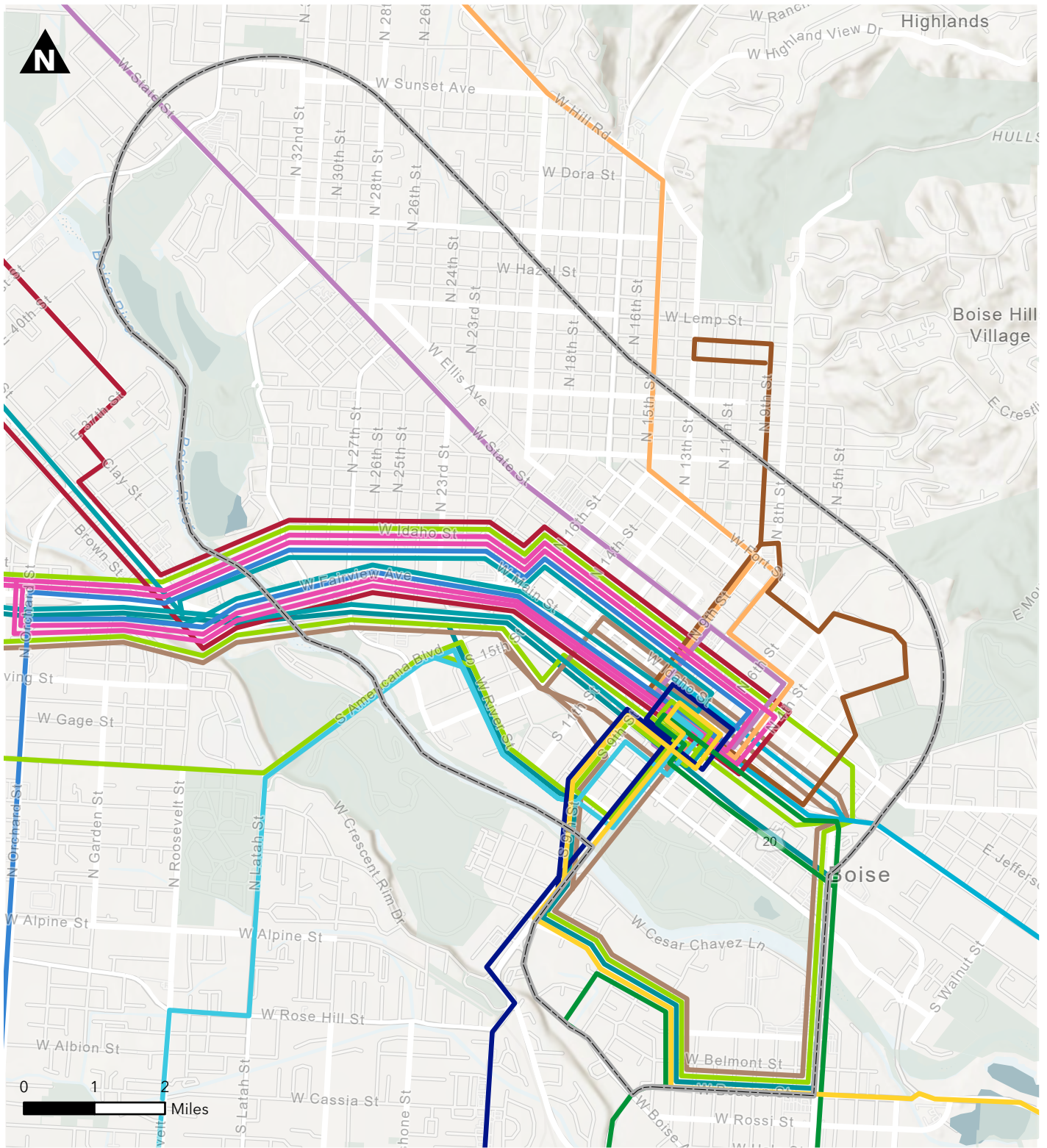
Transit

Valley Regional Transit (VRT) provides bus service in Ada and Canyon Counties. VRT operates 23 total routes: 18 fixed routes in Ada County, one in Canyon County, and four intercounty routes between Ada County and Canyon County. In the study area, there are 18 routes in service. All bus routes that travel within the study area are summarized in Table 1 and shown in Figure 7.

Table 1: Transit Lines Serving Study Area

| Line Name | Route Length (mi) | Min Headway (minutes) | Max Headway (minutes) | Avg Daily Boardings (2019) |
|-----------------------------------|-------------------|-----------------------|-----------------------|----------------------------|
| 01: Harris Ranch via Parkcenter | | | | |
| 02: Broadway | 9.4 | 29 | 60 | 264 |
| 03: Vista | 4.4 | 15 | 30 | 398 |
| 04: Roosevelt | 7.0 | 30 | 87 | 146 |
| 05: Emerald | 4.9 | 30 | 60 | 313 |
| 06: Orchard | 7.2 | 30 | 60 | 257 |
| 07A: Fairview Ustick | 6.3 | 60 | 60 | 198 |
| 07B: Fairview - Towne Square Mall | 5.9 | 60 | 60 | 306 |
| 08x: Five Mile Chinden | 20.8 | 45 | 82 | 110 |
| 09: State Street | 6.0 | 15 | 30 | 800 |
| 10: Hill Road | 6.7 | 60 | 60 | 219 |
| 11: Garden City | 5.2 | 60 | 60 | 27 |
| 16: VA/Hyde Park Loop | 2.8 | 60 | 60 | 39 |
| 17: Warm Springs | 2.3 | 29 | 60 | 77 |
| 29: Overland | 6.6 | 30 | 60 | 255 |
| 40: Nampa/Meridian Express | 31.8 | 28 | 43 | 156 |
| 43: Caldwell Express | 31.5 | 30 | 30 | 50 |
| 45: BSU Express | 18.7 | 35 | 82 | 46 |

Source: 2019 route data from VRT, Remix.



Source: Valley Regional Transit (VRT)

LEGEND

- 01: Harris Ranch via Parkcenter
- 02: Broadway
- 03: Vista
- 04: Roosevelt
- 05: Emerald
- 06: Orchard
- 07A: Fairview Ustick
- 07B: Fairview - Towne Square Mall
- 08x: Five Mile Chinden
- 09: State Street
- 10: Hill Road
- 11: Garden City
- 16: VA/Hyde Park Loop
- 17: Warm Springs
- 29: Overland
- 40: Nampa/Meridian Express
- 43: Caldwell Express
- 45: BSU Express
- Study Area



Transit
Figure 7: Study Area Transit Routes

Layout view only. Many routes overlap.



Current Transit Ridership

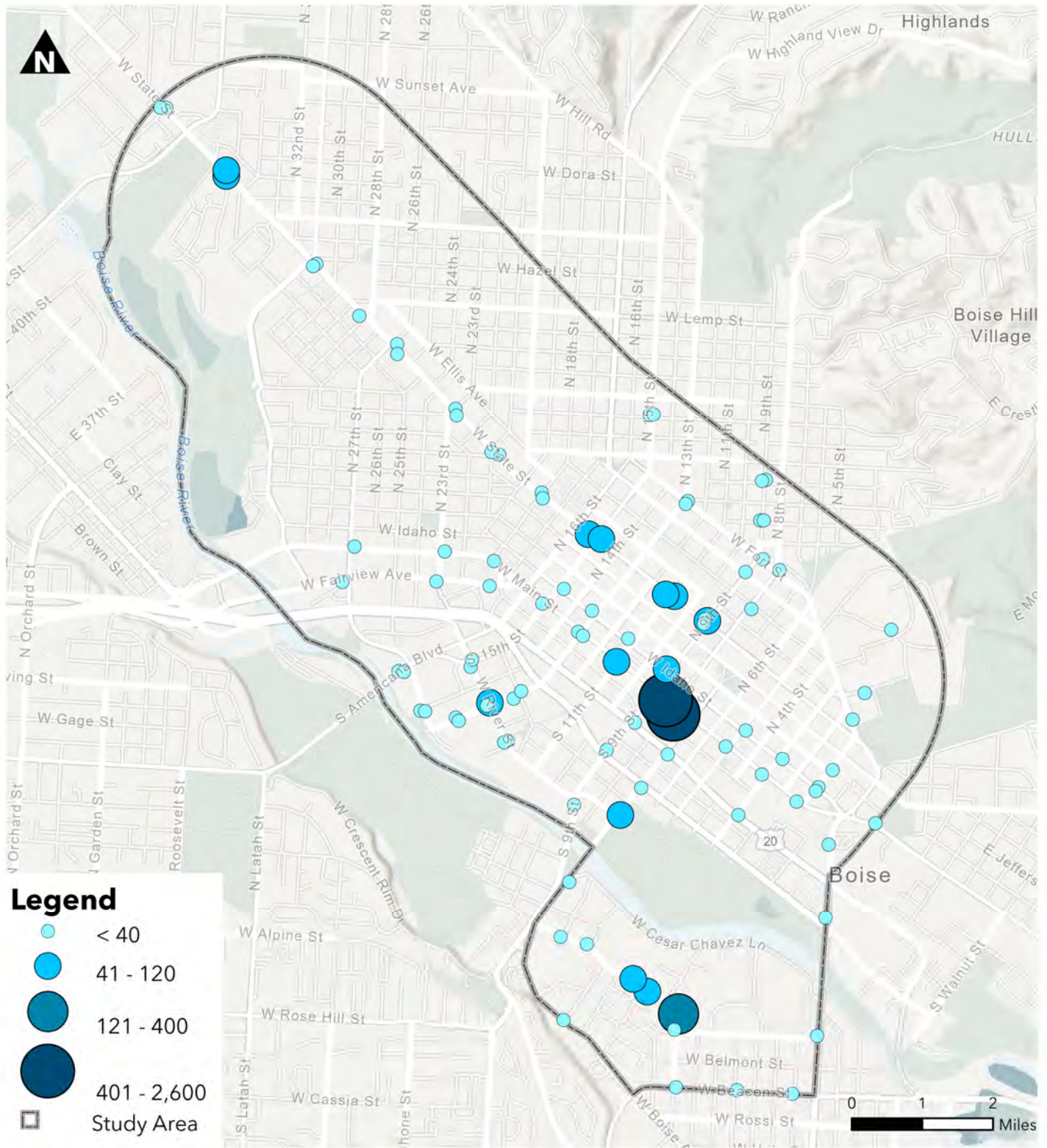
VRT provided average weekday transit boardings and alightings for each bus stop in the study area, reflecting a typical day in October 2019. This represents ridership trends prior to the COVID-19 impacts on transit ridership and overall travel. October also reflects a time of year when people are generally commuting to and from work in a typical pattern, elementary and secondary schools are in session, and students are commuting to colleges and universities in the region as well. Within the study area, stop-level activity is concentrated in several locations:

- State Street/Clover Drive on Route 9 (State Street)
- State Street/15th Street on Route 9
- State Street/11th Street, on Route 9 near the Downtown Boise YWCA and Boise High School
- State Street/9th Street, the nearest inbound stop on Route 9 to the state government complexes and a transfer point between Route 9 and Route 10 (Hill Road); this stop also serves outbound Route 16 (VA/Hyde Park Loop)
- 11th Street/Main Street, on the west side of downtown on Route 7B (Fairview/Towne Square Mall); this stop also serves the inbound 11 (Garden City), inbound 43 (Caldwell Express), outbound 4 (Roosevelt), outbound 6 (Orchard), outbound 7A (Fairview Ustick), and the inbound 8x (Five Mile Chinden)
- 9th Street/Idaho Street, in the heart of downtown and also a transfer point between Route 9 and Route 7B; also serves the outbound 43, inbound 8x, and the outbound 40 (Nampa/Meridian Express)
- River Street/13th Street, on Route 5 (Emerald) and Route 45 (BSU Express)
- River Street/Capitol Boulevard, near the entrance to Julia Davis Park with multiple overlapping routes: the outbound 1 (Harris Ranch via Parkcenter), outbound 3 (Vista), outbound 40, and outbound 5 (Emerald)
- University Drive/Joyce Street, near the Quad at Boise State University, with multiple overlapping routes: the inbound 1, inbound and outbound 40, outbound 43, and inbound/outbound 45
- University Drive/Lincoln Avenue, near the heart of the Boise State University Campus, serving the outbound 40, outbound 43, and inbound 45 multiple overlapping routes
- Main Street Station, in the heart of downtown and a connecting point or terminus for many VRT routes including the 1, 2, 3, 4, 5, 6, and 7

As shown in Table 1, Route 9 on State Street has the highest average daily boardings of all VRT's bus routes. As noted above and in Figure 8, several of the highest-ridership stops in the study area are focused along State Street, serving destinations such as the government complex northeast of



downtown, the downtown core, Boise High School, the Downtown Boise YWCA, and other destinations along the commercial sections of State Street west of downtown.



Source: Valley Regional Transit (VRT), October 2019.



Transit

Figure 8: Average Weekday Transit Boardings and Alightings



Active Transportation

This section summarizes existing and proposed active transportation facilities in the study area. Active transportation conditions vary widely throughout the study area. In the heart of downtown Boise, pedestrian and bicyclists conditions are very good: sidewalks are typically wider than normal, able to accommodate the higher numbers of pedestrians typically seen in urban environments; block sizes are small; high-visibility crosswalks are common; and a range of on-street bicycle facility types are often available. Outside of downtown, infrastructure conditions are still generally good: high-visibility crosswalks are striped on major corridors like Whitewater Park Boulevard and 27th Street, sidewalks are available and consistent, bike facilities are available on several major corridors, and block sizes are small. The following section outlines specific active transportation facilities, which are shown in Figure 9.

Existing Pedestrian Facilities

Typical pedestrian facilities, such as sidewalks, crosswalks, and pedestrian signals, are generally provided throughout the study area. Currently there are 108 miles² of completed sidewalks in the study area. There are also 1,019 crosswalks², with a high concentration of crossings located downtown and along State Street. The Boise River Greenbelt, a paved multi-use bicycle and pedestrian trail, crosses through the study area as it follows the Boise River alignment as shown in Figure 9.

Existing Bicycle Facilities

A brief description of the different types of existing bicycle facilities in the study area is presented below. For more information on bike facility types and classifications, see the Bike Facility Matrix in the [2018 Roadways to Bikeways Master Plan Update](#) (provided as Exhibit 1 to this technical memorandum). Locations of these facilities are shown in Figure 9.

Bike Friendly Route: also referred to as a Neighborhood Bike Route, these routes are designed to provide low-stress options for bicycle travel on local or collector streets with low motorized traffic volumes and speeds of no more than 25 mph. There are nearly twelve miles of road classified as a Bike Friendly Route in the study area, including Bannock Street, Ellis Avenue, and Resseguie Street.

² Source: Community Planning Association (COMPASS)



Bike Lane: a separated portion of the road designated for exclusive use by bicyclists using lane markings and signage. Bike lanes are most often on collector streets where motorized vehicle speed is between 15 and 40 mph, and the average annual daily traffic (AADT) is between 0 and 20,000 vehicles. Approximately twelve miles of bike lanes exist throughout the study area including Main Street, 15th Street, and 16th Street, 27th Street, and Whitewater Park Boulevard.



Bike Lane at Whitewater Park Blvd and Woodlawn Ave

Sharrows/Shared Roadway: routes where bicyclists and motorized vehicles operate in the same travel lane, often denoted by shared lane markings. These facility types are used in areas with a posted speed limit of 30 mph or below and an AADT of between 0 and 10,000 vehicles. In the study area, nearly four miles of these shared roadways exist on 13th Street, 3rd Street, Bannock Street, Fort Street, and Jefferson Street.



Shared Roadway with Sharrow markings at Bannock St and 13th St

Buffered Bike Lanes: bike lanes with a striped buffer separating the cyclists from adjacent traffic lanes. Buffers are represented by two solid white lines, at least 18 inches apart, and with diagonal hatching, if the buffers are more than three feet wide. These types of facilities help cyclists pass one another more easily and avoid the "door zone" adjacent to parked cars. Within the study area there are buffered bike lanes on some sections of Main Street and Fairview Avenue west of downtown.



Buffered Bike Lanes at Capitol Blvd and Broad St

Separated Bike Lanes: bike lanes separated from adjacent traffic lanes by curbing, on-street parking, planters, or other physical barriers. Within the study area, there are separated bike lanes on Capitol Boulevard downtown.



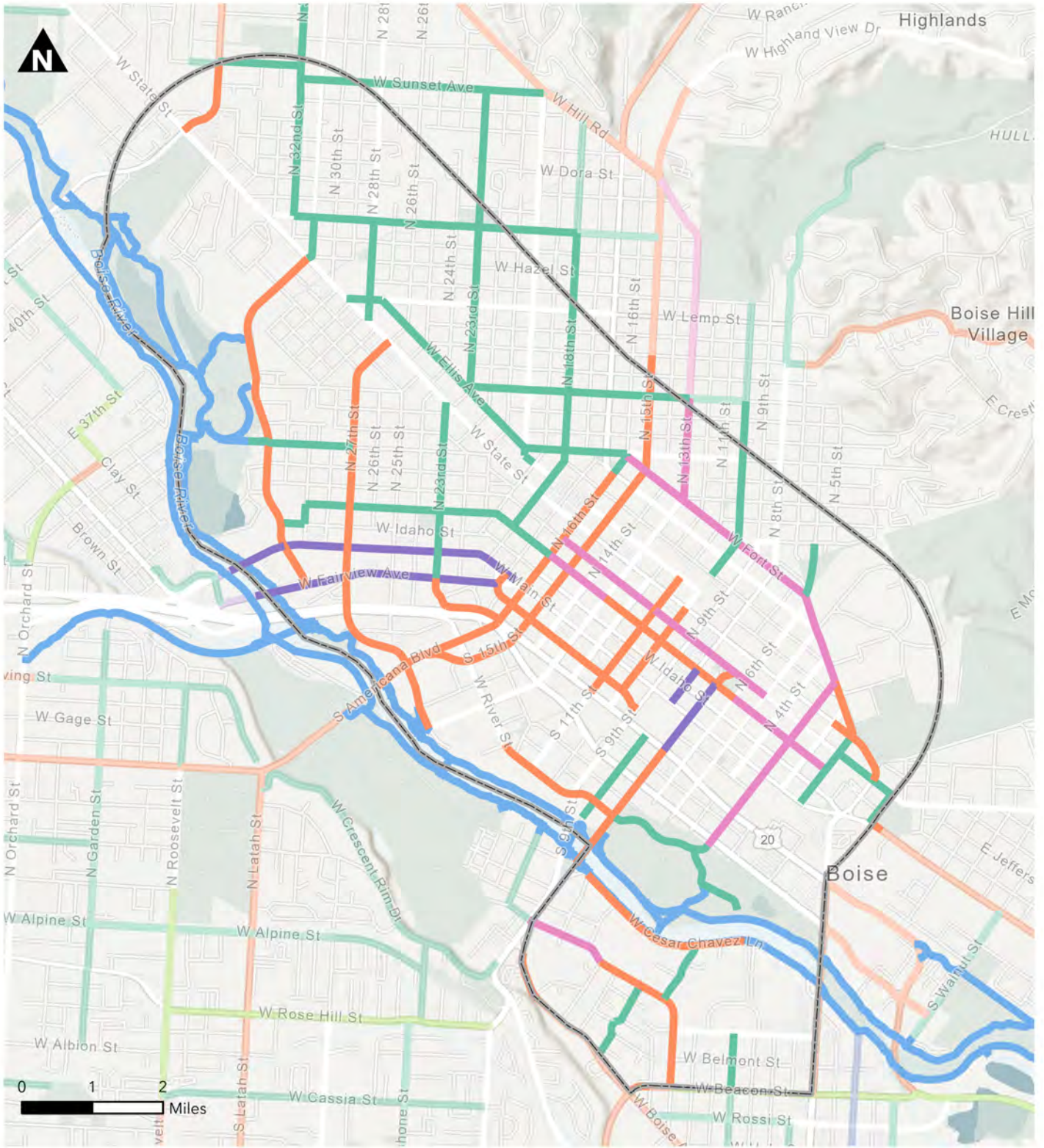
Separated Bike Lane on Capitol Blvd at Main Street

Planned Active Transportation Projects

The ACHD 2020-2024 Integrated Five-Year Work Plan, along with other existing plans, provides a complete assessment of the active transportation network. It outlines specific projects and focused programs to improve and enhance the active transportation experience in Boise, including low-stress bike route options, enhanced pedestrian crossings (Accessible Pedestrian Signals (APS), Pedestrian Hybrid Beacon (PHB), and Rectangular Rapid Flashing Beacon (RRFB)), and safe sidewalks with a cohesive sidewalk network. These recommendations, as well as relevant projects from the Capital City Development Corporation Five-Year Capital Improvement Plan (2020-2024),



are attached as Exhibit 2 to this report. The plan also identifies recommendations for ADA accessibility, zoning and design review, and implementation and funding of the specific elements of each project.



Source: Ada County Highway District (ACHD)

LEGEND

- Bike Friendly Route
- Bike Lane
- Sharrow
- Boise River Greenbelt
- Buffered Bike Lane
- Bikeway
- Shoulder Bikeway
- Study Area

Active Transportation

Figure 9: Existing Bicycle Facilities





Traffic

2019 Model Origins & Analysis Methodology

The ACHD Synchro model was created by ACHD and includes vehicular, bicycle, and pedestrian counts for nearly every intersection in the county for the AM, Midday, and PM peak hours. Data was collected from 2000 to 2018. The Synchro model was used to assess traffic level of service conditions for the signalized intersections along the study corridors. Level of service (LOS) is a term that describes the operating performance of an intersection or roadway. LOS is measured quantitatively and reported on a scale from A to F, with A representing the best performance and F the worst. Table 2 provides a brief description of each LOS letter designation and an accompanying average delay per vehicle for both signalized and unsignalized intersections. The Highway Capacity Manual, 6th Edition (HCM 6) methodology was used in this study to remain consistent with “state of the practice” professional standards. This methodology has different quantitative evaluations for signalized and unsignalized intersections. For signalized intersections, the LOS is provided for the overall intersection (weighted average of all approach delays). The study area in this analysis consisted of only signalized intersections, thus LOS will be provided for the overall intersection.

Table 2: Level of Service Descriptions

| LOS | Description | Signalized Intersections | | Unsignalized Intersections | |
|-----|---|-----------------------------|-------|-----------------------------|-------|
| | | Avg. (sec/veh) ¹ | Delay | Avg. (sec/veh) ² | Delay |
| A | <i>Free Flow / Insignificant Delay</i> Extremely favorable progression. Individual users are virtually unaffected by others in the traffic stream. | < 10.0 | | < 10.0 | |
| B | <i>Stable Operations / Minimum Delays</i> Good progression. The presence of other users in the traffic stream becomes noticeable. | > 10.0 to 20.0 | | > 10.0 to 15.0 | |
| C | <i>Stable Operations / Acceptable Delays</i> Fair progression. The operation of individual users is affected by interactions with others in the traffic stream | > 20.0 to 35.0 | | > 15.0 to 25.0 | |
| D | <i>Approaching Unstable Flows / Tolerable Delays</i> Marginal progression. Operating conditions are noticeably more constrained. | > 35.0 to 55.0 | | > 25.0 to 35.0 | |



| | | | |
|---|---|----------------|----------------|
| E | <i>Unstable Operations / Significant Delays Can Occur</i> Poor progression. Operating conditions are at or near capacity. | > 55.0 to 80.0 | > 35.0 to 50.0 |
| F | <i>Forced, Unpredictable Flows / Excessive Delays</i> Unacceptable progression with forced or breakdown of operating conditions. | > 80.0 | > 50.0 |

1. Overall intersection LOS and average delay (seconds/vehicle) for all approaches.
2. Worst approach LOS and delay (seconds/vehicle) only.

Source: Fehr & Peers descriptions, based on *Highway Capacity Manual, 6th Edition*.

2019 Existing Conditions Results

Using the provided Synchro model from ACHD and the HCM 6th Edition delay thresholds (HCM 2000 used for select intersections, see Table 3), the existing background AM, Midday, and PM peak hour LOS were computed for each study intersection. In Ada County, LOS E (55 seconds or more) or below is considered failing level of delay for Principal Arterials and Minor Arterials and LOS D (35 seconds or more) or below is considered failing level of delay for Collectors. In this study, all study intersections are considered either a Principal Arterial or a Minor Arterial. Thus, LOS D (or less than 55 seconds of delay) or above is considered acceptable. The results of this analysis for the AM, Midday, and PM peak hours are reported in Table 3 (see Exhibit 3 for detailed LOS reports). These results serve as a base for the analysis of the impacts of the proposed route alternatives.

Table 3: Existing 2019 Background Conditions AM, Midday, & PM Peak Hour Level of Service

| Intersection | | | | 2019 Background |
|----------------|--|--------|---------|----------------------------|
| ID | Location | Period | Control | LOS / Sec/Veh ² |
| 1 | State Street & 9 th Street | AM | Signal | B / 15 |
| | | MID | | B / 12 |
| | | PM | | B / 13 |
| 2 | State Street & 15 th Street | AM | Signal | B / 13 |
| | | MID | | B / 18 |
| | | PM | | C / 26 |
| 3 ¹ | State Street & 26 th /27 th Street | AM | Signal | C / 20 |
| | | MID | | C / 24 |
| | | PM | | C / 32 |
| 4 ¹ | State Street & Whitewater Park Boulevard | AM | Signal | C / 22 |

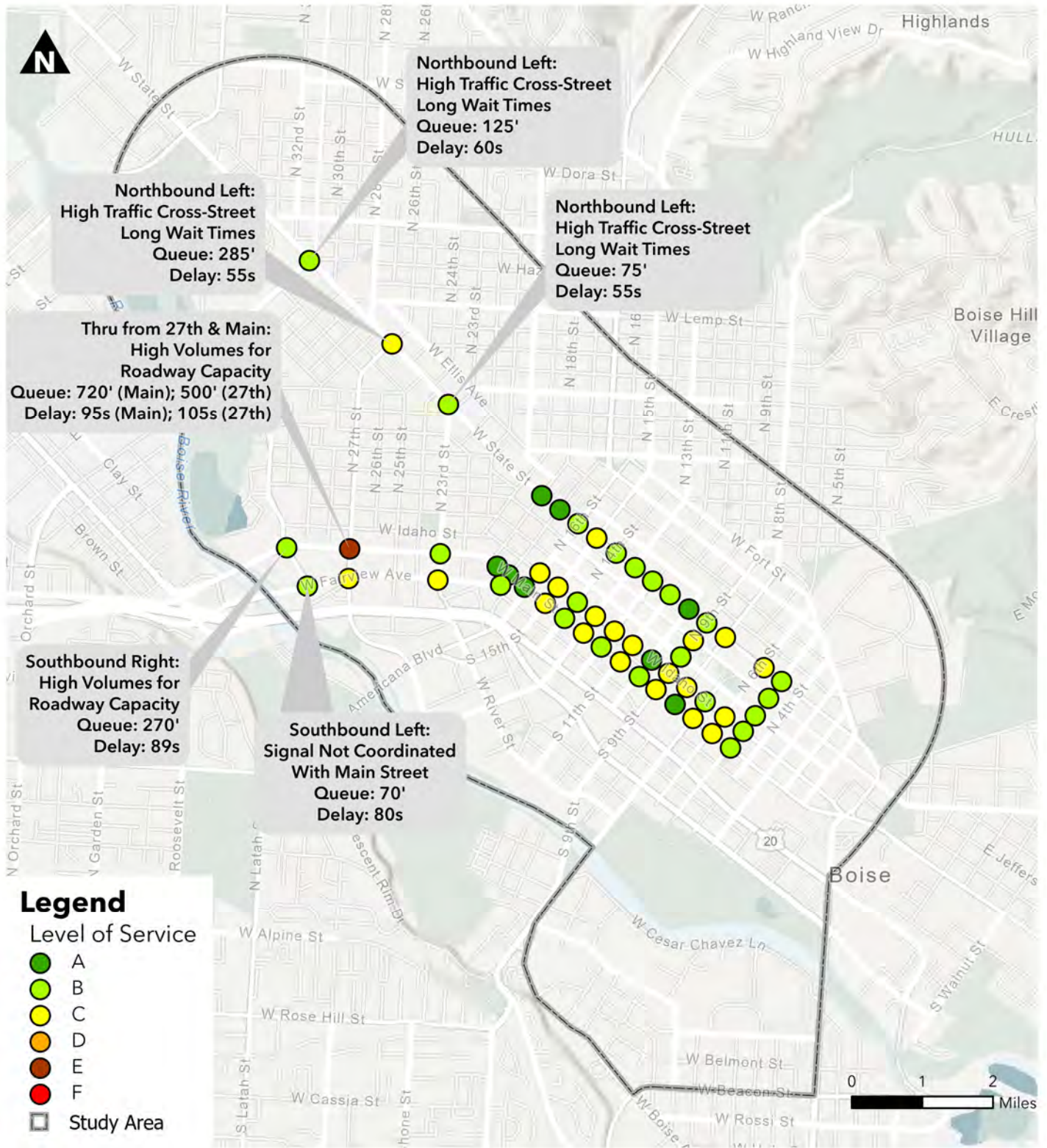


| | | | | |
|-----------------|---|-----|--------|---------------|
| | | MID | | B / 11 |
| | | PM | | B / 19 |
| 5 | Idaho Street & 9 th Street | AM | Signal | C / 20 |
| | | MID | | C / 23 |
| | | PM | | C / 27 |
| 6 | Idaho Street & 15 th Street | AM | Signal | C / 21 |
| | | MID | | C / 21 |
| | | PM | | C / 28 |
| 7 | Main Street & 9 th Street | AM | Signal | C / 24 |
| | | MID | | C / 24 |
| | | PM | | C / 29 |
| 8 | Main Street & 15 th Street | AM | Signal | B / 18 |
| | | MID | | B / 17 |
| | | PM | | C / 21 |
| 9 | Main Street & 27 th Street | AM | Signal | D / 38 |
| | | MID | | C / 21 |
| | | PM | | E / 76 |
| 10 ¹ | Main Street & Whitewater Park Boulevard | AM | Signal | B / 17 |
| | | MID | | B / 12 |
| | | PM | | B / 16 |
| 11 | Fairview Avenue & 27 th Street | AM | Signal | D / 47 |
| | | MID | | B / 20 |
| | | PM | | C / 32 |
| 12 ¹ | Fairview Avenue & Whitewater Park Boulevard | AM | Signal | B / 11 |
| | | MID | | A / 6 |
| | | PM | | B / 11 |

¹Intersections analyzed with HCM 2000 where infeasible to analyze with HCM 6 due to phasing or speed limitations.

²Bolded intersection LOS & Sec/Veh indicate failing levels of delay

Comparing the AM, Midday, and PM LOS, it was found that the PM peak hour experienced the most delay of the three peak hours for the majority of study intersections. In order to simulate worst delay conditions, future background and future plus project conditions were analyzed in the PM peak hour. Figure 10 presents the Existing 2019 PM Background LOS results shown in Table 3. This serves as a base for the analysis of the impacts of the proposed route alternatives.



All queues shown are 95th Percentile.
 Source: Ada County Highway District (ACHD).



Observations of Traffic Trends

As shown in Table 3, the intersection at Main Street & 27th Street operates at failing LOS during the PM peak hour due to heavy side-street through volumes and few gaps along Main Street for right-turning vehicles. All other study intersections operate at acceptable LOS.

Although all other study intersections operate at acceptable LOS, there are some individual movements that experience high delays. Common trends throughout the network include difficult northbound left-turn movements from side streets onto State Street due to high volumes on State Street. Left-turning vehicles from Whitewater Park Boulevard onto Fairview Ave also experience high levels of delay since the signal is coordinated with the eastbound direction. Signal timing adjustments will improve the delay at these intersections.

Background 2035 Future Conditions

Fehr & Peers projected 2035 volumes using linear annual growth rates based on ACHD's Travel Demand Model of the area, in coordination with VRT, COMPASS, and ACHD. The increase in projected volume between the 2019 and 2035 Ada County models indicated between 7.1% and 16.9% growth per year, depending on the segment of road in the study area. The growth rates were applied to the existing 2019 background PM volumes to formulate the traffic volumes for the future 2035 PM background conditions. Only the PM peak hour was analyzed to simulate worst conditions as it is the hour with the highest volume of traffic. The results of this 2035 background condition for the study intersections are found in Table 4.

Table 4: Background 2035 Future Conditions PM Peak Hour Level of Service

| Intersection | | | | 2019 Background | 2035 Background |
|----------------|--|--------|---------|----------------------------|----------------------------|
| ID | Location | Period | Control | LOS / Sec/Veh ² | LOS / Sec/Veh ² |
| 1 | State Street & 9 th Street | PM | Signal | B / 13 | B / 16 |
| 2 | State Street & 15 th Street | PM | Signal | C / 26 | C / 28 |
| 3 ¹ | State Street & 26 th /27 th Street | PM | Signal | C / 32 | F / 97 |
| 4 ¹ | State Street & Whitewater Park Boulevard | PM | Signal | B / 19 | F / 85 |
| 5 | Idaho Street & 9 th Street | PM | Signal | C / 27 | C / 31 |
| 6 | Idaho Street & 15 th Street | PM | Signal | C / 28 | C / 23 |



| | | | | | |
|-----------------|---|----|--------|---------------|----------------|
| 7 | Main Street & 9 th Street | PM | Signal | C / 29 | D / 45 |
| 8 | Main Street & 15 th Street | PM | Signal | C / 21 | B / 18 |
| 9 | Main Street & 27 th Street | PM | Signal | E / 76 | F / 153 |
| 10 ¹ | Main Street & Whitewater Park Boulevard | PM | Signal | B / 16 | D / 43 |
| 11 | Fairview Avenue & 27 th Street | PM | Signal | C / 32 | C / 33 |
| 12 ¹ | Fairview Avenue & Whitewater Park Boulevard | PM | Signal | B / 11 | B / 10 |

¹Intersections analyzed with HCM 2000 where infeasible to analyze with HCM 6 due to phasing or speed limitations.

²Bolded intersection LOS & Sec/Veh indicate failing levels of delay

The 2035 background scenario takes into account signal optimization at the study intersections, thus some intersections experience an overall improvement in LOS. However, the intersections at State Street and 26th/27th Street and at State Street and Whitewater Park Boulevard decline into unacceptable LOS in the 2035 background scenario. The intersection at State Street and 26th/27th Street experiences enough of an increase in traffic on the minor movements to cause the intersection to fall into an unacceptable level of delay. The intersection at State Street and Whitewater Park Boulevard experiences unacceptable delay in the 2035 background scenario due to an increase in traffic from the area's planned mixed-use development.

Build 2035 Future Conditions

The 2035 Build conditions utilize the 2035 background condition volumes with the addition of select transit infrastructure improvements on the proposed route alternatives as outlined below. Transit Signal Priority (TSP), Transit Pre-Emption, and transit queue bypass lanes were considered for this analysis. TSP modifies the normal signal operation process to better accommodate transit vehicles. Transit Pre-Emption acts similarly as an emergency vehicle in that an oncoming bus will interrupt the normal signal operation. Queue bypass lanes are short, dedicated lanes at an intersection which allow specified vehicles (in this case, transit), to bypass the queue of vehicles stopped at a red light. This would minimize the seconds of delay for transit and prevent a bus waiting several cycles to pass through a green light. For intersections that include TSP as an improvement, Fehr & Peers developed a statistical method to best estimate the realistic impacts of these signal improvements since the Synchro software does not specifically analyze TSP. Two scenarios were prepared for each alternative: one with TSP for every cycle and one without TSP for any cycle. A weighted average of the delay between the two models was calculated based on the likelihood that a bus will trigger TSP during the given peak hour. These calculations were based off a five-minute bus headway. Fehr



& Peers opted to not include a passenger vehicle trip reduction with the proposed project in the analysis in order to remain conservative in the LOS results. The results for each of the 2035 plus project condition alternatives are found in Tables 5-7 and a summary of all alternatives is included in the Traffic Summary section.

Alternative 1: Whitewater Park Boulevard Results

Under the Whitewater Park Boulevard alternative, 2035 background LOS is maintained at all intersections except at the intersection at Main Street and Whitewater Park Boulevard. The following location-specific infrastructure improvements are assumed for this scenario's LOS analysis:

- Whitewater Park Boulevard & State Street: Transit signal pre-emption
- Whitewater Park Boulevard & Main Street: Transit signal pre-emption and inbound (southbound) queue bypass lane
- Whitewater Park Boulevard & Fairview Avenue: Transit signal pre-emption and inbound (southbound) queue bypass lane

Table 5 summarizes the level of service for the study intersections along the Alternative 1 route under 2035 conditions.

Table 5: Alternative 1 2035 Future Conditions PM Peak Hour Level of Service

| Intersection | | | | 2035 Background | 2035 Build |
|-----------------|---|--------|---------|----------------------------|----------------------------|
| ID | Location | Period | Control | LOS / Sec/Veh ² | LOS / Sec/Veh ² |
| 4 ¹ | State Street & Whitewater Park Boulevard | PM | Signal | F / 85 | F / 96 |
| 5 | Idaho Street & 9 th Street | PM | Signal | C / 31 | C / 32 |
| 6 | Idaho Street & 15 th Street | PM | Signal | C / 23 | C / 24 |
| 7 | Main Street & 9 th Street | PM | Signal | D / 45 | D / 48 |
| 8 | Main Street & 15 th Street | PM | Signal | B / 18 | B / 18 |
| 9 | Main Street & 27 th Street | PM | Signal | F / 153 | F / 155 |
| 10 ¹ | Main Street & Whitewater Park Boulevard | PM | Signal | D / 43 | E / 56 |
| 11 | Fairview Avenue & 27 th Street | PM | Signal | C / 33 | C / 33 |
| 12 ¹ | Fairview Avenue & Whitewater Park Boulevard | PM | Signal | B / 10 | B / 12 |



¹Intersections analyzed with HCM 2000 where infeasible to analyze with HCM 6 due to phasing or speed limitations.

²Bolded intersection LOS & Sec/Veh indicate failing levels of delay

The increase in delay at the Main Street/Whitewater Park Boulevard intersection is similar to other intersections that also facilitate a bus turning movement. However, at this particular location, the added delay brought the intersection to 56 seconds of delay, which means this intersection will now function at LOS E rather than LOS D. This also happens to be the break point between an acceptable and unacceptable level of delay; many transportation agencies, including ACHD, consider LOS E and LOS F to be unacceptable. Thus, Alternative 1 is the only alternative that causes a change in future LOS designation compared to future background conditions, although that change is limited to one intersection along the corridor.

Alternative 2: 27th Street Results

The 2035 background LOS is maintained at all intersections under Alternative 2. The following location-specific infrastructure improvements are assumed for this scenario's LOS analysis:

- Whitewater Park Boulevard & State Street: Transit signal pre-emption
- 27th Street & Main Street: Transit signal pre-emption and inbound queue bypass lane

Table 6 summarizes the LOS for the study intersections along the Alternative 2 route under 2035 conditions.

Table 6: Alternative 2 2035 Future Conditions PM Peak Hour Level of Service

| Intersection | | | | 2035 Background | 2035 Build |
|----------------|--|--------|---------|----------------------------|----------------------------|
| ID | Location | Period | Control | LOS / Sec/Veh ² | LOS / Sec/Veh ² |
| 3 ¹ | State Street & 26 th /27 th Street | PM | Signal | F / 97 | F / 111 |
| 4 ¹ | State Street & Whitewater Park Boulevard | PM | Signal | F / 85 | F / 98 |
| 5 | Idaho Street & 9 th Street | PM | Signal | C / 31 | C / 31 |
| 6 | Idaho Street & 15 th Street | PM | Signal | C / 23 | C / 23 |
| 7 | Main Street & 9 th Street | PM | Signal | D / 45 | D / 46 |
| 8 | Main Street & 15 th Street | PM | Signal | B / 18 | B / 18 |
| 9 | Main Street & 27 th Street | PM | Signal | F / 153 | F / 173 |
| 11 | Fairview Avenue & 27 th Street | PM | Signal | C / 33 | C / 34 |



¹Intersections analyzed with HCM 2000 where infeasible to analyze with HCM 6 due to phasing or speed limitations.

²Bolded intersection LOS & Sec/Veh indicate failing levels of delay

The greatest increases in delay are at intersections which facilitate bus turning movements. While some intersections experience an increased level of delay, most of these intersections experience a slight increase of one or two seconds of delay. Intersections with increases of 10-20 seconds of delay were already at failing conditions in the 2035 Background condition. Thus the bus does not greatly impact traffic operations along this route.

Alternative 3: State Street Results

The Alternative 3 LOS is maintained at all intersections under Alternative 3. The following location-specific infrastructure improvements are assumed for this scenario's LOS analysis:

- State Street & Whitewater Park Boulevard: Transit signal pre-emption
- State Street & 27th Street: Transit signal pre-emption
- 9th Street & Main Street: Transit signal pre-emption

Table 7 summarizes the LOS in more detail for the study intersections along the Alternative 3 route under 2035 conditions.

Table 7: Alternative 3 2035 Future Conditions PM Peak Hour Level of Service

| Intersection | | | | 2035 Background | 2035 Build |
|----------------|--|--------|---------|-----------------------------|----------------------------|
| ID | Location | Period | Control | LOS & /Sec/Veh ² | LOS / Sec/Veh ² |
| 1 | State Street & 9 th Street | PM | Signal | B / 16 | B / 16 |
| 2 | State Street & 15 th Street | PM | Signal | C / 28 | C / 28 |
| 3 ¹ | State Street & 26 th /27 th Street | PM | Signal | F / 97 | F / 110 |
| 4 ¹ | State Street & Whitewater Park Boulevard | PM | Signal | F / 85 | F / 96 |
| 5 | Idaho Street & 9 th Street | PM | Signal | C / 31 | C / 32 |
| 7 | Main Street & 9 th Street | PM | Signal | D / 45 | D / 54 |

¹Intersections analyzed with HCM 2000 where infeasible to analyze with HCM 6 due to phasing or speed limitations.

²Bolded intersection LOS & Sec/Veh indicate failing levels of delay



While some intersections experience an increased level of delay, most of these intersections experience a slight increase of one or two seconds of delay. Intersections with increases of 10-20 seconds of delay were already at failing conditions in the 2035 Background condition. Therefore the bus does not greatly impact traffic operations along this route.

Traffic Summary

Table 8 summarizes and compares the results for the 2019 and 2035 background scenarios, as well as the results for all three 2035 build scenarios.

Table 8: Future 2035 Conditions PM Peak Hour Level of Service

| Intersection | | | | 2019 Background | 2035 Background | 2035 Alt. 1 | 2035 Alt. 2 | 2035 Alt. 3 |
|-----------------|--|--------|---------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| ID | Location | Period | Control | LOS / Sec/Veh ² | LOS / Sec/Veh ² | LOS / Sec/Veh ² | LOS / Sec/Veh ² | LOS / Sec/Veh ² |
| 1 | State Street & 9 th Street | PM | Signal | B / 15 | B / 16 | - | - | B / 16 |
| 2 | State Street & 15 th Street | PM | Signal | B / 13 | C / 28 | - | - | C / 28 |
| 3 ¹ | State Street & 26 th /27 th Street | PM | Signal | C / 21 | F / 97 | - | F / 111 | F / 110 |
| 4 ¹ | State Street & Whitewater Park Boulevard | PM | Signal | C / 21 | F / 85 | F / 96 | F / 98 | F / 96 |
| 5 | Idaho Street & 9 th Street | PM | Signal | C / 20 | C / 31 | C / 32 | C / 31 | C / 32 |
| 6 | Idaho Street & 15 th Street | PM | Signal | C / 21 | C / 23 | C / 24 | C / 23 | - |
| 7 | Main Street & 9 th Street | PM | Signal | C / 24 | D / 45 | D / 48 | D / 46 | D / 54 |
| 8 | Main Street & 15 th Street | PM | Signal | B / 18 | B / 18 | B / 18 | B / 18 | - |
| 9 | Main Street & 27 th Street | PM | Signal | D / 38 | F / 153 | F / 155 | F / 173 | - |
| 10 ¹ | Main Street & Whitewater Park Boulevard | PM | Signal | F / 308 | D / 43 | E / 56 | - | - |
| 11 | Fairview Avenue & 27 th Street | PM | Signal | D / 47 | C / 33 | C / 33 | C / 34 | - |
| 12 ¹ | Fairview Avenue & Whitewater Park Boulevard | PM | Signal | B / 12 | B / 10 | B / 12 | - | - |

¹Intersections analyzed with HCM 2000 where infeasible to analyze with HCM 6 due to phasing or speed limitations.

²Bolded intersection LOS & Sec/Veh indicate failing levels of delay

Overall, the introduction of a bus service with a five-minute headway does not substantially impact traffic operations. All alternatives except Alternative 1 maintain the Background level of service. In Alternative 1, the delay at the intersection of Whitewater Park Boulevard and Main Street increased from LOS D to LOS E. The delay of 56 seconds that this intersection may experience is one second

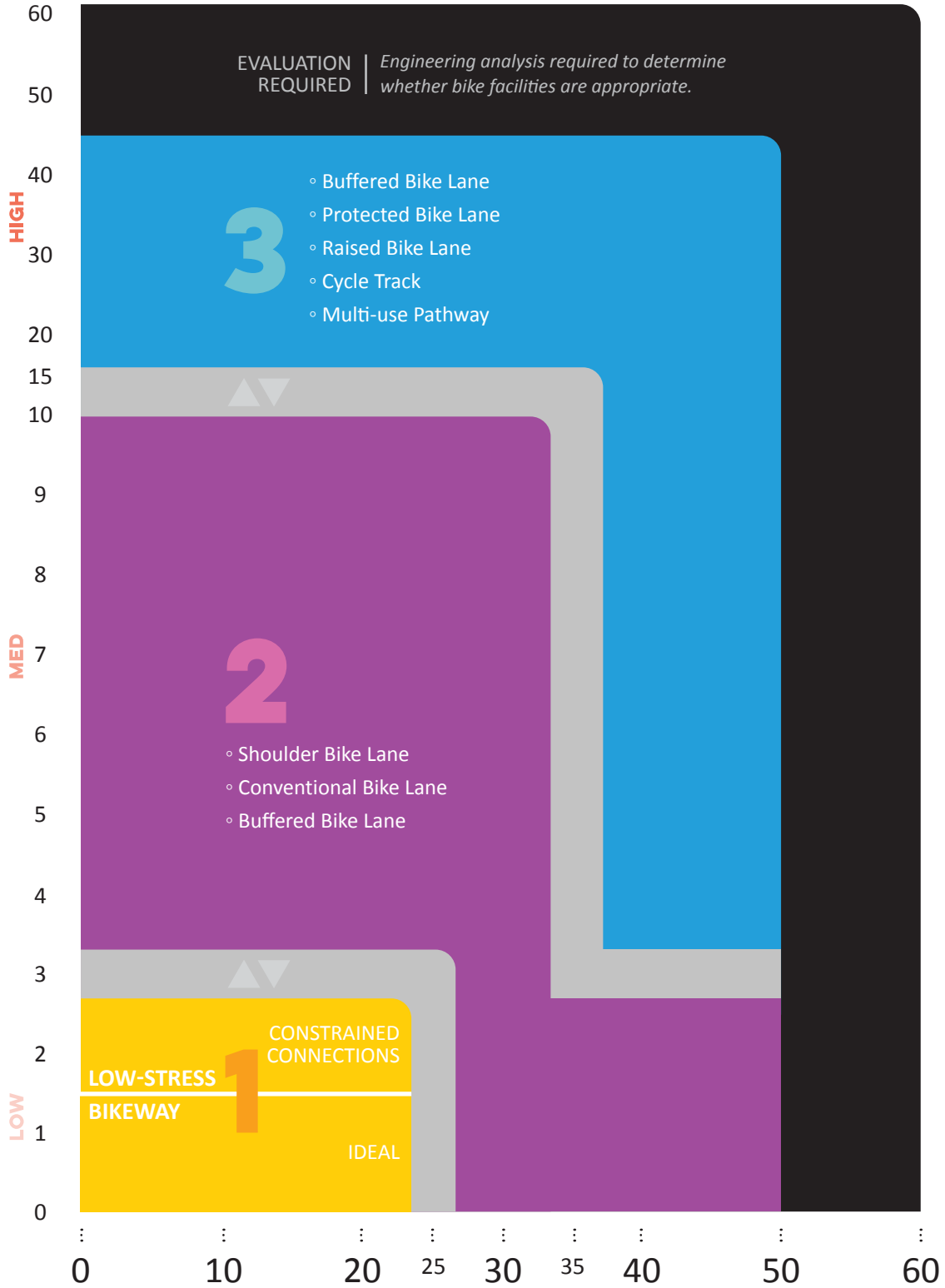


over the LOS E threshold of 55 seconds and thus is one second over the limit for an acceptable LOS. This analysis was conducted in a conservative manner in order to simulate worst traffic conditions. No reduction in background traffic was assumed as is typically caused by shift from vehicular travel to transit due to the introduction of a high-capacity bus route. Along with upgraded stations and traffic delay mitigations (such as transit signal pre-emption and queue bypass lanes), high-capacity bus routes tend to attract more of a shift from personal vehicles to transit than a basic bus network typically would attract, thus lowering the base vehicular traffic.



Bike Facility Matrix

TRAFFIC
Average Daily Traffic | All lanes, both directions
1,000 vehicles per day or 100 vehicles per hour



SPEED 85th-percentile speed (preferred), design speed or posted speed (MPH)

Planned Active Transportation Projects

| Project Name | Description | Est Project Cost |
|--|---|------------------|
| Front St. & Myrtle St. Improvements | Enhanced Crosswalk Treatment, post micro sealing | \$200,000 |
| S. 10th St. & W. Front St. | Signalized Crossing | \$200,000 |
| S. 12th St. & W. Front St | Signalized Crossing | \$200,000 |
| S. 5th St. & W. Myrtle St | Signalized Crossing | \$200,000 |
| Neighborhood Traffic Calming - S. 8th St. & W. River St. | Bike/Ped Raised Intersection | \$200,000 |
| Vista Ave and Nez Perce St | Install a PHB | \$259,000 |
| Hays St and 10th St and 11th St | Install a Rectangular Rapid Flashing Beacon (RRFB) | \$321,000 |
| Overland Rd and Phillippi St | Install a PHB | \$304,000 |
| 11th St Maintenance and Bikeway, State/Heron | Complete roadway maintenance on 11th St from Fort to Heron and implement the 11TH St Bikeway Concept | \$1,043,000 |
| Cassia St Bikeway and Pedestrian Improvements | Improve Cassia St as a bikeway from Franklin to Kootenai. Includes pavement rehab, sidewalk, pedestrian bridge and enhanced pedestrian crossings | \$3,186,000 |
| Kootenai St Traffic Calming, Orchard/Vista | Implement components of the Kootenai St Traffic Calming Concept Study | \$1,477,000 |
| Downtown Boise Implementation (2019) - HB312 Project | Accessible pedestrian signal at 16th St and Idaho St. | |
| Downtown Boise Implementation (2019) - HB312 Project | Enhanced pedestrian crossings at State and 12 th and State and 14th | |
| Residential Capital Maintenance (2019) - HB312 Project | Pavement rehabilitation and pedestrian ramps on residential streets identified as part of ACHD's Pavement Management Program | |
| Federal Aid Capital Maintenance (2020) - Phase 1, 2, 3 | Pavement rehabilitation and upgrade of adjacent pedestrian ramps on identified arterial and collector road segments. | \$5,576,000 |
| | | \$2,262,000 |
| | | \$300,000 |
| Federal Aid Capital Maintenance (2021) - Phase 1, 2, 3 | Pavement rehabilitation and upgrade of adjacent pedestrian ramps on identified arterial and collector road segments. | \$4,948,000 |
| | | \$2,120,000 |
| | | \$300,000 |
| Residential Capital Maintenance (2020) - HB312 Project | Pavement rehabilitation and pedestrian ramps on residential streets identified as part of ACHD's Pavement Management Program. | \$3,095,000 |
| Bikeway Signage (2022) | Install wayfinding and bikeway signage on improved bikeways. Corridors include: Cloverdale Rd (Overland / Franklin), MainSt & Fairview Ave (Greenbelt/ Grove St), Protest Hill Bikeway, and Orchard Hill Bikeway. | \$65,000 |
| Columbia Village Bikeway, Hwy 21 / Boise Ave | Improve select streets (Holcomb, Yamhill, Lake Forest, Grand Forest) in Columbia Village as a bikeway to include wayfinding, signage, crossings, and markings. | \$192,000 |
| Nez Perce St Bikeway, Orchard St / Columbus St | Improve Nez Perce St as a low-stress bikeway to include wayfinding and bikeway signage, enhanced crossings, and markings. | \$205,000 |
| Northwest Boise Bikeway, Horseshoe Bend Rd / 36th St | Improve select streets in Northwest Boise as a bikeway to include wayfinding, signage, enhanced crossings, and markings. | \$132,000 |
| Pleasanton Ave Bikeway, Greenbelt / 23rd St | Improve Pleasanton Ave as a bikeway to include wayfinding and bikeway signage and markings. | \$107,000 |
| Shoshone St Bikeway, Canal St / Capital Blvd | Improve Shoshone St as a bikeway network to include wayfinding, bikeway signage, a mini roundabout, enhanced connections at Overland, and markings. | \$446,000 |
| Allumbaugh St, Fairview Ave / Northview St | Complete curb, gutter, and sidewalk on the west side of Allumbaugh St, between Fairview Ave and Northview St. | \$479,000 |
| Coston St, Bannock St/ Franklin St | Complete sidewalk on the west side of Coston, from Bannock to Franklin. | \$173,000 |
| Eckert Rd and Arrow Junction Dr Pedestrian Crossing | Install crosswalk, curb ramps and lighting to improve pedestrian connectivity and safety at the intersection of Eckert Rd and Arrow Junction Dr. | \$66,000 |
| Holcomb Rd, Mimosa Way / Amity Rd | Construct sidewalk on the east side of Holcomb Rd from Mendota to Amity. Includes bike lane and wayfinding signage from Amity to Mimosa and an enhanced crossing at Amity. | \$139,000 |
| Horseshoe Bend Rd, State St / Hill Rd | Construct a pathway on the east side of Horseshoe Bend Rd as per the NW Boise Neighborhood Plan. Includes precast bridge, pedestrian crossing (Utahna St), and bikeway signage. | \$658,000 |
| Liberty St Sidewalk and Bikeway, Douglas St / Denton St | Complete sidewalk on the east side of Liberty St, between Douglas St and Denton St. Install bikeway signage between Franklin Rd and Emerald St. | \$483,000 |
| Maple Grove Rd and Edna St Pedestrian Crossing | Install an enhanced pedestrian crossing (PHB) across Maple Grove Rd at Edna St. | \$184,000 |
| McMillan Rd, Westview Dr / Maple Grove Rd | Complete sidewalk on the south side and a pathway on the north side from Westview to Maple Grove. Includes an enhanced crossing at Mitchell. | \$765,000 |
| Overland Rd and Phillippi St Pedestrian Crossing | Install an enhanced crossing (PHB) across Overland Rd at Phillippi St. | \$265,000 |
| Overland Rd, Columbus St / Federal Way | Complete curb, gutter and sidewalk on Overland, Columbus to Federal Way. | \$94,000 |

Planned Active Transportation Projects

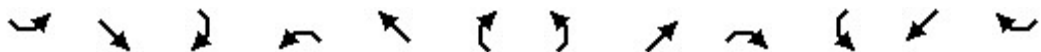
| Project Name | Description | Est Project Cost |
|--|--|------------------|
| Phillippi St, Malad St / Targee St | Complete curb, gutter and sidewalk from Malad to Targee. | \$504,000 |
| Phillippi St, Targee St / Overland Rd | Construct curb, gutter, and sidewalk on the east side of Phillippi from Targee to Overland. Includes partial road rehabilitation. | \$901,000 |
| Roosevelt St, Rose Hill St / Emerald St | Construct sidewalk on the west side of Roosevelt from Rose Hill to Emerald. | \$1,234,000 |
| Vista Ave and Nez Perce St Pedestrian Crossing | Install an enhanced crossing on Vista at Nez Perce, including bike push buttons. Includes relocation of bus stops closer to Nez Perce from Spaulding in coordination with Valley Regional Transit. | \$227,000 |
| 5th St and Fort St and Hays St | Improve intersection for pedestrians, bicyclists, and motorists. | \$0 |
| Safe Sidewalk Program (2020) | Repair existing damaged sidewalk, replace on-compliant curb ramps, and fill in small sidewalk gaps to high priority locations. Project includes the Castle Hills, Pierce Park Meadows, and Gary Lane Meadows #5 subdivisions in northwest Boise. | \$1,600,000 |
| Safe Sidewalk Program (2021) | Repair existing damaged sidewalk, replace non-compliant curb ramps, and fill in small sidewalk gaps to high priority locations. Project includes the area of Fairview Ave to Northview St, Allumbaugh St / Curtis Rd. | \$1,600,000 |
| Safe Sidewalk Program (2022) | Repair existing damaged sidewalk, replace non-compliant curb ramps, and fill in small sidewalk gaps to high priority locations. Project includes the area of Edna St to McMillan Rd, Shamrock Ave/ Five Mile Rd. | \$1,600,000 |
| 9th St and Washington St Pedestrian Crossing | Install an enhanced crossing (RRFB) on 9th St at Washington St. | \$141,000 |
| 13th St Traffic Calming (Phase 1), Fort St / Hill Rd | Implement components of the 13th St Traffic Calming Concept Study, including bulbouts at select intersections and an enhanced pedestrian crossing (RRFB) of 13th St at Resseque St. | \$408,000 |
| 28th St, Hazel St / Irene St | Construct bulb-outs at corners of the 28th St intersections of Irene St, Bella St, and Hazel St to provide traffic calming. | \$352,000 |
| 38th St, Bush Ave / Sunset Ave | Extend roadway and complete sidewalk on both sides of 38th St from Bush Ave to Sunset Ave. | \$370,000 |
| Bogart Ln, SH 44 (State St) / Sloan St | Install an asphalt path with raised curb on the east side of Bogart between Pocono and Caswell and curb, gutter, and sidewalk on the east side at Sloan. Includes an enhanced pedestrian crossing at Bogart and Sloan. | \$252,000 |
| Bogus Basin Rd, Curling Dr / 550' N/O Curling Dr | Install curb, gutter, and sidewalk on both sides of Bogus Basin in a 550' gap north of Curling Dr. | \$42,000 |
| Boise Ave and Linden St Pedestrian Crossing | Install an enhanced crossing (RRFB) on Boise Ave at Linden St. | \$123,000 |
| Broadway Ave and Boise Ave | Improve intersection for bikes and pedestrians. Includes accessible pedestrian signal. | \$301,000 |
| Cassia St Bikeway and Pedestrian Improvements | Improve Cassia St as a bikeway from Franklin to Kootenai and sidewalk from Franklin Park to Curtis and Latah to Shoshone. Includes pavement rehabilitation, mini roundabout at Shoshone, pedestrian bridge at Cassia Park, and enhance pedestrian crossings. | \$2,933,000 |
| Christine St, Northview St / Ustick Rd | Construct sidewalk on both sides of Christine, from Northview to Ustick. Includes roadway rehabilitation. | \$1,014,000 |
| Columbus St, Overland Rd / Kootenai St | Construct curb, gutter and sidewalk on Columbus from Overland to Kootenai. | \$336,000 |
| Cory Ln, Mitchell St/ Maple Grove Rd | Complete sidewalk on the north side of Cory Ln from Maple Grove Rd to Mitchell St. | \$195,000 |
| Enhanced School Crossings - Meridian Middle School and Capital High School | Install enhanced pedestrian crossings (RRFBs) on West 08th St in front of Meridian Middle School and on Milwaukee St next to Capital High School at the existing crosswalks. | \$148,000 |
| Franklin St, McKinley St / Pierce St | Construct sidewalks on the north side of Franklin St, between McKinley St and Pierce St. | \$374,000 |
| Garden St, Bethel St/ Emerald St | Construct sidewalks on the both sides of Garden St, between Bethel St and Emerald St. | \$939,000 |
| Garden St, Franklin Rd / Bethel St | Construct sidewalks on the both sides of Garden St, between Franklin Rd and Bethel St. | \$989,000 |
| Hays St at 11th St and 12th St Pedestrian Crossings | Install enhanced crossings (RRFB) and pedestrian ramps to cross Hays St at 11th St and 12th St. 11th St crossing to be coordinated with the 11th St Maintenance and Bikeway project. | \$275,000 |
| Hazel St, 28th St / 26th St | Construct detached sidewalk on the south side of Hazel St, between 28th St and 26th St. | \$39,000 |
| Kootenai St, Vista Ave / Federal Way | Construct curb, gutter, sidewalks and bike lanes on Kootenai St from Vista Ave to Federal Way. Project includes removal of on-street parking. | \$106,000 |
| Linda Vista Ln, Canterbury Dr / Ustick Rd | Complete curb, gutter, and sidewalk on west side of Linda Vista Ln from Canterbury Dr to Ustick Rd. | \$760,000 |
| McMillan Rd and Leather Way Pedestrian Crossing | Install an enhanced crossing (PHB) on McMillan Rd at Leather Way. | \$48,000 |
| Milwaukee St, Marcum St / Ustick Rd | Install curb, gutter, and sidewalk on the west side of Milwaukee St from Marcum St to Ustick Rd. Sidewalk would be placed between the canal and the roadway. | \$971,000 |
| Pierce St, Washington St / Shenandoah Dr | Complete sidewalks on Pierce St from Washington to Shenandoah to improve pedestrian safety for students walking to Roosevelt Elementary. | \$517,000 |
| Ustick Rd and Milwaukee St School Zone | Expand the existing school zone by installing new school zone flashers on all legs of the intersection to improve student safety. | \$29,000 |
| Warm Springs Ave and Straughan Ave Pedestrian Crossing | Install an enhance pedestrian crossing (RRFB) on Warm Springs Ave at Straughan Ave. | \$156,000 |
| Warm Springs Ave, Glacier Dr / Glacier Dr | Construct sidewalk on the north side of Warm Springs Ave from 320' northwest of Glacier Dr to the southeast corner of Riverland Terrace Subdivision. | \$292,000 |
| Fairview Ave and Curtis Rd Accessible Pedestrian Signal | Replace pedestrian poles with Accessible Pedestrian Signal-compatible push buttons and replace pedestrian ramps with ADA compliant ramps. | \$392,000 |
| Fairview Ave and Milwaukee St Accessible Pedestrian Signal | Replace pedestrian poles with Accessible Pedestrian Signals and replace pedestrian ramps with ADA compliant ramps. | \$229,000 |
| Fairview Ave and Orchard St | Replace pedestrian poles with Accessible Pedestrian Signal-compatible push buttons and replace pedestrian ramps with directional ramps. | \$521,000 |
| Orchard St and Franklin Rd Accessible Pedestrian Signal | Install Accessible Pedestrian Signals at the Franklin Rd and Orchard St intersection to enhance accessibility in compliance with the Americans with Disabilities Act. | \$84,000 |

HCM 6th Signalized Intersection Summary
 1: 9th Street & State Street



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|------|------|------|------|------|------|-----|-----|-----|------|------|------|
| Lane Configurations | | ↑↑ | | | ↑↑ | | | | | | ↑↑ | ↑ |
| Traffic Volume (veh/h) | 0 | 910 | 190 | 15 | 235 | 0 | 0 | 0 | 0 | 20 | 665 | 110 |
| Future Volume (veh/h) | 0 | 910 | 190 | 15 | 235 | 0 | 0 | 0 | 0 | 20 | 665 | 110 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | | | | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | 1.00 | | 1.00 | | | | 1.00 | | 0.99 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | | | | No | |
| Adj Sat Flow, veh/h/ln | 0 | 1772 | 1772 | 1772 | 1772 | 0 | | | | 1772 | 1843 | 1772 |
| Adj Flow Rate, veh/h | 0 | 1096 | 202 | 17 | 270 | 0 | | | | 29 | 792 | 122 |
| Peak Hour Factor | 0.88 | 0.83 | 0.94 | 0.88 | 0.87 | 0.88 | | | | 0.69 | 0.84 | 0.90 |
| Percent Heavy Veh, % | 0 | 2 | 2 | 2 | 2 | 0 | | | | 2 | 2 | 2 |
| Cap, veh/h | 0 | 1526 | 280 | 111 | 1572 | 0 | | | | 37 | 1067 | 456 |
| Arrive On Green | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | | | | 0.10 | 0.10 | 0.10 |
| Sat Flow, veh/h | 0 | 2922 | 520 | 92 | 3001 | 0 | | | | 121 | 3466 | 1481 |
| Grp Volume(v), veh/h | 0 | 649 | 649 | 147 | 140 | 0 | | | | 440 | 381 | 122 |
| Grp Sat Flow(s),veh/h/ln | 0 | 1683 | 1670 | 1480 | 1532 | 0 | | | | 1837 | 1751 | 1481 |
| Q Serve(g_s), s | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | 15.2 | 13.7 | 4.9 |
| Cycle Q Clear(g_c), s | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | 15.2 | 13.7 | 4.9 |
| Prop In Lane | 0.00 | | 0.31 | 0.12 | | 0.00 | | | | 0.07 | | 1.00 |
| Lane Grp Cap(c), veh/h | 0 | 906 | 899 | 859 | 825 | 0 | | | | 565 | 539 | 456 |
| V/C Ratio(X) | 0.00 | 0.72 | 0.72 | 0.17 | 0.17 | 0.00 | | | | 0.78 | 0.71 | 0.27 |
| Avail Cap(c_a), veh/h | 0 | 906 | 899 | 859 | 825 | 0 | | | | 565 | 539 | 456 |
| HCM Platoon Ratio | 1.00 | 2.00 | 2.00 | 2.00 | 2.00 | 1.00 | | | | 0.33 | 0.33 | 0.33 |
| Upstream Filter(l) | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | | | | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | 27.0 | 26.4 | 22.4 |
| Incr Delay (d2), s/veh | 0.0 | 4.8 | 5.0 | 0.4 | 0.4 | 0.0 | | | | 10.1 | 7.7 | 1.4 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.0 | 1.2 | 1.2 | 0.1 | 0.1 | 0.0 | | | | 8.9 | 7.4 | 1.9 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 0.0 | 4.8 | 5.0 | 0.4 | 0.4 | 0.0 | | | | 37.2 | 34.0 | 23.9 |
| LnGrp LOS | A | A | A | A | A | A | | | | D | C | C |
| Approach Vol, veh/h | | 1298 | | | 287 | | | | | | 943 | |
| Approach Delay, s/veh | | 4.9 | | | 0.4 | | | | | | 34.2 | |
| Approach LOS | | A | | | A | | | | | | C | |
| Timer - Assigned Phs | | 2 | | 4 | | 6 | | | | | | |
| Phs Duration (G+Y+Rc), s | | 40.0 | | 25.0 | | 40.0 | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | 5.0 | | | | | | |
| Max Green Setting (Gmax), s | | 35.0 | | 20.0 | | 35.0 | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | | 0.0 | | 0.0 | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | 0.0 | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 15.3 | | | | | | | | | |
| HCM 6th LOS | | | B | | | | | | | | | |

HCM 6th Signalized Intersection Summary
 2: 15th Street & State Street



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|------|------|------|------|------|------|------|------|------|-----|-----|-----|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 120 | 1195 | 0 | 0 | 435 | 40 | 85 | 345 | 80 | 0 | 0 | 0 |
| Future Volume (veh/h) | 120 | 1195 | 0 | 0 | 435 | 40 | 85 | 345 | 80 | 0 | 0 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 0.99 | 1.00 | | 0.98 | | | |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Work Zone On Approach | | No | | | No | | | No | | | | |
| Adj Sat Flow, veh/h/ln | 1772 | 1843 | 0 | 0 | 1843 | 1772 | 1772 | 1772 | 1772 | | | |
| Adj Flow Rate, veh/h | 150 | 1299 | 0 | 0 | 565 | 68 | 108 | 421 | 107 | | | |
| Peak Hour Factor | 0.80 | 0.92 | 0.95 | 0.95 | 0.77 | 0.59 | 0.79 | 0.82 | 0.75 | | | |
| Percent Heavy Veh, % | 2 | 2 | 0 | 0 | 2 | 2 | 2 | 2 | 2 | | | |
| Cap, veh/h | 506 | 2183 | 0 | 0 | 1479 | 178 | 437 | 687 | 173 | | | |
| Arrive On Green | 0.19 | 1.00 | 0.00 | 0.00 | 0.47 | 0.47 | 0.26 | 0.26 | 0.26 | | | |
| Sat Flow, veh/h | 1688 | 3593 | 0 | 0 | 3235 | 377 | 1688 | 2653 | 668 | | | |
| Grp Volume(v), veh/h | 150 | 1299 | 0 | 0 | 314 | 319 | 108 | 266 | 262 | | | |
| Grp Sat Flow(s),veh/h/ln | 1688 | 1751 | 0 | 0 | 1751 | 1770 | 1688 | 1683 | 1638 | | | |
| Q Serve(g_s), s | 0.0 | 0.0 | 0.0 | 0.0 | 9.8 | 9.9 | 4.3 | 11.8 | 12.0 | | | |
| Cycle Q Clear(g_c), s | 0.0 | 0.0 | 0.0 | 0.0 | 9.8 | 9.9 | 4.3 | 11.8 | 12.0 | | | |
| Prop In Lane | 1.00 | | 0.00 | 0.00 | | 0.21 | 1.00 | | 0.41 | | | |
| Lane Grp Cap(c), veh/h | 506 | 2183 | 0 | 0 | 824 | 833 | 437 | 436 | 424 | | | |
| V/C Ratio(X) | 0.30 | 0.60 | 0.00 | 0.00 | 0.38 | 0.38 | 0.25 | 0.61 | 0.62 | | | |
| Avail Cap(c_a), veh/h | 506 | 2183 | 0 | 0 | 824 | 833 | 437 | 436 | 424 | | | |
| HCM Platoon Ratio | 2.00 | 2.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Upstream Filter(I) | 0.63 | 0.63 | 0.00 | 0.00 | 1.00 | 1.00 | 0.95 | 0.95 | 0.95 | | | |
| Uniform Delay (d), s/veh | 15.2 | 0.0 | 0.0 | 0.0 | 14.5 | 14.5 | 24.9 | 27.7 | 27.8 | | | |
| Incr Delay (d2), s/veh | 0.1 | 0.8 | 0.0 | 0.0 | 1.3 | 1.3 | 1.3 | 5.9 | 6.3 | | | |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| %ile BackOfQ(50%),veh/ln | 1.8 | 0.2 | 0.0 | 0.0 | 4.1 | 4.1 | 1.9 | 5.4 | 5.4 | | | |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 15.3 | 0.8 | 0.0 | 0.0 | 15.9 | 15.9 | 26.2 | 33.6 | 34.1 | | | |
| LnGrp LOS | B | A | A | A | B | B | C | C | C | | | |
| Approach Vol, veh/h | | 1449 | | | 633 | | | 636 | | | | |
| Approach Delay, s/veh | | 2.3 | | | 15.9 | | | 32.6 | | | | |
| Approach LOS | | A | | | B | | | C | | | | |
| Timer - Assigned Phs | 1 | 2 | | | | 6 | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 13.0 | 45.0 | | | | 58.0 | | 27.0 | | | | |
| Change Period (Y+Rc), s | 5.0 | 5.0 | | | | 5.0 | | 5.0 | | | | |
| Max Green Setting (Gmax), s | 8.0 | 40.0 | | | | 53.0 | | 22.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.0 | 0.0 | | | | 0.0 | | 0.0 | | | | |
| Green Ext Time (p_c), s | 0.1 | 0.0 | | | | 0.0 | | 0.0 | | | | |

| Intersection Summary | | | | | | | | | | | | |
|----------------------|--|--|--|--|------|--|--|--|--|--|--|--|
| HCM 6th Ctrl Delay | | | | | 12.5 | | | | | | | |
| HCM 6th LOS | | | | | B | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 3: 27th Street/26th Street & State Street



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------|-------|-------|------|-------|------|------|-------|------|------|-------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 5 | 1250 | 285 | 23 | 430 | 9 | 123 | 26 | 48 | 42 | 112 | 13 |
| Future Volume (vph) | 5 | 1250 | 285 | 23 | 430 | 9 | 123 | 26 | 48 | 42 | 112 | 13 |
| Ideal Flow (vphpl) | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 |
| Lane Width | 10 | 12 | 14 | 10 | 12 | 12 | 10 | 13 | 12 | 12 | 10 | 12 |
| Total Lost time (s) | 6.0 | 5.0 | 5.0 | 6.0 | 5.0 | | 6.0 | 6.0 | | 6.0 | 6.0 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.91 | | 0.95 | 0.95 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.93 | | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 0.99 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1608 | 3446 | 1644 | 1608 | 4937 | | 1528 | 1628 | | 1723 | 1666 | |
| Flt Permitted | 0.46 | 1.00 | 1.00 | 0.10 | 1.00 | | 0.95 | 0.99 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 777 | 3446 | 1644 | 173 | 4937 | | 1528 | 1628 | | 1723 | 1666 | |
| Peak-hour factor, PHF | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 | 0.88 |
| Adj. Flow (vph) | 6 | 1420 | 324 | 26 | 489 | 10 | 140 | 30 | 55 | 48 | 127 | 15 |
| RTOR Reduction (vph) | 0 | 0 | 79 | 0 | 1 | 0 | 0 | 29 | 0 | 0 | 3 | 0 |
| Lane Group Flow (vph) | 6 | 1420 | 245 | 26 | 498 | 0 | 115 | 81 | 0 | 48 | 139 | 0 |
| Turn Type | pm+pt | NA | Perm | pm+pt | NA | | Split | NA | | Split | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | 8 | 8 | | 4 | 4 | |
| Permitted Phases | 6 | | 6 | 2 | | | | | | | | |
| Actuated Green, G (s) | 90.2 | 88.6 | 88.6 | 96.6 | 91.8 | | 15.7 | 15.7 | | 17.9 | 17.9 | |
| Effective Green, g (s) | 90.2 | 88.6 | 88.6 | 96.6 | 91.8 | | 15.7 | 15.7 | | 17.9 | 17.9 | |
| Actuated g/C Ratio | 0.60 | 0.59 | 0.59 | 0.64 | 0.61 | | 0.10 | 0.10 | | 0.12 | 0.12 | |
| Clearance Time (s) | 6.0 | 5.0 | 5.0 | 6.0 | 5.0 | | 6.0 | 6.0 | | 6.0 | 6.0 | |
| Vehicle Extension (s) | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | | 2.0 | 2.0 | | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | 476 | 2035 | 971 | 157 | 3021 | | 159 | 170 | | 205 | 198 | |
| v/s Ratio Prot | 0.00 | c0.41 | | c0.01 | 0.10 | | c0.08 | 0.05 | | 0.03 | c0.08 | |
| v/s Ratio Perm | 0.01 | | 0.15 | c0.10 | | | | | | | | |
| v/c Ratio | 0.01 | 0.70 | 0.25 | 0.17 | 0.16 | | 0.72 | 0.48 | | 0.23 | 0.70 | |
| Uniform Delay, d1 | 12.0 | 21.4 | 14.8 | 16.0 | 12.6 | | 65.0 | 63.3 | | 59.8 | 63.5 | |
| Progression Factor | 0.62 | 0.51 | 0.21 | 0.91 | 0.92 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 0.0 | 1.9 | 0.6 | 0.2 | 0.1 | | 12.9 | 0.8 | | 0.2 | 8.9 | |
| Delay (s) | 7.4 | 12.8 | 3.7 | 14.8 | 11.6 | | 77.9 | 64.1 | | 60.1 | 72.4 | |
| Level of Service | A | B | A | B | B | | E | E | | E | E | |
| Approach Delay (s) | | 11.1 | | | 11.8 | | | 71.1 | | | 69.3 | |
| Approach LOS | | B | | | B | | | E | | | E | |

| Intersection Summary | | |
|-----------------------------------|-------|-----------------------------|
| HCM 2000 Control Delay | 20.4 | HCM 2000 Level of Service C |
| HCM 2000 Volume to Capacity ratio | 0.68 | |
| Actuated Cycle Length (s) | 150.0 | Sum of lost time (s) 23.0 |
| Intersection Capacity Utilization | 63.2% | ICU Level of Service B |
| Analysis Period (min) | 15 | |

Description: Count Date: 1/22/2015
 c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
4: Whitewater Park Blvd./31st Street & State Street

ACHD Countywide Model
03/11/2021



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------|-------|-------|------|-------|------|------|-------|-------|------|-------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 5 | 1345 | 390 | 75 | 535 | 10 | 90 | 10 | 30 | 20 | 140 | 1 |
| Future Volume (vph) | 5 | 1345 | 390 | 75 | 535 | 10 | 90 | 10 | 30 | 20 | 140 | 1 |
| Ideal Flow (vphpl) | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 |
| Lane Width | 10 | 13 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 11 | 12 | 12 |
| Total Lost time (s) | 6.0 | 5.5 | 5.5 | 6.0 | 5.5 | | 6.0 | 5.5 | | 6.0 | 6.0 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | | 0.97 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.89 | | 1.00 | 1.00 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1608 | 3561 | 1542 | 1723 | 3437 | | 3343 | 1608 | | 1666 | 1812 | |
| Flt Permitted | 0.44 | 1.00 | 1.00 | 0.12 | 1.00 | | 0.95 | 1.00 | | 0.73 | 1.00 | |
| Satd. Flow (perm) | 747 | 3561 | 1542 | 209 | 3437 | | 3343 | 1608 | | 1280 | 1812 | |
| Peak-hour factor, PHF | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Adj. Flow (vph) | 5 | 1387 | 402 | 77 | 552 | 10 | 93 | 10 | 31 | 21 | 144 | 1 |
| RTOR Reduction (vph) | 0 | 0 | 83 | 0 | 1 | 0 | 0 | 26 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 5 | 1387 | 319 | 77 | 561 | 0 | 93 | 15 | 0 | 21 | 145 | 0 |
| Turn Type | pm+pt | NA | Perm | pm+pt | NA | | Prot | NA | | pm+pt | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | 6 | | 6 | 2 | | | | | | 4 | 4 | |
| Actuated Green, G (s) | 93.3 | 92.1 | 92.1 | 104.9 | 97.9 | | 8.6 | 23.7 | | 23.0 | 18.8 | |
| Effective Green, g (s) | 93.3 | 92.1 | 92.1 | 104.9 | 97.9 | | 8.6 | 23.7 | | 23.0 | 18.8 | |
| Actuated g/C Ratio | 0.62 | 0.61 | 0.61 | 0.70 | 0.65 | | 0.06 | 0.16 | | 0.15 | 0.13 | |
| Clearance Time (s) | 6.0 | 5.5 | 5.5 | 6.0 | 5.5 | | 6.0 | 5.5 | | 6.0 | 6.0 | |
| Vehicle Extension (s) | 3.0 | 2.0 | 2.0 | 2.0 | 2.0 | | 2.0 | 2.0 | | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | 471 | 2186 | 946 | 216 | 2243 | | 191 | 254 | | 207 | 227 | |
| v/s Ratio Prot | 0.00 | c0.39 | | c0.02 | 0.16 | | c0.03 | c0.01 | | 0.00 | c0.08 | |
| v/s Ratio Perm | 0.01 | | 0.21 | 0.23 | | | | | | 0.01 | | |
| v/c Ratio | 0.01 | 0.63 | 0.34 | 0.36 | 0.25 | | 0.49 | 0.06 | | 0.10 | 0.64 | |
| Uniform Delay, d1 | 10.7 | 18.3 | 14.1 | 13.9 | 10.8 | | 68.6 | 53.7 | | 54.4 | 62.4 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.52 | 0.72 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 0.0 | 1.4 | 1.0 | 0.4 | 0.0 | | 0.7 | 0.0 | | 0.1 | 4.3 | |
| Delay (s) | 10.8 | 19.7 | 15.1 | 21.4 | 7.8 | | 69.3 | 53.7 | | 54.5 | 66.7 | |
| Level of Service | B | B | B | C | A | | E | D | | D | E | |
| Approach Delay (s) | | 18.7 | | | 9.5 | | | 64.5 | | | 65.1 | |
| Approach LOS | | B | | | A | | | E | | | E | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 21.6 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.61 | | |
| Actuated Cycle Length (s) | 150.0 | Sum of lost time (s) | 23.5 |
| Intersection Capacity Utilization | 74.5% | ICU Level of Service | D |
| Analysis Period (min) | 15 | | |

Description: Count Date: 1/21/2014

c Critical Lane Group

HCM 6th Signalized Intersection Summary
 5: 9th Street & Idaho Street



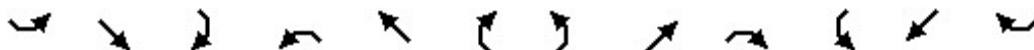
| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|-----|------|-----|------|------|------|-----|-----|-----|------|------|------|
| Lane Configurations | | | | | ↑↑↑ | | | | | | ↑↑↑ | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 135 | 255 | 0 | 0 | 0 | 0 | 0 | 650 | 35 |
| Future Volume (veh/h) | 0 | 0 | 0 | 135 | 255 | 0 | 0 | 0 | 0 | 0 | 650 | 35 |
| Initial Q (Qb), veh | | | | 0 | 0 | 0 | | | | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | | | | 1.00 | | 1.00 | | | | 1.00 | | 0.98 |
| Parking Bus, Adj | | | | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | | | No | | | | | | No | | |
| Adj Sat Flow, veh/h/ln | | | | 1772 | 1772 | 0 | | | | 0 | 1772 | 1772 |
| Adj Flow Rate, veh/h | | | | 161 | 287 | 0 | | | | 0 | 730 | 41 |
| Peak Hour Factor | | | | 0.84 | 0.89 | 0.89 | | | | 0.89 | 0.89 | 0.85 |
| Percent Heavy Veh, % | | | | 2 | 2 | 0 | | | | 0 | 2 | 2 |
| Cap, veh/h | | | | 642 | 1215 | 0 | | | | 0 | 2088 | 117 |
| Arrive On Green | | | | 0.13 | 0.13 | 0.00 | | | | 0.00 | 0.15 | 0.15 |
| Sat Flow, veh/h | | | | 1336 | 3182 | 0 | | | | 0 | 4840 | 262 |
| Grp Volume(v), veh/h | | | | 172 | 276 | 0 | | | | 0 | 502 | 269 |
| Grp Sat Flow(s),veh/h/ln | | | | 1438 | 1467 | 0 | | | | 0 | 1612 | 1717 |
| Q Serve(g_s), s | | | | 6.9 | 5.5 | 0.0 | | | | 0.0 | 9.1 | 9.2 |
| Cycle Q Clear(g_c), s | | | | 7.0 | 5.5 | 0.0 | | | | 0.0 | 9.1 | 9.2 |
| Prop In Lane | | | | 0.94 | | 0.00 | | | | 0.00 | | 0.15 |
| Lane Grp Cap(c), veh/h | | | | 682 | 1174 | 0 | | | | 0 | 1439 | 766 |
| V/C Ratio(X) | | | | 0.25 | 0.23 | 0.00 | | | | 0.00 | 0.35 | 0.35 |
| Avail Cap(c_a), veh/h | | | | 682 | 1174 | 0 | | | | 0 | 1439 | 766 |
| HCM Platoon Ratio | | | | 0.33 | 0.33 | 1.00 | | | | 1.00 | 0.33 | 0.33 |
| Upstream Filter(I) | | | | 1.00 | 1.00 | 0.00 | | | | 0.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | | | | 20.0 | 19.3 | 0.0 | | | | 0.0 | 19.2 | 19.3 |
| Incr Delay (d2), s/veh | | | | 0.9 | 0.5 | 0.0 | | | | 0.0 | 0.7 | 1.3 |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | | | | 2.6 | 2.0 | 0.0 | | | | 0.0 | 3.9 | 4.3 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 20.8 | 19.8 | 0.0 | | | | 0.0 | 19.9 | 20.5 |
| LnGrp LOS | | | | C | B | A | | | | A | B | C |
| Approach Vol, veh/h | | | | | 448 | | | | | | 771 | |
| Approach Delay, s/veh | | | | | 20.2 | | | | | | 20.1 | |
| Approach LOS | | | | | C | | | | | | C | |
| Timer - Assigned Phs | | 2 | | 4 | | | | | | | | |
| Phs Duration (G+Y+Rc), s | | 31.0 | | 34.0 | | | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | | | | | | | |
| Max Green Setting (Gmax), s | | 26.0 | | 29.0 | | | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | | 0.0 | | | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 20.1 | | | | | | | | |
| HCM 6th LOS | | | | C | | | | | | | | |

HCM 6th Signalized Intersection Summary
6: 15th Street & Idaho Street















| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|-----|------|-----|------|------|------|------|------|------|-----|-----|-----|
| Lane Configurations | | | | | ↑↑↑ | | | ↑↑ | | | | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 0 | 251 | 65 | 32 | 468 | 0 | 0 | 0 | 0 |
| Future Volume (veh/h) | 0 | 0 | 0 | 0 | 251 | 65 | 32 | 468 | 0 | 0 | 0 | 0 |
| Initial Q (Qb), veh | | | | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| Ped-Bike Adj(A_pbT) | | | | 1.00 | | 1.00 | 1.00 | | 1.00 | | | |
| Parking Bus, Adj | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Work Zone On Approach | | | | No | | | | No | | | | |
| Adj Sat Flow, veh/h/ln | | | | 0 | 1772 | 1772 | 1772 | 1843 | 0 | | | |
| Adj Flow Rate, veh/h | | | | 0 | 273 | 71 | 35 | 509 | 0 | | | |
| Peak Hour Factor | | | | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | | | |
| Percent Heavy Veh, % | | | | 0 | 2 | 2 | 2 | 2 | 0 | | | |
| Cap, veh/h | | | | 0 | 1785 | 442 | 85 | 1293 | 0 | | | |
| Arrive On Green | | | | 0.00 | 0.15 | 0.15 | 0.13 | 0.13 | 0.00 | | | |
| Sat Flow, veh/h | | | | 0 | 4026 | 958 | 220 | 3454 | 0 | | | |
| Grp Volume(v), veh/h | | | | 0 | 225 | 119 | 291 | 253 | 0 | | | |
| Grp Sat Flow(s),veh/h/ln | | | | 0 | 1612 | 1599 | 1832 | 1751 | 0 | | | |
| Q Serve(g_s), s | | | | 0.0 | 3.9 | 4.2 | 9.5 | 8.6 | 0.0 | | | |
| Cycle Q Clear(g_c), s | | | | 0.0 | 3.9 | 4.2 | 9.5 | 8.6 | 0.0 | | | |
| Prop In Lane | | | | 0.00 | | 0.60 | 0.12 | | 0.00 | | | |
| Lane Grp Cap(c), veh/h | | | | 0 | 1488 | 738 | 705 | 673 | 0 | | | |
| V/C Ratio(X) | | | | 0.00 | 0.15 | 0.16 | 0.41 | 0.38 | 0.00 | | | |
| Avail Cap(c_a), veh/h | | | | 0 | 1488 | 738 | 705 | 673 | 0 | | | |
| HCM Platoon Ratio | | | | 1.00 | 0.33 | 0.33 | 0.33 | 0.33 | 1.00 | | | |
| Upstream Filter(l) | | | | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | | | |
| Uniform Delay (d), s/veh | | | | 0.0 | 16.5 | 16.6 | 21.6 | 21.2 | 0.0 | | | |
| Incr Delay (d2), s/veh | | | | 0.0 | 0.2 | 0.5 | 1.8 | 1.6 | 0.0 | | | |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| %ile BackOfQ(50%),veh/ln | | | | 0.0 | 1.4 | 1.5 | 4.8 | 4.1 | 0.0 | | | |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 0.0 | 16.7 | 17.1 | 23.4 | 22.8 | 0.0 | | | |
| LnGrp LOS | | | | A | B | B | C | C | A | | | |
| Approach Vol, veh/h | | | | | 344 | | | 544 | | | | |
| Approach Delay, s/veh | | | | | 16.8 | | | 23.1 | | | | |
| Approach LOS | | | | | B | | | C | | | | |
| Timer - Assigned Phs | | 2 | | 4 | | | | | | | | |
| Phs Duration (G+Y+Rc), s | | 35.0 | | 30.0 | | | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | | | | | | | |
| Max Green Setting (Gmax), s | | 30.0 | | 25.0 | | | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | | 0.0 | | | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 20.7 | | | | | | | | |
| HCM 6th LOS | | | | C | | | | | | | | |

HCM 6th Signalized Intersection Summary
7: 9th Street & Main Street



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|------|------|------|------|-----|-----|-----|-----|-----|------|------|------|
| Lane Configurations | | ↑↑↑ | | | | | | | | | ↑↑↑ | |
| Traffic Volume (veh/h) | 0 | 840 | 180 | 0 | 0 | 0 | 0 | 0 | 0 | 115 | 905 | 0 |
| Future Volume (veh/h) | 0 | 840 | 180 | 0 | 0 | 0 | 0 | 0 | 0 | 115 | 905 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | | | | | | | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | | | | | | | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | | | | | | | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | | | | | | | No | |
| Adj Sat Flow, veh/h/ln | 0 | 1772 | 1772 | | | | | | | 1772 | 1772 | 0 |
| Adj Flow Rate, veh/h | 0 | 913 | 196 | | | | | | | 125 | 984 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | | | | | | | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 0 | 2 | 2 | | | | | | | 2 | 2 | 0 |
| Cap, veh/h | 0 | 1780 | 381 | | | | | | | 247 | 1664 | 0 |
| Arrive On Green | 0.00 | 0.15 | 0.15 | | | | | | | 0.13 | 0.13 | 0.00 |
| Sat Flow, veh/h | 0 | 4150 | 853 | | | | | | | 437 | 4305 | 0 |
| Grp Volume(v), veh/h | 0 | 737 | 372 | | | | | | | 410 | 699 | 0 |
| Grp Sat Flow(s),veh/h/ln | 0 | 1612 | 1618 | | | | | | | 1663 | 1467 | 0 |
| Q Serve(g_s), s | 0.0 | 13.7 | 13.8 | | | | | | | 11.7 | 14.6 | 0.0 |
| Cycle Q Clear(g_c), s | 0.0 | 13.7 | 13.8 | | | | | | | 15.0 | 14.6 | 0.0 |
| Prop In Lane | 0.00 | | 0.53 | | | | | | | 0.30 | | 0.00 |
| Lane Grp Cap(c), veh/h | 0 | 1439 | 722 | | | | | | | 737 | 1174 | 0 |
| V/C Ratio(X) | 0.00 | 0.51 | 0.51 | | | | | | | 0.56 | 0.60 | 0.00 |
| Avail Cap(c_a), veh/h | 0 | 1439 | 722 | | | | | | | 737 | 1174 | 0 |
| HCM Platoon Ratio | 1.00 | 0.33 | 0.33 | | | | | | | 0.33 | 0.33 | 1.00 |
| Upstream Filter(l) | 0.00 | 1.00 | 1.00 | | | | | | | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 0.0 | 21.2 | 21.2 | | | | | | | 23.4 | 23.3 | 0.0 |
| Incr Delay (d2), s/veh | 0.0 | 1.3 | 2.6 | | | | | | | 3.0 | 2.2 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | | | | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.0 | 6.0 | 6.4 | | | | | | | 7.2 | 6.0 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 0.0 | 22.5 | 23.8 | | | | | | | 26.4 | 25.5 | 0.0 |
| LnGrp LOS | A | C | C | | | | | | | C | C | A |
| Approach Vol, veh/h | | 1109 | | | | | | | | | 1109 | |
| Approach Delay, s/veh | | 22.9 | | | | | | | | | 25.8 | |
| Approach LOS | | C | | | | | | | | | C | |
| Timer - Assigned Phs | | 2 | | 4 | | | | | | | | |
| Phs Duration (G+Y+Rc), s | | 34.0 | | 31.0 | | | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | | | | | | | |
| Max Green Setting (Gmax), s | | 29.0 | | 26.0 | | | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | | 0.0 | | | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 24.4 | | | | | | | | | |
| HCM 6th LOS | | | C | | | | | | | | | |

HCM 6th Signalized Intersection Summary
 8: 15th Street & Main Street

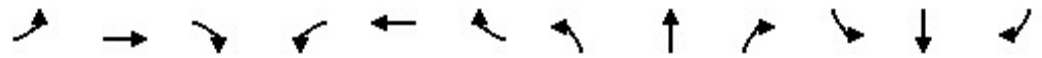
| |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
| Lane Configurations | | ↑↑↑ | | | | | | ↑↑ | ↑ | | | |
| Traffic Volume (veh/h) | 100 | 1080 | 0 | 0 | 0 | 0 | 0 | 350 | 135 | 0 | 0 | 0 |
| Future Volume (veh/h) | 100 | 1080 | 0 | 0 | 0 | 0 | 0 | 350 | 135 | 0 | 0 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | | | | 0 | 0 | 0 | | | |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | | | | 1.00 | | 1.00 | | | |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 0.90 | | | |
| Work Zone On Approach | | No | | | | | | No | | | | |
| Adj Sat Flow, veh/h/ln | 1772 | 1772 | 0 | | | | 0 | 1772 | 1772 | | | |
| Adj Flow Rate, veh/h | 109 | 1174 | 0 | | | | 0 | 380 | 147 | | | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | | | | 0.92 | 0.92 | 0.92 | | | |
| Percent Heavy Veh, % | 2 | 2 | 0 | | | | 0 | 2 | 2 | | | |
| Cap, veh/h | 210 | 1922 | 0 | | | | 0 | 1347 | 541 | | | |
| Arrive On Green | 0.45 | 0.45 | 0.00 | | | | 0.00 | 0.13 | 0.13 | | | |
| Sat Flow, veh/h | 319 | 4453 | 0 | | | | 0 | 3455 | 1351 | | | |
| Grp Volume(v), veh/h | 476 | 807 | 0 | | | | 0 | 380 | 147 | | | |
| Grp Sat Flow(s),veh/h/ln | 1692 | 1467 | 0 | | | | 0 | 1683 | 1351 | | | |
| Q Serve(g_s), s | 9.0 | 13.7 | 0.0 | | | | 0.0 | 6.6 | 6.4 | | | |
| Cycle Q Clear(g_c), s | 13.9 | 13.7 | 0.0 | | | | 0.0 | 6.6 | 6.4 | | | |
| Prop In Lane | 0.23 | | 0.00 | | | | 0.00 | | 1.00 | | | |
| Lane Grp Cap(c), veh/h | 823 | 1309 | 0 | | | | 0 | 1347 | 541 | | | |
| V/C Ratio(X) | 0.58 | 0.62 | 0.00 | | | | 0.00 | 0.28 | 0.27 | | | |
| Avail Cap(c_a), veh/h | 823 | 1309 | 0 | | | | 0 | 1347 | 541 | | | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | | | | 1.00 | 0.33 | 0.33 | | | |
| Upstream Filter(l) | 1.00 | 1.00 | 0.00 | | | | 0.00 | 1.00 | 1.00 | | | |
| Uniform Delay (d), s/veh | 13.7 | 13.8 | 0.0 | | | | 0.0 | 19.8 | 19.7 | | | |
| Incr Delay (d2), s/veh | 2.9 | 2.2 | 0.0 | | | | 0.0 | 0.5 | 1.2 | | | |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 | | | |
| %ile BackOfQ(50%),veh/ln | 5.3 | 4.4 | 0.0 | | | | 0.0 | 2.8 | 2.2 | | | |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 16.7 | 15.9 | 0.0 | | | | 0.0 | 20.3 | 20.9 | | | |
| LnGrp LOS | B | B | A | | | | A | C | C | | | |
| Approach Vol, veh/h | | 1283 | | | | | | 527 | | | | |
| Approach Delay, s/veh | | 16.2 | | | | | | 20.5 | | | | |
| Approach LOS | | B | | | | | | C | | | | |
| Timer - Assigned Phs | | 2 | | 4 | | | | | | | | |
| Phs Duration (G+Y+Rc), s | | 34.0 | | 31.0 | | | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | | | | | | | |
| Max Green Setting (Gmax), s | | 29.0 | | 26.0 | | | | | | | | |
| Max Q Clear Time (g_c+l1), s | | 0.0 | | 0.0 | | | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 17.5 | | | | | | | | | |
| HCM 6th LOS | | | B | | | | | | | | | |

HCM 6th Signalized Intersection Summary
 9: 27th Street & Main Street



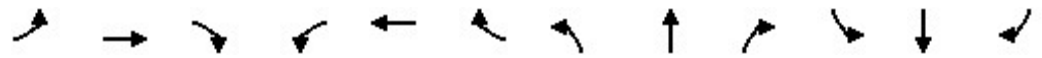
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | 4111 | | 1 | 1 | | | 1 | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 40 | 680 | 25 | 160 | 220 | 0 | 0 | 470 | 165 |
| Future Volume (veh/h) | 0 | 0 | 0 | 40 | 680 | 25 | 160 | 220 | 0 | 0 | 470 | 165 |
| Initial Q (Qb), veh | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | | | | 1.00 | | 0.99 | 1.00 | | 1.00 | 1.00 | | 1.00 |
| Parking Bus, Adj | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | | | No | | | No | | No | | | |
| Adj Sat Flow, veh/h/ln | | | | 1800 | 1772 | 1800 | 1772 | 1772 | 0 | 0 | 1772 | 1772 |
| Adj Flow Rate, veh/h | | | | 45 | 800 | 38 | 176 | 262 | 0 | 0 | 547 | 212 |
| Peak Hour Factor | | | | 0.88 | 0.85 | 0.65 | 0.91 | 0.84 | 0.90 | 0.90 | 0.86 | 0.78 |
| Percent Heavy Veh, % | | | | 0 | 2 | 0 | 2 | 2 | 0 | 0 | 2 | 2 |
| Cap, veh/h | | | | 85 | 1629 | 79 | 259 | 1063 | 0 | 0 | 532 | 206 |
| Arrive On Green | | | | 0.28 | 0.28 | 0.28 | 0.20 | 1.00 | 0.00 | 0.00 | 0.44 | 0.44 |
| Sat Flow, veh/h | | | | 311 | 5925 | 286 | 1688 | 1772 | 0 | 0 | 1215 | 471 |
| Grp Volume(v), veh/h | | | | 254 | 401 | 228 | 176 | 262 | 0 | 0 | 0 | 759 |
| Grp Sat Flow(s),veh/h/ln | | | | 1756 | 1524 | 1718 | 1688 | 1772 | 0 | 0 | 0 | 1686 |
| Q Serve(g_s), s | | | | 9.8 | 8.8 | 8.9 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 35.0 |
| Cycle Q Clear(g_c), s | | | | 9.8 | 8.8 | 8.9 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 35.0 |
| Prop In Lane | | | | 0.18 | | 0.17 | 1.00 | | 0.00 | 0.00 | | 0.28 |
| Lane Grp Cap(c), veh/h | | | | 483 | 838 | 472 | 259 | 1063 | 0 | 0 | 0 | 738 |
| V/C Ratio(X) | | | | 0.53 | 0.48 | 0.48 | 0.68 | 0.25 | 0.00 | 0.00 | 0.00 | 1.03 |
| Avail Cap(c_a), veh/h | | | | 483 | 838 | 472 | 259 | 1063 | 0 | 0 | 0 | 738 |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | 2.00 | 2.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | | | | 0.99 | 0.99 | 0.99 | 0.98 | 0.98 | 0.00 | 0.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | | | | 24.6 | 24.2 | 24.2 | 29.2 | 0.0 | 0.0 | 0.0 | 0.0 | 22.5 |
| Incr Delay (d2), s/veh | | | | 4.0 | 1.9 | 3.5 | 6.9 | 0.5 | 0.0 | 0.0 | 0.0 | 40.8 |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | | | | 4.4 | 3.2 | 3.9 | 3.2 | 0.2 | 0.0 | 0.0 | 0.0 | 21.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 28.6 | 26.1 | 27.7 | 36.1 | 0.5 | 0.0 | 0.0 | 0.0 | 63.3 |
| LnGrp LOS | | | | C | C | C | D | A | A | A | A | F |
| Approach Vol, veh/h | | | | | 883 | | | 438 | | | 759 | |
| Approach Delay, s/veh | | | | | 27.3 | | | 14.8 | | | 63.3 | |
| Approach LOS | | | | | C | | | B | | | E | |
| Timer - Assigned Phs | | 2 | 3 | 4 | | | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | | 27.0 | 13.0 | 40.0 | | | | 53.0 | | | | |
| Change Period (Y+Rc), s | | 5.0 | 5.0 | 5.0 | | | | 5.0 | | | | |
| Max Green Setting (Gmax), s | | 22.0 | 8.0 | 35.0 | | | | 48.0 | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | 0.0 | 0.0 | | | | 0.0 | | | | |
| Green Ext Time (p_c), s | | 0.0 | 0.0 | 0.0 | | | | 0.0 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | | | | | | | | 37.8 | |
| HCM 6th LOS | | | | | | | | | | | D | |

HCM Signalized Intersection Capacity Analysis
 10: Main Street & Whitewater Park Blvd.



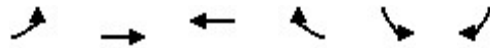
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|------------------------------------|------|------|-------|------|---------------------------|------|------|-------|------|------|------|-------|--|
| Lane Configurations | | | | | ↑↑↑ | ↑ | ↑ | ↑↑ | | | ↑↑ | ↑ | |
| Traffic Volume (vph) | 0 | 0 | 0 | 10 | 880 | 70 | 10 | 185 | 0 | 0 | 295 | 455 | |
| Future Volume (vph) | 0 | 0 | 0 | 10 | 880 | 70 | 10 | 185 | 0 | 0 | 295 | 455 | |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | |
| Lane Width | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 11 | 12 | 12 | 16 | 12 | |
| Total Lost time (s) | | | | | 6.0 | 6.0 | 6.0 | 6.0 | | | 6.0 | 6.0 | |
| Lane Util. Factor | | | | | 0.91 | 1.00 | 1.00 | 0.95 | | | 0.95 | 1.00 | |
| Fr _t | | | | | 1.00 | 0.85 | 1.00 | 1.00 | | | 1.00 | 0.85 | |
| Fl _t Protected | | | | | 1.00 | 1.00 | 0.95 | 1.00 | | | 1.00 | 1.00 | |
| Satd. Flow (prot) | | | | | 4813 | 1500 | 1676 | 3241 | | | 3610 | 1500 | |
| Fl _t Permitted | | | | | 1.00 | 1.00 | 0.95 | 1.00 | | | 1.00 | 1.00 | |
| Satd. Flow (perm) | | | | | 4813 | 1500 | 1676 | 3241 | | | 3610 | 1500 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.50 | 0.91 | 0.77 | 0.75 | 0.71 | 0.92 | 0.92 | 0.90 | 0.75 | |
| Adj. Flow (vph) | 0 | 0 | 0 | 20 | 967 | 91 | 13 | 261 | 0 | 0 | 328 | 607 | |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 59 | 0 | 0 | 0 | 0 | 0 | 103 | |
| Lane Group Flow (vph) | 0 | 0 | 0 | 0 | 987 | 32 | 13 | 261 | 0 | 0 | 328 | 504 | |
| Parking (#/hr) | | | | | | | | | | | 0 | | |
| Turn Type | | | | Perm | NA | Perm | Prot | NA | | | NA | Perm | |
| Protected Phases | | | | | 2 | | 3 | 8 | | | 4 | | |
| Permitted Phases | | | | 2 | | 2 | | | | | | 4 | |
| Actuated Green, G (s) | | | | | 28.2 | 28.2 | 1.2 | 39.8 | | | 32.6 | 32.6 | |
| Effective Green, g (s) | | | | | 28.2 | 28.2 | 1.2 | 39.8 | | | 32.6 | 32.6 | |
| Actuated g/C Ratio | | | | | 0.35 | 0.35 | 0.01 | 0.50 | | | 0.41 | 0.41 | |
| Clearance Time (s) | | | | | 6.0 | 6.0 | 6.0 | 6.0 | | | 6.0 | 6.0 | |
| Vehicle Extension (s) | | | | | 2.0 | 2.0 | 2.0 | 2.0 | | | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | | | | | 1696 | 528 | 25 | 1612 | | | 1471 | 611 | |
| v/s Ratio Prot | | | | | | | 0.01 | c0.08 | | | 0.09 | | |
| v/s Ratio Perm | | | | | 0.21 | 0.02 | | | | | | c0.34 | |
| v/c Ratio | | | | | 0.58 | 0.06 | 0.52 | 0.16 | | | 0.22 | 0.82 | |
| Uniform Delay, d ₁ | | | | | 21.1 | 17.1 | 39.1 | 11.0 | | | 15.4 | 21.2 | |
| Progression Factor | | | | | 0.58 | 0.04 | 1.19 | 0.99 | | | 1.00 | 1.00 | |
| Incremental Delay, d ₂ | | | | | 1.0 | 0.1 | 8.0 | 0.0 | | | 0.0 | 8.5 | |
| Delay (s) | | | | | 13.2 | 0.9 | 54.6 | 10.9 | | | 15.5 | 29.6 | |
| Level of Service | | | | | B | A | D | B | | | B | C | |
| Approach Delay (s) | | 0.0 | | | 12.2 | | | 13.0 | | | 24.7 | | |
| Approach LOS | | A | | | B | | | B | | | C | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 17.4 | | HCM 2000 Level of Service | | | | | | B | | |
| HCM 2000 Volume to Capacity ratio | | | 0.71 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 80.0 | | Sum of lost time (s) | | | | | 18.0 | | | |
| Intersection Capacity Utilization | | | 64.1% | | ICU Level of Service | | | | | C | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| Description: Count Date: 11/9/2016 | | | | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

HCM 6th Signalized Intersection Summary
 11: 27th Street & Fairview



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|-----|------|------|------|------|------|------|------|
| Lane Configurations | ↖ | ↑↑↑ | | | | | | ↑↑ | ↖ | ↖ | ↑ | |
| Traffic Volume (veh/h) | 145 | 1330 | 390 | 0 | 0 | 0 | 0 | 205 | 45 | 80 | 345 | 0 |
| Future Volume (veh/h) | 145 | 1330 | 390 | 0 | 0 | 0 | 0 | 205 | 45 | 80 | 345 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | | | | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | | | | 1.00 | | 0.99 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1843 | 1843 | 1772 | | | | 0 | 1772 | 1772 | 1772 | 1772 | 0 |
| Adj Flow Rate, veh/h | 171 | 1622 | 557 | | | | 0 | 244 | 53 | 89 | 383 | 0 |
| Peak Hour Factor | 0.85 | 0.82 | 0.70 | | | | 0.83 | 0.84 | 0.85 | 0.90 | 0.90 | 0.83 |
| Percent Heavy Veh, % | 2 | 2 | 2 | | | | 0 | 2 | 2 | 2 | 2 | 0 |
| Cap, veh/h | 768 | 1628 | 544 | | | | 0 | 968 | 429 | 488 | 775 | 0 |
| Arrive On Green | 0.14 | 0.14 | 0.14 | | | | 0.00 | 0.29 | 0.29 | 0.17 | 0.88 | 0.00 |
| Sat Flow, veh/h | 1755 | 3722 | 1243 | | | | 0 | 3455 | 1494 | 1688 | 1772 | 0 |
| Grp Volume(v), veh/h | 171 | 1457 | 722 | | | | 0 | 244 | 53 | 89 | 383 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1755 | 1677 | 1611 | | | | 0 | 1683 | 1494 | 1688 | 1772 | 0 |
| Q Serve(g_s), s | 6.9 | 34.7 | 35.0 | | | | 0.0 | 4.5 | 2.1 | 0.0 | 3.8 | 0.0 |
| Cycle Q Clear(g_c), s | 6.9 | 34.7 | 35.0 | | | | 0.0 | 4.5 | 2.1 | 0.0 | 3.8 | 0.0 |
| Prop In Lane | 1.00 | | 0.77 | | | | 0.00 | | 1.00 | 1.00 | | 0.00 |
| Lane Grp Cap(c), veh/h | 768 | 1467 | 705 | | | | 0 | 968 | 429 | 488 | 775 | 0 |
| V/C Ratio(X) | 0.22 | 0.99 | 1.02 | | | | 0.00 | 0.25 | 0.12 | 0.18 | 0.49 | 0.00 |
| Avail Cap(c_a), veh/h | 768 | 1467 | 705 | | | | 0 | 968 | 429 | 488 | 775 | 0 |
| HCM Platoon Ratio | 0.33 | 0.33 | 0.33 | | | | 1.00 | 1.00 | 1.00 | 2.00 | 2.00 | 1.00 |
| Upstream Filter(l) | 0.88 | 0.88 | 0.88 | | | | 0.00 | 1.00 | 1.00 | 0.09 | 0.09 | 0.00 |
| Uniform Delay (d), s/veh | 22.2 | 34.1 | 34.2 | | | | 0.0 | 21.9 | 21.1 | 18.1 | 3.1 | 0.0 |
| Incr Delay (d2), s/veh | 0.6 | 20.4 | 38.1 | | | | 0.0 | 0.6 | 0.6 | 0.0 | 0.2 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 3.0 | 19.5 | 22.3 | | | | 0.0 | 1.8 | 0.8 | 1.1 | 0.9 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 22.8 | 54.5 | 72.3 | | | | 0.0 | 22.5 | 21.6 | 18.1 | 3.3 | 0.0 |
| LnGrp LOS | C | D | F | | | | A | C | C | B | A | A |
| Approach Vol, veh/h | | 2350 | | | | | | 297 | | | 472 | |
| Approach Delay, s/veh | | 57.7 | | | | | | 22.4 | | | 6.1 | |
| Approach LOS | | E | | | | | | C | | | A | |
| Timer - Assigned Phs | | | | 4 | | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | | | | 40.0 | | 40.0 | 12.0 | 28.0 | | | | |
| Change Period (Y+Rc), s | | | | 5.0 | | 5.0 | 5.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | | | | 35.0 | | 35.0 | 7.0 | 23.0 | | | | |
| Max Q Clear Time (g_c+I1), s | | | | 0.0 | | 0.0 | 0.0 | 0.0 | | | | |
| Green Ext Time (p_c), s | | | | 0.0 | | 0.0 | 0.0 | 0.0 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 46.5 | | | | | | | | | |
| HCM 6th LOS | | | D | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 12: Fairview Avenue & Whitewater Park Blvd.



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|------|------|------|------|------|------|
| Lane Configurations | | 4111 | | | 11 | |
| Traffic Volume (vph) | 205 | 1405 | 0 | 0 | 305 | 0 |
| Future Volume (vph) | 205 | 1405 | 0 | 0 | 305 | 0 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Total Lost time (s) | | 5.5 | | | 6.0 | |
| Lane Util. Factor | | 0.86 | | | 0.97 | |
| Frt | | 1.00 | | | 1.00 | |
| Flt Protected | | 0.99 | | | 0.95 | |
| Satd. Flow (prot) | | 6027 | | | 3252 | |
| Flt Permitted | | 0.99 | | | 0.95 | |
| Satd. Flow (perm) | | 6027 | | | 3252 | |
| Peak-hour factor, PHF | 0.77 | 0.89 | 0.92 | 0.92 | 0.90 | 0.92 |
| Adj. Flow (vph) | 266 | 1579 | 0 | 0 | 339 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 1845 | 0 | 0 | 339 | 0 |
| Turn Type | Perm | NA | | | Prot | |
| Protected Phases | | 6 | | | 4 | |
| Permitted Phases | 6 | | | | | |
| Actuated Green, G (s) | | 55.8 | | | 12.7 | |
| Effective Green, g (s) | | 55.8 | | | 12.7 | |
| Actuated g/C Ratio | | 0.70 | | | 0.16 | |
| Clearance Time (s) | | 5.5 | | | 6.0 | |
| Vehicle Extension (s) | | 2.0 | | | 2.0 | |
| Lane Grp Cap (vph) | | 4203 | | | 516 | |
| v/s Ratio Prot | | | | | 0.10 | |
| v/s Ratio Perm | | 0.31 | | | | |
| v/c Ratio | | 0.44 | | | 0.66 | |
| Uniform Delay, d1 | | 5.3 | | | 31.6 | |
| Progression Factor | | 1.00 | | | 1.12 | |
| Incremental Delay, d2 | | 0.3 | | | 2.3 | |
| Delay (s) | | 5.6 | | | 37.8 | |
| Level of Service | | A | | | D | |
| Approach Delay (s) | | 5.6 | 0.0 | | 37.8 | |
| Approach LOS | | A | A | | D | |

| Intersection Summary | | | |
|------------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 10.6 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.48 | | |
| Actuated Cycle Length (s) | 80.0 | Sum of lost time (s) | 11.5 |
| Intersection Capacity Utilization | 92.8% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |
| Description: Count Date: 11/9/2016 | | | |
| c Critical Lane Group | | | |

HCM 6th Signalized Intersection Summary
 1: 9th Street & State Street



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|------|------|------|------|------|------|-----|-----|-----|------|------|------|
| Lane Configurations | | ↑↑ | | | ↑↑ | | | | | | ↑↑ | |
| Traffic Volume (veh/h) | 0 | 570 | 150 | 35 | 440 | 0 | 0 | 0 | 0 | 20 | 445 | 110 |
| Future Volume (veh/h) | 0 | 570 | 150 | 35 | 440 | 0 | 0 | 0 | 0 | 20 | 445 | 110 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | | | | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.95 | 0.98 | | 1.00 | | | | 1.00 | | 0.93 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | | | | No | |
| Adj Sat Flow, veh/h/ln | 0 | 1595 | 1595 | 1595 | 1595 | 0 | | | | 1620 | 1659 | 1620 |
| Adj Flow Rate, veh/h | 0 | 600 | 165 | 44 | 518 | 0 | | | | 25 | 506 | 133 |
| Peak Hour Factor | 0.92 | 0.95 | 0.91 | 0.80 | 0.85 | 0.91 | | | | 0.79 | 0.88 | 0.83 |
| Percent Heavy Veh, % | 0 | 2 | 2 | 2 | 2 | 0 | | | | 0 | 2 | 0 |
| Cap, veh/h | 0 | 1177 | 323 | 133 | 1333 | 0 | | | | 38 | 801 | 223 |
| Arrive On Green | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | | | | 0.11 | 0.11 | 0.11 |
| Sat Flow, veh/h | 0 | 2398 | 636 | 136 | 2697 | 0 | | | | 114 | 2367 | 658 |
| Grp Volume(v), veh/h | 0 | 391 | 374 | 286 | 276 | 0 | | | | 364 | 0 | 300 |
| Grp Sat Flow(s),veh/h/ln | 0 | 1515 | 1439 | 1382 | 1379 | 0 | | | | 1653 | 0 | 1485 |
| Q Serve(g_s), s | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | 13.7 | 0.0 | 12.5 |
| Cycle Q Clear(g_c), s | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | 13.7 | 0.0 | 12.5 |
| Prop In Lane | 0.00 | | 0.44 | 0.15 | | 0.00 | | | | 0.07 | | 0.44 |
| Lane Grp Cap(c), veh/h | 0 | 769 | 731 | 765 | 700 | 0 | | | | 559 | 0 | 503 |
| V/C Ratio(X) | 0.00 | 0.51 | 0.51 | 0.37 | 0.39 | 0.00 | | | | 0.65 | 0.00 | 0.60 |
| Avail Cap(c_a), veh/h | 0 | 769 | 731 | 765 | 700 | 0 | | | | 559 | 0 | 503 |
| HCM Platoon Ratio | 1.00 | 2.00 | 2.00 | 2.00 | 2.00 | 1.00 | | | | 0.33 | 0.33 | 0.33 |
| Upstream Filter(l) | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | | | | 1.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | 25.2 | 0.0 | 24.7 |
| Incr Delay (d2), s/veh | 0.0 | 2.4 | 2.5 | 1.4 | 1.7 | 0.0 | | | | 5.8 | 0.0 | 5.2 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.0 | 0.5 | 0.5 | 0.3 | 0.3 | 0.0 | | | | 6.8 | 0.0 | 5.6 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 0.0 | 2.4 | 2.5 | 1.4 | 1.7 | 0.0 | | | | 30.9 | 0.0 | 29.8 |
| LnGrp LOS | A | A | A | A | A | A | | | | C | A | C |
| Approach Vol, veh/h | | 765 | | | 562 | | | | | | | 664 |
| Approach Delay, s/veh | | 2.5 | | | 1.5 | | | | | | | 30.4 |
| Approach LOS | | A | | | A | | | | | | | C |
| Timer - Assigned Phs | | 2 | | 4 | | 6 | | | | | | |
| Phs Duration (G+Y+Rc), s | | 38.0 | | 27.0 | | 38.0 | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | 5.0 | | | | | | |
| Max Green Setting (Gmax), s | | 33.0 | | 22.0 | | 33.0 | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | | 0.0 | | 0.0 | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | 0.0 | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 11.5 | | | | | | | | |
| HCM 6th LOS | | | | B | | | | | | | | |

HCM 6th Signalized Intersection Summary
 2: 15th Street & State Street

ACHD Countywide Model
 03/11/2021



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|------|------|------|------|------|------|------|------|------|-----|-----|-----|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 75 | 705 | 0 | 0 | 640 | 35 | 205 | 380 | 45 | 0 | 0 | 0 |
| Future Volume (veh/h) | 75 | 705 | 0 | 0 | 640 | 35 | 205 | 380 | 45 | 0 | 0 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 0.99 | 1.00 | | 0.99 | | | |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Work Zone On Approach | | No | | | No | | | No | | | | |
| Adj Sat Flow, veh/h/ln | 1772 | 1843 | 0 | 0 | 1772 | 1772 | 1772 | 1772 | 1772 | | | |
| Adj Flow Rate, veh/h | 94 | 742 | 0 | 0 | 696 | 44 | 214 | 396 | 60 | | | |
| Peak Hour Factor | 0.80 | 0.95 | 0.98 | 0.98 | 0.92 | 0.80 | 0.96 | 0.96 | 0.75 | | | |
| Percent Heavy Veh, % | 2 | 2 | 0 | 0 | 2 | 2 | 2 | 2 | 2 | | | |
| Cap, veh/h | 467 | 2142 | 0 | 0 | 1399 | 88 | 457 | 792 | 119 | | | |
| Arrive On Green | 0.24 | 1.00 | 0.00 | 0.00 | 0.44 | 0.44 | 0.09 | 0.09 | 0.09 | | | |
| Sat Flow, veh/h | 1688 | 3593 | 0 | 0 | 3303 | 203 | 1688 | 2928 | 440 | | | |
| Grp Volume(v), veh/h | 94 | 742 | 0 | 0 | 364 | 376 | 214 | 226 | 230 | | | |
| Grp Sat Flow(s),veh/h/ln | 1688 | 1751 | 0 | 0 | 1683 | 1734 | 1688 | 1683 | 1685 | | | |
| Q Serve(g_s), s | 0.0 | 0.0 | 0.0 | 0.0 | 13.3 | 13.3 | 10.2 | 10.9 | 11.0 | | | |
| Cycle Q Clear(g_c), s | 0.0 | 0.0 | 0.0 | 0.0 | 13.3 | 13.3 | 10.2 | 10.9 | 11.0 | | | |
| Prop In Lane | 1.00 | | 0.00 | 0.00 | | 0.12 | 1.00 | | 0.26 | | | |
| Lane Grp Cap(c), veh/h | 467 | 2142 | 0 | 0 | 733 | 755 | 457 | 455 | 456 | | | |
| V/C Ratio(X) | 0.20 | 0.35 | 0.00 | 0.00 | 0.50 | 0.50 | 0.47 | 0.50 | 0.50 | | | |
| Avail Cap(c_a), veh/h | 467 | 2142 | 0 | 0 | 733 | 755 | 457 | 455 | 456 | | | |
| HCM Platoon Ratio | 2.00 | 2.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.33 | 0.33 | 0.33 | | | |
| Upstream Filter(l) | 0.63 | 0.63 | 0.00 | 0.00 | 0.86 | 0.86 | 0.91 | 0.91 | 0.91 | | | |
| Uniform Delay (d), s/veh | 16.3 | 0.0 | 0.0 | 0.0 | 17.3 | 17.3 | 32.9 | 33.2 | 33.3 | | | |
| Incr Delay (d2), s/veh | 0.0 | 0.3 | 0.0 | 0.0 | 2.1 | 2.0 | 3.1 | 3.5 | 3.6 | | | |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| %ile BackOfQ(50%),veh/ln | 1.1 | 0.1 | 0.0 | 0.0 | 5.4 | 5.5 | 5.0 | 5.3 | 5.4 | | | |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 16.4 | 0.3 | 0.0 | 0.0 | 19.4 | 19.3 | 36.0 | 36.7 | 36.9 | | | |
| LnGrp LOS | B | A | A | A | B | B | D | D | D | | | |
| Approach Vol, veh/h | | 836 | | | 740 | | | 670 | | | | |
| Approach Delay, s/veh | | 2.1 | | | 19.3 | | | 36.5 | | | | |
| Approach LOS | | A | | | B | | | D | | | | |
| Timer - Assigned Phs | 1 | 2 | | | | 6 | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 15.0 | 42.0 | | | | 57.0 | | 28.0 | | | | |
| Change Period (Y+Rc), s | 5.0 | 5.0 | | | | 5.0 | | 5.0 | | | | |
| Max Green Setting (Gmax), s | 10.0 | 37.0 | | | | 52.0 | | 23.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 2.0 | 0.0 | | | | 0.0 | | 0.0 | | | | |
| Green Ext Time (p_c), s | 0.0 | 0.0 | | | | 0.0 | | 0.0 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 18.0 | | | | | | | | |
| HCM 6th LOS | | | | B | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 3: 27th Street/26th Street & State Street

| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------|-------|-------|------|-------|------|------|-------|------|------|-------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 15 | 742 | 144 | 32 | 778 | 18 | 117 | 51 | 28 | 21 | 47 | 19 |
| Future Volume (vph) | 15 | 742 | 144 | 32 | 778 | 18 | 117 | 51 | 28 | 21 | 47 | 19 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Lane Width | 10 | 12 | 14 | 10 | 12 | 12 | 10 | 13 | 12 | 12 | 10 | 12 |
| Total Lost time (s) | 6.0 | 5.0 | 5.0 | 6.0 | 5.0 | | 6.0 | 6.0 | | 6.0 | 6.0 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.91 | | 0.95 | 0.95 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.96 | | 1.00 | 0.96 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 0.99 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1565 | 3353 | 1600 | 1565 | 4801 | | 1486 | 1642 | | 1676 | 1574 | |
| Flt Permitted | 0.32 | 1.00 | 1.00 | 0.31 | 1.00 | | 0.95 | 0.99 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 523 | 3353 | 1600 | 516 | 4801 | | 1486 | 1642 | | 1676 | 1574 | |
| Peak-hour factor, PHF | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Adj. Flow (vph) | 15 | 765 | 148 | 33 | 802 | 19 | 121 | 53 | 29 | 22 | 48 | 20 |
| RTOR Reduction (vph) | 0 | 0 | 56 | 0 | 1 | 0 | 0 | 13 | 0 | 0 | 12 | 0 |
| Lane Group Flow (vph) | 15 | 765 | 92 | 33 | 820 | 0 | 102 | 88 | 0 | 22 | 56 | 0 |
| Turn Type | pm+pt | NA | Perm | pm+pt | NA | | Split | NA | | Split | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | 8 | 8 | | 7 | 7 | |
| Permitted Phases | 6 | | 6 | 2 | | | | | | | | |
| Actuated Green, G (s) | 83.6 | 80.4 | 80.4 | 86.8 | 82.0 | | 13.5 | 13.5 | | 8.3 | 8.3 | |
| Effective Green, g (s) | 83.6 | 80.4 | 80.4 | 86.8 | 82.0 | | 13.5 | 13.5 | | 8.3 | 8.3 | |
| Actuated g/C Ratio | 0.64 | 0.62 | 0.62 | 0.67 | 0.63 | | 0.10 | 0.10 | | 0.06 | 0.06 | |
| Clearance Time (s) | 6.0 | 5.0 | 5.0 | 6.0 | 5.0 | | 6.0 | 6.0 | | 6.0 | 6.0 | |
| Vehicle Extension (s) | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | | 2.0 | 2.0 | | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | 361 | 2073 | 989 | 383 | 3028 | | 154 | 170 | | 107 | 100 | |
| v/s Ratio Prot | 0.00 | c0.23 | | c0.00 | 0.17 | | c0.07 | 0.05 | | 0.01 | c0.04 | |
| v/s Ratio Perm | 0.03 | | 0.06 | 0.05 | | | | | | | | |
| v/c Ratio | 0.04 | 0.37 | 0.09 | 0.09 | 0.27 | | 0.66 | 0.52 | | 0.21 | 0.56 | |
| Uniform Delay, d1 | 8.4 | 12.3 | 10.0 | 7.8 | 10.7 | | 56.1 | 55.2 | | 57.7 | 59.1 | |
| Progression Factor | 1.13 | 1.66 | 4.62 | 0.95 | 0.95 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 0.0 | 0.5 | 0.2 | 0.0 | 0.2 | | 8.0 | 1.1 | | 0.3 | 3.8 | |
| Delay (s) | 9.5 | 20.8 | 46.5 | 7.5 | 10.4 | | 64.1 | 56.2 | | 58.1 | 62.9 | |
| Level of Service | A | C | D | A | B | | E | E | | E | E | |
| Approach Delay (s) | | 24.7 | | | 10.3 | | | 60.2 | | | 61.7 | |
| Approach LOS | | C | | | B | | | E | | | E | |

| Intersection Summary | | |
|-----------------------------------|-------|-----------------------------|
| HCM 2000 Control Delay | 23.9 | HCM 2000 Level of Service C |
| HCM 2000 Volume to Capacity ratio | 0.41 | |
| Actuated Cycle Length (s) | 130.0 | Sum of lost time (s) 23.0 |
| Intersection Capacity Utilization | 49.6% | ICU Level of Service A |
| Analysis Period (min) | 15 | |

Description: Count Date: 1/22/2015

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 4: Whitewater Park Blvd./31st Street & State Street

ACHD Countywide Model
 03/11/2021



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------|-------|-------|------|-------|-------|------|-------|------|------|-------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 7 | 887 | 88 | 41 | 889 | 10 | 86 | 16 | 31 | 11 | 25 | 4 |
| Future Volume (vph) | 7 | 887 | 88 | 41 | 889 | 10 | 86 | 16 | 31 | 11 | 25 | 4 |
| Ideal Flow (vphpl) | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 |
| Lane Width | 10 | 13 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 11 | 12 | 12 |
| Total Lost time (s) | 6.0 | 5.5 | 5.5 | 6.0 | 5.5 | | 6.0 | 5.5 | | 6.0 | 6.0 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | | 0.97 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.90 | | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1608 | 3561 | 1542 | 1723 | 3440 | | 3343 | 1632 | | 1666 | 1777 | |
| Flt Permitted | 0.31 | 1.00 | 1.00 | 0.25 | 1.00 | | 0.95 | 1.00 | | 0.73 | 1.00 | |
| Satd. Flow (perm) | 522 | 3561 | 1542 | 452 | 3440 | | 3343 | 1632 | | 1272 | 1777 | |
| Peak-hour factor, PHF | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Adj. Flow (vph) | 7 | 914 | 91 | 42 | 916 | 10 | 89 | 16 | 32 | 11 | 26 | 4 |
| RTOR Reduction (vph) | 0 | 0 | 31 | 0 | 0 | 0 | 0 | 28 | 0 | 0 | 4 | 0 |
| Lane Group Flow (vph) | 7 | 914 | 60 | 42 | 926 | 0 | 89 | 20 | 0 | 11 | 26 | 0 |
| Turn Type | pm+pt | NA | Perm | pm+pt | NA | | Prot | NA | | pm+pt | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | 6 | | 6 | 2 | | | | | | 4 | 4 | |
| Actuated Green, G (s) | 85.4 | 85.4 | 85.4 | 88.1 | 88.1 | | 9.2 | 14.5 | | 9.6 | 7.2 | |
| Effective Green, g (s) | 85.4 | 85.4 | 85.4 | 88.1 | 88.1 | | 9.2 | 14.5 | | 9.6 | 7.2 | |
| Actuated g/C Ratio | 0.66 | 0.66 | 0.66 | 0.68 | 0.68 | | 0.07 | 0.11 | | 0.07 | 0.06 | |
| Clearance Time (s) | 6.0 | 5.5 | 5.5 | 6.0 | 5.5 | | 6.0 | 5.5 | | 6.0 | 6.0 | |
| Vehicle Extension (s) | 3.0 | 2.0 | 2.0 | 2.0 | 2.0 | | 2.0 | 2.0 | | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | 359 | 2339 | 1012 | 352 | 2331 | | 236 | 182 | | 101 | 98 | |
| v/s Ratio Prot | 0.00 | c0.26 | | 0.00 | c0.27 | | c0.03 | 0.01 | | 0.00 | c0.01 | |
| v/s Ratio Perm | 0.01 | | 0.04 | 0.08 | | | | | | 0.01 | | |
| v/c Ratio | 0.02 | 0.39 | 0.06 | 0.12 | 0.40 | | 0.38 | 0.11 | | 0.11 | 0.27 | |
| Uniform Delay, d1 | 7.8 | 10.3 | 8.0 | 8.1 | 9.2 | | 57.7 | 51.9 | | 56.1 | 58.9 | |
| Progression Factor | 0.74 | 0.66 | 0.28 | 0.70 | 0.74 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 0.0 | 0.5 | 0.1 | 0.1 | 0.5 | | 0.4 | 0.1 | | 0.2 | 0.5 | |
| Delay (s) | 5.7 | 7.3 | 2.4 | 5.8 | 7.3 | | 58.0 | 52.0 | | 56.3 | 59.4 | |
| Level of Service | A | A | A | A | A | | E | D | | E | E | |
| Approach Delay (s) | | 6.8 | | | 7.3 | | | 55.9 | | | 58.6 | |
| Approach LOS | | A | | | A | | | E | | | E | |

| Intersection Summary | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 11.1 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.40 | | |
| Actuated Cycle Length (s) | 130.0 | Sum of lost time (s) | 23.5 |
| Intersection Capacity Utilization | 53.1% | ICU Level of Service | A |
| Analysis Period (min) | 15 | | |

Description: Count Date: 1/21/2014

c Critical Lane Group

HCM 6th Signalized Intersection Summary
5: 9th Street & Idaho Street



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|-----|------|-----|------|------|------|-----|-----|-----|------|------|------|
| Lane Configurations | | | | | ↑↑↑ | | | | | | ↑↑↑ | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 210 | 495 | 0 | 0 | 0 | 0 | 0 | 675 | 60 |
| Future Volume (veh/h) | 0 | 0 | 0 | 210 | 495 | 0 | 0 | 0 | 0 | 0 | 675 | 60 |
| Initial Q (Qb), veh | | | | 0 | 0 | 0 | | | | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | | | | 1.00 | | 1.00 | | | | 1.00 | | 0.83 |
| Parking Bus, Adj | | | | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | | | No | | | | | | No | | |
| Adj Sat Flow, veh/h/ln | | | | 1595 | 1595 | 0 | | | | 0 | 1595 | 1595 |
| Adj Flow Rate, veh/h | | | | 250 | 544 | 0 | | | | 0 | 734 | 79 |
| Peak Hour Factor | | | | 0.84 | 0.91 | 0.93 | | | | 0.93 | 0.92 | 0.76 |
| Percent Heavy Veh, % | | | | 2 | 2 | 0 | | | | 0 | 2 | 2 |
| Cap, veh/h | | | | 545 | 1140 | 0 | | | | 0 | 1744 | 185 |
| Arrive On Green | | | | 0.13 | 0.13 | 0.00 | | | | 0.00 | 0.15 | 0.15 |
| Sat Flow, veh/h | | | | 1108 | 2982 | 0 | | | | 0 | 4053 | 414 |
| Grp Volume(v), veh/h | | | | 297 | 497 | 0 | | | | 0 | 542 | 271 |
| Grp Sat Flow(s),veh/h/ln | | | | 1318 | 1321 | 0 | | | | 0 | 1451 | 1421 |
| Q Serve(g_s), s | | | | 13.8 | 11.3 | 0.0 | | | | 0.0 | 11.0 | 11.3 |
| Cycle Q Clear(g_c), s | | | | 13.8 | 11.3 | 0.0 | | | | 0.0 | 11.0 | 11.3 |
| Prop In Lane | | | | 0.84 | | 0.00 | | | | 0.00 | | 0.29 |
| Lane Grp Cap(c), veh/h | | | | 629 | 1056 | 0 | | | | 0 | 1295 | 634 |
| V/C Ratio(X) | | | | 0.47 | 0.47 | 0.00 | | | | 0.00 | 0.42 | 0.43 |
| Avail Cap(c_a), veh/h | | | | 629 | 1056 | 0 | | | | 0 | 1295 | 634 |
| HCM Platoon Ratio | | | | 0.33 | 0.33 | 1.00 | | | | 1.00 | 0.33 | 0.33 |
| Upstream Filter(I) | | | | 1.00 | 1.00 | 0.00 | | | | 0.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | | | | 22.9 | 21.8 | 0.0 | | | | 0.0 | 20.1 | 20.2 |
| Incr Delay (d2), s/veh | | | | 2.5 | 1.5 | 0.0 | | | | 0.0 | 1.0 | 2.1 |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | | | | 5.2 | 4.1 | 0.0 | | | | 0.0 | 4.4 | 4.6 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 25.4 | 23.3 | 0.0 | | | | 0.0 | 21.0 | 22.3 |
| LnGrp LOS | | | | C | C | A | | | | A | C | C |
| Approach Vol, veh/h | | | | | 794 | | | | | | 813 | |
| Approach Delay, s/veh | | | | | 24.1 | | | | | | 21.5 | |
| Approach LOS | | | | | C | | | | | | C | |
| Timer - Assigned Phs | | 2 | | 4 | | | | | | | | |
| Phs Duration (G+Y+Rc), s | | 31.0 | | 34.0 | | | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | | | | | | | |
| Max Green Setting (Gmax), s | | 26.0 | | 29.0 | | | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | | 0.0 | | | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 22.8 | | | | | | | | |
| HCM 6th LOS | | | | C | | | | | | | | |

HCM 6th Signalized Intersection Summary
6: 15th Street & Idaho Street



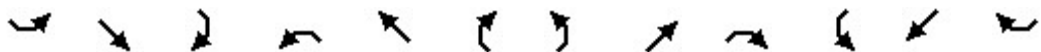
| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|-----|------|-----|------|------|------|------|------|------|-----|-----|-----|
| Lane Configurations | | | | | ↑↑↑ | | | ↑↑ | | | | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 0 | 425 | 100 | 50 | 450 | 0 | 0 | 0 | 0 |
| Future Volume (veh/h) | 0 | 0 | 0 | 0 | 425 | 100 | 50 | 450 | 0 | 0 | 0 | 0 |
| Initial Q (Qb), veh | | | | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| Ped-Bike Adj(A_pbT) | | | | 1.00 | | 1.00 | 1.00 | | 1.00 | | | |
| Parking Bus, Adj | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Work Zone On Approach | | | | No | | | | No | | | | |
| Adj Sat Flow, veh/h/ln | | | | 0 | 1595 | 1595 | 1595 | 1659 | 0 | | | |
| Adj Flow Rate, veh/h | | | | 0 | 462 | 109 | 54 | 489 | 0 | | | |
| Peak Hour Factor | | | | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | | | |
| Percent Heavy Veh, % | | | | 0 | 2 | 2 | 2 | 2 | 0 | | | |
| Cap, veh/h | | | | 0 | 1525 | 350 | 127 | 1210 | 0 | | | |
| Arrive On Green | | | | 0.00 | 0.14 | 0.14 | 0.14 | 0.14 | 0.00 | | | |
| Sat Flow, veh/h | | | | 0 | 3683 | 812 | 306 | 2996 | 0 | | | |
| Grp Volume(v), veh/h | | | | 0 | 376 | 195 | 290 | 253 | 0 | | | |
| Grp Sat Flow(s),veh/h/ln | | | | 0 | 1451 | 1449 | 1643 | 1576 | 0 | | | |
| Q Serve(g_s), s | | | | 0.0 | 7.6 | 7.8 | 10.5 | 9.5 | 0.0 | | | |
| Cycle Q Clear(g_c), s | | | | 0.0 | 7.6 | 7.8 | 10.5 | 9.5 | 0.0 | | | |
| Prop In Lane | | | | 0.00 | | 0.56 | 0.19 | | 0.00 | | | |
| Lane Grp Cap(c), veh/h | | | | 0 | 1250 | 624 | 683 | 654 | 0 | | | |
| V/C Ratio(X) | | | | 0.00 | 0.30 | 0.31 | 0.43 | 0.39 | 0.00 | | | |
| Avail Cap(c_a), veh/h | | | | 0 | 1250 | 624 | 683 | 654 | 0 | | | |
| HCM Platoon Ratio | | | | 1.00 | 0.33 | 0.33 | 0.33 | 0.33 | 1.00 | | | |
| Upstream Filter(l) | | | | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | | | |
| Uniform Delay (d), s/veh | | | | 0.0 | 19.1 | 19.2 | 20.9 | 20.5 | 0.0 | | | |
| Incr Delay (d2), s/veh | | | | 0.0 | 0.6 | 1.3 | 1.9 | 1.7 | 0.0 | | | |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| %ile BackOfQ(50%),veh/ln | | | | 0.0 | 2.7 | 2.9 | 4.9 | 4.2 | 0.0 | | | |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 0.0 | 19.7 | 20.5 | 22.9 | 22.2 | 0.0 | | | |
| LnGrp LOS | | | | A | B | C | C | C | A | | | |
| Approach Vol, veh/h | | | | | 571 | | | 543 | | | | |
| Approach Delay, s/veh | | | | | 20.0 | | | 22.6 | | | | |
| Approach LOS | | | | | C | | | C | | | | |
| Timer - Assigned Phs | | 2 | | 4 | | | | | | | | |
| Phs Duration (G+Y+Rc), s | | 33.0 | | 32.0 | | | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | | | | | | | |
| Max Green Setting (Gmax), s | | 28.0 | | 27.0 | | | | | | | | |
| Max Q Clear Time (g_c+l1), s | | 0.0 | | 0.0 | | | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 21.3 | | | | | | | | |
| HCM 6th LOS | | | | C | | | | | | | | |

HCM 6th Signalized Intersection Summary
 7: 9th Street & Main Street



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|------|------|------|------|-----|-----|-----|-----|-----|------|------|------|
| Lane Configurations | | ↑↑↑ | | | | | | | | | ↑↑↑ | |
| Traffic Volume (veh/h) | 0 | 525 | 250 | 0 | 0 | 0 | 0 | 0 | 0 | 160 | 825 | 0 |
| Future Volume (veh/h) | 0 | 525 | 250 | 0 | 0 | 0 | 0 | 0 | 0 | 160 | 825 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | | | | | | | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | | | | | | | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | | | | | | | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | | | | | | | No | |
| Adj Sat Flow, veh/h/ln | 0 | 1595 | 1595 | | | | | | | 1595 | 1595 | 0 |
| Adj Flow Rate, veh/h | 0 | 571 | 272 | | | | | | | 174 | 897 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | | | | | | | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 0 | 2 | 2 | | | | | | | 2 | 2 | 0 |
| Cap, veh/h | 0 | 1163 | 539 | | | | | | | 344 | 1559 | 0 |
| Arrive On Green | 0.00 | 0.13 | 0.13 | | | | | | | 0.15 | 0.15 | 0.00 |
| Sat Flow, veh/h | 0 | 3051 | 1347 | | | | | | | 593 | 3625 | 0 |
| Grp Volume(v), veh/h | 0 | 570 | 273 | | | | | | | 394 | 677 | 0 |
| Grp Sat Flow(s),veh/h/ln | 0 | 1451 | 1352 | | | | | | | 1446 | 1321 | 0 |
| Q Serve(g_s), s | 0.0 | 11.8 | 12.2 | | | | | | | 14.6 | 15.5 | 0.0 |
| Cycle Q Clear(g_c), s | 0.0 | 11.8 | 12.2 | | | | | | | 16.5 | 15.5 | 0.0 |
| Prop In Lane | 0.00 | | 1.00 | | | | | | | 0.44 | | 0.00 |
| Lane Grp Cap(c), veh/h | 0 | 1161 | 541 | | | | | | | 725 | 1178 | 0 |
| V/C Ratio(X) | 0.00 | 0.49 | 0.50 | | | | | | | 0.54 | 0.57 | 0.00 |
| Avail Cap(c_a), veh/h | 0 | 1161 | 541 | | | | | | | 725 | 1178 | 0 |
| HCM Platoon Ratio | 1.00 | 0.33 | 0.33 | | | | | | | 0.33 | 0.33 | 1.00 |
| Upstream Filter(l) | 0.00 | 1.00 | 1.00 | | | | | | | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 0.0 | 22.1 | 22.2 | | | | | | | 22.3 | 22.0 | 0.0 |
| Incr Delay (d2), s/veh | 0.0 | 1.5 | 3.3 | | | | | | | 2.9 | 2.0 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | | | | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.0 | 4.7 | 4.8 | | | | | | | 6.9 | 5.7 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 0.0 | 23.6 | 25.6 | | | | | | | 25.2 | 24.0 | 0.0 |
| LnGrp LOS | A | C | C | | | | | | | C | C | A |
| Approach Vol, veh/h | | 843 | | | | | | | | | 1071 | |
| Approach Delay, s/veh | | 24.2 | | | | | | | | | 24.4 | |
| Approach LOS | | C | | | | | | | | | C | |
| Timer - Assigned Phs | | 2 | | 4 | | | | | | | | |
| Phs Duration (G+Y+Rc), s | | 31.0 | | 34.0 | | | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | | | | | | | |
| Max Green Setting (Gmax), s | | 26.0 | | 29.0 | | | | | | | | |
| Max Q Clear Time (g_c+l1), s | | 0.0 | | 0.0 | | | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 24.3 | | | | | | | | | |
| HCM 6th LOS | | | C | | | | | | | | | |

HCM 6th Signalized Intersection Summary
 8: 15th Street & Main Street



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|------|------|------|------|-----|-----|------|------|------|-----|-----|-----|
| Lane Configurations | | ↑↑↑ | | | | | | ↑↑ | ↑ | | | |
| Traffic Volume (veh/h) | 20 | 600 | 0 | 0 | 0 | 0 | 0 | 410 | 120 | 0 | 0 | 0 |
| Future Volume (veh/h) | 20 | 600 | 0 | 0 | 0 | 0 | 0 | 410 | 120 | 0 | 0 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | | | | 0 | 0 | 0 | | | |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | | | | 1.00 | | 1.00 | | | |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 0.90 | | | |
| Work Zone On Approach | | No | | | | | | No | | | | |
| Adj Sat Flow, veh/h/ln | 1595 | 1595 | 0 | | | | 0 | 1595 | 1595 | | | |
| Adj Flow Rate, veh/h | 22 | 652 | 0 | | | | 0 | 446 | 130 | | | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | | | | 0.92 | 0.92 | 0.92 | | | |
| Percent Heavy Veh, % | 2 | 2 | 0 | | | | 0 | 2 | 2 | | | |
| Cap, veh/h | 85 | 1728 | 0 | | | | 0 | 1305 | 524 | | | |
| Arrive On Green | 0.42 | 0.42 | 0.00 | | | | 0.00 | 0.14 | 0.14 | | | |
| Sat Flow, veh/h | 61 | 4291 | 0 | | | | 0 | 3110 | 1216 | | | |
| Grp Volume(v), veh/h | 254 | 420 | 0 | | | | 0 | 446 | 130 | | | |
| Grp Sat Flow(s),veh/h/ln | 1580 | 1321 | 0 | | | | 0 | 1515 | 1216 | | | |
| Q Serve(g_s), s | 0.0 | 7.2 | 0.0 | | | | 0.0 | 8.6 | 6.2 | | | |
| Cycle Q Clear(g_c), s | 7.2 | 7.2 | 0.0 | | | | 0.0 | 8.6 | 6.2 | | | |
| Prop In Lane | 0.09 | | 0.00 | | | | 0.00 | | 1.00 | | | |
| Lane Grp Cap(c), veh/h | 716 | 1097 | 0 | | | | 0 | 1305 | 524 | | | |
| V/C Ratio(X) | 0.35 | 0.38 | 0.00 | | | | 0.00 | 0.34 | 0.25 | | | |
| Avail Cap(c_a), veh/h | 716 | 1097 | 0 | | | | 0 | 1305 | 524 | | | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | | | | 1.00 | 0.33 | 0.33 | | | |
| Upstream Filter(l) | 1.00 | 1.00 | 0.00 | | | | 0.00 | 1.00 | 1.00 | | | |
| Uniform Delay (d), s/veh | 13.2 | 13.2 | 0.0 | | | | 0.0 | 19.6 | 18.5 | | | |
| Incr Delay (d2), s/veh | 1.4 | 1.0 | 0.0 | | | | 0.0 | 0.7 | 1.1 | | | |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 | | | |
| %ile BackOfQ(50%),veh/ln | 2.6 | 2.1 | 0.0 | | | | 0.0 | 3.4 | 1.9 | | | |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 14.6 | 14.2 | 0.0 | | | | 0.0 | 20.3 | 19.6 | | | |
| LnGrp LOS | B | B | A | | | | A | C | B | | | |
| Approach Vol, veh/h | | 674 | | | | | | 576 | | | | |
| Approach Delay, s/veh | | 14.4 | | | | | | 20.1 | | | | |
| Approach LOS | | B | | | | | | C | | | | |
| Timer - Assigned Phs | | 2 | | 4 | | | | | | | | |
| Phs Duration (G+Y+Rc), s | | 32.0 | | 33.0 | | | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | | | | | | | |
| Max Green Setting (Gmax), s | | 27.0 | | 28.0 | | | | | | | | |
| Max Q Clear Time (g_c+l1), s | | 0.0 | | 0.0 | | | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 17.0 | | | | | | | | | |
| HCM 6th LOS | | | B | | | | | | | | | |

HCM 6th Signalized Intersection Summary
 9: 27th Street & Main Street



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|-----|------|------|------|------|------|------|------|------|------|------|------|
| Lane Configurations | | | | | 4111 | | 1 | 1 | | | 1 | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 75 | 840 | 70 | 235 | 285 | 0 | 0 | 215 | 130 |
| Future Volume (veh/h) | 0 | 0 | 0 | 75 | 840 | 70 | 235 | 285 | 0 | 0 | 215 | 130 |
| Initial Q (Qb), veh | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | | | | 1.00 | | 0.99 | 1.00 | | 1.00 | 1.00 | | 0.99 |
| Parking Bus, Adj | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | | | No | | | No | | | No | | |
| Adj Sat Flow, veh/h/ln | | | | 1800 | 1843 | 1800 | 1772 | 1772 | 0 | 0 | 1772 | 1772 |
| Adj Flow Rate, veh/h | | | | 104 | 866 | 86 | 264 | 310 | 0 | 0 | 265 | 146 |
| Peak Hour Factor | | | | 0.72 | 0.97 | 0.81 | 0.89 | 0.92 | 0.95 | 0.95 | 0.81 | 0.89 |
| Percent Heavy Veh, % | | | | 0 | 2 | 0 | 2 | 2 | 0 | 0 | 2 | 2 |
| Cap, veh/h | | | | 186 | 1663 | 167 | 478 | 987 | 0 | 0 | 336 | 185 |
| Arrive On Green | | | | 0.30 | 0.30 | 0.30 | 0.34 | 1.00 | 0.00 | 0.00 | 0.31 | 0.31 |
| Sat Flow, veh/h | | | | 619 | 5543 | 557 | 1688 | 1772 | 0 | 0 | 1069 | 589 |
| Grp Volume(v), veh/h | | | | 305 | 483 | 268 | 264 | 310 | 0 | 0 | 0 | 411 |
| Grp Sat Flow(s),veh/h/ln | | | | 1812 | 1585 | 1738 | 1688 | 1772 | 0 | 0 | 0 | 1658 |
| Q Serve(g_s), s | | | | 9.9 | 8.8 | 8.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 15.8 |
| Cycle Q Clear(g_c), s | | | | 9.9 | 8.8 | 8.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 15.8 |
| Prop In Lane | | | | 0.34 | | 0.32 | 1.00 | | 0.00 | 0.00 | | 0.36 |
| Lane Grp Cap(c), veh/h | | | | 544 | 951 | 521 | 478 | 987 | 0 | 0 | 0 | 521 |
| V/C Ratio(X) | | | | 0.56 | 0.51 | 0.51 | 0.55 | 0.31 | 0.00 | 0.00 | 0.00 | 0.79 |
| Avail Cap(c_a), veh/h | | | | 544 | 951 | 521 | 478 | 987 | 0 | 0 | 0 | 521 |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | 2.00 | 2.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | | | | 0.96 | 0.96 | 0.96 | 0.94 | 0.94 | 0.00 | 0.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | | | | 20.6 | 20.2 | 20.3 | 18.1 | 0.0 | 0.0 | 0.0 | 0.0 | 21.9 |
| Incr Delay (d2), s/veh | | | | 4.0 | 1.9 | 3.5 | 1.3 | 0.8 | 0.0 | 0.0 | 0.0 | 11.5 |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | | | | 4.4 | 3.2 | 3.8 | 3.0 | 0.2 | 0.0 | 0.0 | 0.0 | 7.5 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 24.6 | 22.1 | 23.7 | 19.3 | 0.8 | 0.0 | 0.0 | 0.0 | 33.4 |
| LnGrp LOS | | | | C | C | C | B | A | A | A | A | C |
| Approach Vol, veh/h | | | | | 1056 | | | 574 | | | | 411 |
| Approach Delay, s/veh | | | | | 23.2 | | | 9.3 | | | | 33.4 |
| Approach LOS | | | | | C | | | A | | | | C |
| Timer - Assigned Phs | | 2 | 3 | 4 | | | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | | 26.0 | 17.0 | 27.0 | | | | 44.0 | | | | |
| Change Period (Y+Rc), s | | 5.0 | 5.0 | 5.0 | | | | 5.0 | | | | |
| Max Green Setting (Gmax), s | | 21.0 | 12.0 | 22.0 | | | | 39.0 | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | 0.0 | 0.0 | | | | 0.0 | | | | |
| Green Ext Time (p_c), s | | 0.0 | 0.0 | 0.0 | | | | 0.0 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 21.4 | | | | | | | | |
| HCM 6th LOS | | | | C | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 10: Whitewater Park Blvd. & Main Street

ACHD Countywide Model
 03/11/2021



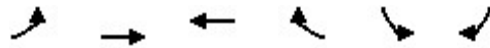
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|------------------------------------|------|------|-------|------|---------------------------|------|------|-------|------|------|------|-------|--|
| Lane Configurations | | | | | ↑↑↑ | ↑ | ↑ | ↑↑ | | | ↑↑ | ↑ | |
| Traffic Volume (vph) | 0 | 0 | 0 | 10 | 1040 | 120 | 10 | 175 | 0 | 0 | 120 | 230 | |
| Future Volume (vph) | 0 | 0 | 0 | 10 | 1040 | 120 | 10 | 175 | 0 | 0 | 120 | 230 | |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | |
| Lane Width | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 16 | 12 | 12 | 16 | 12 | |
| Total Lost time (s) | | | | | 6.0 | 6.0 | 6.0 | 6.0 | | | 6.0 | 6.0 | |
| Lane Util. Factor | | | | | 0.91 | 1.00 | 1.00 | 0.95 | | | 0.95 | 1.00 | |
| Fr _t | | | | | 1.00 | 0.85 | 1.00 | 1.00 | | | 1.00 | 0.85 | |
| Fl _t Protected | | | | | 1.00 | 1.00 | 0.95 | 1.00 | | | 1.00 | 1.00 | |
| Satd. Flow (prot) | | | | | 4815 | 1500 | 1676 | 3800 | | | 3610 | 1500 | |
| Fl _t Permitted | | | | | 1.00 | 1.00 | 0.95 | 1.00 | | | 1.00 | 1.00 | |
| Satd. Flow (perm) | | | | | 4815 | 1500 | 1676 | 3800 | | | 3610 | 1500 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.69 | 0.87 | 0.80 | 0.67 | 0.88 | 0.92 | 0.92 | 0.89 | 0.90 | |
| Adj. Flow (vph) | 0 | 0 | 0 | 14 | 1195 | 150 | 15 | 199 | 0 | 0 | 135 | 256 | |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 65 | 0 | 0 | 0 | 0 | 0 | 119 | |
| Lane Group Flow (vph) | 0 | 0 | 0 | 0 | 1209 | 85 | 15 | 199 | 0 | 0 | 135 | 137 | |
| Parking (#/hr) | | | | | | | | | | | 0 | | |
| Turn Type | | | | Perm | NA | Perm | Prot | NA | | | NA | Perm | |
| Protected Phases | | | | | 2 | | 3 | 8 | | | 4 | | |
| Permitted Phases | | | | 2 | | 2 | | | | | | 4 | |
| Actuated Green, G (s) | | | | | 39.7 | 39.7 | 1.0 | 18.3 | | | 11.3 | 11.3 | |
| Effective Green, g (s) | | | | | 39.7 | 39.7 | 1.0 | 18.3 | | | 11.3 | 11.3 | |
| Actuated g/C Ratio | | | | | 0.57 | 0.57 | 0.01 | 0.26 | | | 0.16 | 0.16 | |
| Clearance Time (s) | | | | | 6.0 | 6.0 | 6.0 | 6.0 | | | 6.0 | 6.0 | |
| Vehicle Extension (s) | | | | | 2.0 | 2.0 | 2.0 | 2.0 | | | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | | | | | 2730 | 850 | 23 | 993 | | | 582 | 242 | |
| v/s Ratio Prot | | | | | | | 0.01 | c0.05 | | | 0.04 | | |
| v/s Ratio Perm | | | | | 0.25 | 0.06 | | | | | | c0.09 | |
| v/c Ratio | | | | | 0.44 | 0.10 | 0.65 | 0.20 | | | 0.23 | 0.57 | |
| Uniform Delay, d ₁ | | | | | 8.8 | 7.0 | 34.3 | 20.1 | | | 25.6 | 27.1 | |
| Progression Factor | | | | | 0.61 | 0.09 | 1.54 | 0.90 | | | 1.00 | 1.00 | |
| Incremental Delay, d ₂ | | | | | 0.4 | 0.2 | 40.0 | 0.0 | | | 0.1 | 1.8 | |
| Delay (s) | | | | | 5.7 | 0.8 | 92.9 | 18.1 | | | 25.6 | 28.9 | |
| Level of Service | | | | | A | A | F | B | | | C | C | |
| Approach Delay (s) | | 0.0 | | | 5.2 | | | 23.4 | | | 27.8 | | |
| Approach LOS | | A | | | A | | | C | | | C | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 11.7 | | HCM 2000 Level of Service | | | | | | B | | |
| HCM 2000 Volume to Capacity ratio | | | 0.48 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 70.0 | | Sum of lost time (s) | | | | | 18.0 | | | |
| Intersection Capacity Utilization | | | 48.7% | | ICU Level of Service | | | | | A | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| Description: Count Date: 11/9/2016 | | | | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

HCM 6th Signalized Intersection Summary
 11: 27th Street & Fairview



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|-----|------|------|------|------|------|------|------|
| Lane Configurations | ↗ | ↑↑↑ | | | | | | ↑↑ | ↗ | ↘ | ↑ | |
| Traffic Volume (veh/h) | 130 | 575 | 155 | 0 | 0 | 0 | 0 | 310 | 55 | 70 | 190 | 0 |
| Future Volume (veh/h) | 130 | 575 | 155 | 0 | 0 | 0 | 0 | 310 | 55 | 70 | 190 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | | | | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | | | | 1.00 | | 0.99 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1843 | 1843 | 1772 | | | | 0 | 1772 | 1843 | 1772 | 1772 | 0 |
| Adj Flow Rate, veh/h | 138 | 625 | 182 | | | | 0 | 365 | 70 | 104 | 216 | 0 |
| Peak Hour Factor | 0.94 | 0.92 | 0.85 | | | | 0.93 | 0.85 | 0.79 | 0.67 | 0.88 | 0.93 |
| Percent Heavy Veh, % | 2 | 2 | 2 | | | | 0 | 2 | 2 | 2 | 2 | 0 |
| Cap, veh/h | 852 | 1886 | 538 | | | | 0 | 770 | 354 | 351 | 658 | 0 |
| Arrive On Green | 0.16 | 0.16 | 0.16 | | | | 0.00 | 0.23 | 0.23 | 0.14 | 0.74 | 0.00 |
| Sat Flow, veh/h | 1755 | 3882 | 1109 | | | | 0 | 3455 | 1548 | 1688 | 1772 | 0 |
| Grp Volume(v), veh/h | 138 | 538 | 269 | | | | 0 | 365 | 70 | 104 | 216 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1755 | 1677 | 1637 | | | | 0 | 1683 | 1548 | 1688 | 1772 | 0 |
| Q Serve(g_s), s | 4.7 | 10.0 | 10.2 | | | | 0.0 | 6.6 | 2.6 | 0.0 | 2.9 | 0.0 |
| Cycle Q Clear(g_c), s | 4.7 | 10.0 | 10.2 | | | | 0.0 | 6.6 | 2.6 | 0.0 | 2.9 | 0.0 |
| Prop In Lane | 1.00 | | 0.68 | | | | 0.00 | | 1.00 | 1.00 | | 0.00 |
| Lane Grp Cap(c), veh/h | 852 | 1629 | 795 | | | | 0 | 770 | 354 | 351 | 658 | 0 |
| V/C Ratio(X) | 0.16 | 0.33 | 0.34 | | | | 0.00 | 0.47 | 0.20 | 0.30 | 0.33 | 0.00 |
| Avail Cap(c_a), veh/h | 852 | 1629 | 795 | | | | 0 | 770 | 354 | 351 | 658 | 0 |
| HCM Platoon Ratio | 0.33 | 0.33 | 0.33 | | | | 1.00 | 1.00 | 1.00 | 2.00 | 2.00 | 1.00 |
| Upstream Filter(l) | 0.97 | 0.97 | 0.97 | | | | 0.00 | 1.00 | 1.00 | 0.55 | 0.55 | 0.00 |
| Uniform Delay (d), s/veh | 17.1 | 19.3 | 19.4 | | | | 0.0 | 23.4 | 21.8 | 22.6 | 6.0 | 0.0 |
| Incr Delay (d2), s/veh | 0.4 | 0.5 | 1.1 | | | | 0.0 | 2.1 | 1.3 | 0.3 | 0.7 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 1.9 | 4.2 | 4.4 | | | | 0.0 | 2.7 | 1.0 | 1.4 | 1.0 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 17.5 | 19.8 | 20.5 | | | | 0.0 | 25.5 | 23.1 | 22.9 | 6.8 | 0.0 |
| LnGrp LOS | B | B | C | | | | A | C | C | C | A | A |
| Approach Vol, veh/h | | 945 | | | | | | 435 | | | 320 | |
| Approach Delay, s/veh | | 19.7 | | | | | | 25.1 | | | 12.0 | |
| Approach LOS | | B | | | | | | C | | | B | |
| Timer - Assigned Phs | | | | 4 | | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | | | | 31.0 | | 39.0 | 10.0 | 21.0 | | | | |
| Change Period (Y+Rc), s | | | | 5.0 | | 5.0 | 5.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | | | | 26.0 | | 34.0 | 5.0 | 16.0 | | | | |
| Max Q Clear Time (g_c+l1), s | | | | 0.0 | | 0.0 | 0.0 | 0.0 | | | | |
| Green Ext Time (p_c), s | | | | 0.0 | | 0.0 | 0.0 | 0.0 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 19.6 | | | | | | | | | |
| HCM 6th LOS | | | B | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 12: Fairview Avenue & Whitewater Park Blvd.



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|------|------|------|------|------|------|
| Lane Configurations | | 4111 | | | 11 | |
| Traffic Volume (vph) | 225 | 800 | 0 | 0 | 145 | 0 |
| Future Volume (vph) | 225 | 800 | 0 | 0 | 145 | 0 |
| Ideal Flow (vphpl) | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Total Lost time (s) | | 5.5 | | | 6.0 | |
| Lane Util. Factor | | 0.86 | | | 0.97 | |
| Frt | | 1.00 | | | 1.00 | |
| Flt Protected | | 0.99 | | | 0.95 | |
| Satd. Flow (prot) | | 6008 | | | 3252 | |
| Flt Permitted | | 0.99 | | | 0.95 | |
| Satd. Flow (perm) | | 6008 | | | 3252 | |
| Peak-hour factor, PHF | 0.92 | 0.86 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 245 | 930 | 0 | 0 | 158 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 1175 | 0 | 0 | 158 | 0 |
| Turn Type | Perm | NA | | | Prot | |
| Protected Phases | | 6 | | | 4 | |
| Permitted Phases | 6 | | | | | |
| Actuated Green, G (s) | | 50.7 | | | 7.8 | |
| Effective Green, g (s) | | 50.7 | | | 7.8 | |
| Actuated g/C Ratio | | 0.72 | | | 0.11 | |
| Clearance Time (s) | | 5.5 | | | 6.0 | |
| Vehicle Extension (s) | | 2.0 | | | 2.0 | |
| Lane Grp Cap (vph) | | 4351 | | | 362 | |
| v/s Ratio Prot | | | | | 0.05 | |
| v/s Ratio Perm | | 0.20 | | | | |
| v/c Ratio | | 0.27 | | | 0.44 | |
| Uniform Delay, d1 | | 3.3 | | | 29.0 | |
| Progression Factor | | 1.00 | | | 0.91 | |
| Incremental Delay, d2 | | 0.2 | | | 0.3 | |
| Delay (s) | | 3.5 | | | 26.6 | |
| Level of Service | | A | | | C | |
| Approach Delay (s) | | 3.5 | 0.0 | | 26.6 | |
| Approach LOS | | A | A | | C | |

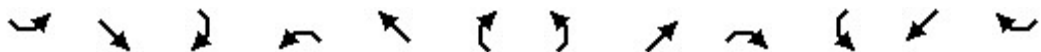
| Intersection Summary | | | |
|------------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 6.2 | HCM 2000 Level of Service | A |
| HCM 2000 Volume to Capacity ratio | 0.29 | | |
| Actuated Cycle Length (s) | 70.0 | Sum of lost time (s) | 11.5 |
| Intersection Capacity Utilization | 71.0% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |
| Description: Count Date: 11/9/2016 | | | |
| c Critical Lane Group | | | |

HCM 6th Signalized Intersection Summary
 1: 9th Street & State Street



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|------|------|------|------|------|------|-----|-----|-----|------|------|------|
| Lane Configurations | | ↑↑ | | | ↑↑ | | | | | | ↑↑ | ↑ |
| Traffic Volume (veh/h) | 0 | 430 | 130 | 35 | 740 | 0 | 0 | 0 | 0 | 20 | 570 | 130 |
| Future Volume (veh/h) | 0 | 430 | 130 | 35 | 740 | 0 | 0 | 0 | 0 | 20 | 570 | 130 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | | | | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | 0.99 | | 1.00 | | | | 1.00 | | 0.99 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | | | | No | |
| Adj Sat Flow, veh/h/ln | 0 | 1639 | 1639 | 1639 | 1639 | 0 | | | | 1639 | 1639 | 1639 |
| Adj Flow Rate, veh/h | 0 | 494 | 149 | 45 | 796 | 0 | | | | 32 | 640 | 155 |
| Peak Hour Factor | 0.93 | 0.87 | 0.87 | 0.77 | 0.93 | 0.93 | | | | 0.63 | 0.89 | 0.84 |
| Percent Heavy Veh, % | 0 | 2 | 2 | 2 | 2 | 0 | | | | 2 | 2 | 2 |
| Cap, veh/h | 0 | 1244 | 373 | 104 | 1505 | 0 | | | | 48 | 1000 | 452 |
| Arrive On Green | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | | | | 0.11 | 0.11 | 0.11 |
| Sat Flow, veh/h | 0 | 2435 | 705 | 90 | 2921 | 0 | | | | 145 | 3044 | 1375 |
| Grp Volume(v), veh/h | 0 | 326 | 317 | 437 | 404 | 0 | | | | 360 | 312 | 155 |
| Grp Sat Flow(s),veh/h/ln | 0 | 1557 | 1501 | 1520 | 1417 | 0 | | | | 1632 | 1557 | 1375 |
| Q Serve(g_s), s | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | 14.8 | 13.4 | 7.3 |
| Cycle Q Clear(g_c), s | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | 14.8 | 13.4 | 7.3 |
| Prop In Lane | 0.00 | | 0.47 | 0.10 | | 0.00 | | | | 0.09 | | 1.00 |
| Lane Grp Cap(c), veh/h | 0 | 823 | 793 | 860 | 749 | 0 | | | | 536 | 512 | 452 |
| V/C Ratio(X) | 0.00 | 0.40 | 0.40 | 0.51 | 0.54 | 0.00 | | | | 0.67 | 0.61 | 0.34 |
| Avail Cap(c_a), veh/h | 0 | 823 | 793 | 860 | 749 | 0 | | | | 536 | 512 | 452 |
| HCM Platoon Ratio | 1.00 | 2.00 | 2.00 | 2.00 | 2.00 | 1.00 | | | | 0.33 | 0.33 | 0.33 |
| Upstream Filter(l) | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | | | | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | 27.6 | 26.9 | 24.2 |
| Incr Delay (d2), s/veh | 0.0 | 1.4 | 1.5 | 2.1 | 2.8 | 0.0 | | | | 6.6 | 5.3 | 2.1 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.0 | 0.3 | 0.3 | 0.5 | 0.6 | 0.0 | | | | 7.4 | 6.3 | 2.8 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 0.0 | 1.4 | 1.5 | 2.1 | 2.8 | 0.0 | | | | 34.1 | 32.3 | 26.3 |
| LnGrp LOS | A | A | A | A | A | A | | | | C | C | C |
| Approach Vol, veh/h | | 643 | | | 841 | | | | | | 827 | |
| Approach Delay, s/veh | | 1.5 | | | 2.4 | | | | | | 32.0 | |
| Approach LOS | | A | | | A | | | | | | C | |
| Timer - Assigned Phs | | 2 | | 4 | | 6 | | | | | | |
| Phs Duration (G+Y+Rc), s | | 42.0 | | 28.0 | | 42.0 | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | 5.0 | | | | | | |
| Max Green Setting (Gmax), s | | 37.0 | | 23.0 | | 37.0 | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | | 0.0 | | 0.0 | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | 0.0 | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 12.7 | | | | | | | | |
| HCM 6th LOS | | | | B | | | | | | | | |

HCM 6th Signalized Intersection Summary
 2: 15th Street & State Street



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|------|------|------|------|------|------|------|------|------|-----|-----|-----|
| Lane Configurations | ↖ | ↗ | | | ↖ | | ↖ | ↗ | | | | |
| Traffic Volume (veh/h) | 95 | 580 | 0 | 0 | 1115 | 80 | 250 | 715 | 35 | 0 | 0 | 0 |
| Future Volume (veh/h) | 95 | 580 | 0 | 0 | 1115 | 80 | 250 | 715 | 35 | 0 | 0 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 0.99 | 1.00 | | 0.99 | | | |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Work Zone On Approach | | No | | | No | | | No | | | | |
| Adj Sat Flow, veh/h/ln | 1821 | 1894 | 0 | 0 | 1894 | 1821 | 1821 | 1821 | 1821 | | | |
| Adj Flow Rate, veh/h | 114 | 659 | 0 | 0 | 1212 | 101 | 272 | 786 | 42 | | | |
| Peak Hour Factor | 0.83 | 0.88 | 0.95 | 0.95 | 0.92 | 0.79 | 0.92 | 0.91 | 0.84 | | | |
| Percent Heavy Veh, % | 2 | 2 | 0 | 0 | 2 | 2 | 2 | 2 | 2 | | | |
| Cap, veh/h | 264 | 2193 | 0 | 0 | 1665 | 138 | 512 | 986 | 53 | | | |
| Arrive On Green | 0.13 | 1.00 | 0.00 | 0.00 | 0.50 | 0.50 | 0.30 | 0.30 | 0.30 | | | |
| Sat Flow, veh/h | 1734 | 3693 | 0 | 0 | 3456 | 280 | 1734 | 3339 | 178 | | | |
| Grp Volume(v), veh/h | 114 | 659 | 0 | 0 | 648 | 665 | 272 | 407 | 421 | | | |
| Grp Sat Flow(s),veh/h/ln | 1734 | 1799 | 0 | 0 | 1799 | 1842 | 1734 | 1730 | 1787 | | | |
| Q Serve(g_s), s | 0.0 | 0.0 | 0.0 | 0.0 | 29.8 | 30.0 | 13.8 | 22.8 | 22.8 | | | |
| Cycle Q Clear(g_c), s | 0.0 | 0.0 | 0.0 | 0.0 | 29.8 | 30.0 | 13.8 | 22.8 | 22.8 | | | |
| Prop In Lane | 1.00 | | 0.00 | 0.00 | | 0.15 | 1.00 | | 0.10 | | | |
| Lane Grp Cap(c), veh/h | 264 | 2193 | 0 | 0 | 891 | 912 | 512 | 511 | 528 | | | |
| V/C Ratio(X) | 0.43 | 0.30 | 0.00 | 0.00 | 0.73 | 0.73 | 0.53 | 0.80 | 0.80 | | | |
| Avail Cap(c_a), veh/h | 264 | 2193 | 0 | 0 | 891 | 912 | 512 | 511 | 528 | | | |
| HCM Platoon Ratio | 2.00 | 2.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Upstream Filter(l) | 0.82 | 0.82 | 0.00 | 0.00 | 1.00 | 1.00 | 0.73 | 0.73 | 0.73 | | | |
| Uniform Delay (d), s/veh | 35.5 | 0.0 | 0.0 | 0.0 | 20.9 | 20.9 | 30.9 | 34.1 | 34.1 | | | |
| Incr Delay (d2), s/veh | 0.3 | 0.3 | 0.0 | 0.0 | 5.2 | 5.1 | 2.9 | 9.2 | 8.9 | | | |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| %ile BackOfQ(50%),veh/ln | 2.6 | 0.1 | 0.0 | 0.0 | 13.5 | 13.8 | 6.2 | 10.8 | 11.2 | | | |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 35.8 | 0.3 | 0.0 | 0.0 | 26.1 | 26.0 | 33.8 | 43.3 | 43.0 | | | |
| LnGrp LOS | D | A | A | A | C | C | C | D | D | | | |
| Approach Vol, veh/h | | 773 | | | 1313 | | | 1100 | | | | |
| Approach Delay, s/veh | | 5.5 | | | 26.1 | | | 40.8 | | | | |
| Approach LOS | | A | | | C | | | D | | | | |
| Timer - Assigned Phs | 1 | 2 | | | | 6 | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 12.0 | 57.0 | | | | 69.0 | | 36.0 | | | | |
| Change Period (Y+Rc), s | 5.0 | 5.0 | | | | 5.0 | | 5.0 | | | | |
| Max Green Setting (Gmax), s | 7.0 | 52.0 | | | | 64.0 | | 31.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 0.0 | 0.0 | | | | 0.0 | | 0.0 | | | | |
| Green Ext Time (p_c), s | 0.0 | 0.0 | | | | 0.0 | | 0.0 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | | 26.2 | | | | | | | |
| HCM 6th LOS | | | | | C | | | | | | | |

HCM Signalized Intersection Capacity Analysis
3: 27th Street/26th Street & State Street

ACHD Countywide Model
03/11/2021



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------|-------|------|------|-------|-------|------|-------|------|------|-------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 25 | 695 | 170 | 45 | 1495 | 45 | 305 | 135 | 45 | 20 | 50 | 15 |
| Future Volume (vph) | 25 | 695 | 170 | 45 | 1495 | 45 | 305 | 135 | 45 | 20 | 50 | 15 |
| Ideal Flow (vphpl) | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 |
| Lane Width | 11 | 12 | 12 | 11 | 12 | 12 | 11 | 11 | 12 | 11 | 11 | 12 |
| Total Lost time (s) | 6.0 | 5.0 | 5.0 | 6.0 | 5.0 | | 6.0 | 6.0 | | 6.0 | 6.0 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.91 | | 0.95 | 0.95 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.97 | | 1.00 | 0.96 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 0.99 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1666 | 3446 | 1542 | 1666 | 4927 | | 1582 | 1597 | | 1666 | 1679 | |
| Flt Permitted | 0.07 | 1.00 | 1.00 | 0.25 | 1.00 | | 0.95 | 0.99 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 130 | 3446 | 1542 | 446 | 4927 | | 1582 | 1597 | | 1666 | 1679 | |
| Peak-hour factor, PHF | 0.82 | 0.90 | 0.84 | 0.67 | 0.94 | 0.83 | 0.86 | 0.77 | 0.73 | 0.68 | 0.89 | 0.67 |
| Adj. Flow (vph) | 30 | 772 | 202 | 67 | 1590 | 54 | 355 | 175 | 62 | 29 | 56 | 22 |
| RTOR Reduction (vph) | 0 | 0 | 111 | 0 | 2 | 0 | 0 | 8 | 0 | 0 | 12 | 0 |
| Lane Group Flow (vph) | 30 | 772 | 91 | 67 | 1642 | 0 | 295 | 289 | 0 | 29 | 66 | 0 |
| Turn Type | pm+pt | NA | Perm | pm+pt | NA | | Split | NA | | Split | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | 8 | 8 | | 4 | 4 | |
| Permitted Phases | 6 | | 6 | 2 | | | | | | | | |
| Actuated Green, G (s) | 58.6 | 53.8 | 53.8 | 62.6 | 55.8 | | 28.1 | 28.1 | | 8.3 | 8.3 | |
| Effective Green, g (s) | 58.6 | 53.8 | 53.8 | 62.6 | 55.8 | | 28.1 | 28.1 | | 8.3 | 8.3 | |
| Actuated g/C Ratio | 0.49 | 0.45 | 0.45 | 0.52 | 0.46 | | 0.23 | 0.23 | | 0.07 | 0.07 | |
| Clearance Time (s) | 6.0 | 5.0 | 5.0 | 6.0 | 5.0 | | 6.0 | 6.0 | | 6.0 | 6.0 | |
| Vehicle Extension (s) | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | | 2.0 | 2.0 | | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | 124 | 1544 | 691 | 301 | 2291 | | 370 | 373 | | 115 | 116 | |
| v/s Ratio Prot | 0.01 | 0.22 | | c0.01 | c0.33 | | c0.19 | 0.18 | | 0.02 | c0.04 | |
| v/s Ratio Perm | 0.11 | | 0.06 | 0.10 | | | | | | | | |
| v/c Ratio | 0.24 | 0.50 | 0.13 | 0.22 | 0.72 | | 0.80 | 0.77 | | 0.25 | 0.57 | |
| Uniform Delay, d1 | 19.0 | 23.5 | 19.4 | 15.5 | 25.8 | | 43.3 | 43.0 | | 52.9 | 54.1 | |
| Progression Factor | 0.79 | 1.09 | 2.79 | 0.91 | 0.88 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 0.4 | 1.2 | 0.4 | 0.1 | 1.6 | | 10.6 | 8.8 | | 0.4 | 3.8 | |
| Delay (s) | 15.4 | 26.8 | 54.6 | 14.2 | 24.2 | | 53.9 | 51.8 | | 53.3 | 57.9 | |
| Level of Service | B | C | D | B | C | | D | D | | D | E | |
| Approach Delay (s) | | 32.0 | | | 23.8 | | | 52.8 | | | 56.6 | |
| Approach LOS | | C | | | C | | | D | | | E | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 32.3 | HCM 2000 Level of Service | C |
| HCM 2000 Volume to Capacity ratio | 0.71 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 23.0 |
| Intersection Capacity Utilization | 68.0% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

Description: Count Date: 1/22/2015

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 4: Whitewater Park Blvd./31st Street & State Street

ACHD Countywide Model
 03/11/2021



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------|-------|------|------|-------|-------|------|-------|-------|------|-------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 22 | 820 | 106 | 16 | 1684 | 4 | 218 | 64 | 36 | 18 | 30 | 4 |
| Future Volume (vph) | 22 | 820 | 106 | 16 | 1684 | 4 | 218 | 64 | 36 | 18 | 30 | 4 |
| Ideal Flow (vphpl) | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 |
| Lane Width | 10 | 13 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 11 | 12 | 12 |
| Total Lost time (s) | 6.0 | 5.5 | 5.5 | 6.0 | 5.5 | | 6.0 | 5.5 | | 6.0 | 6.0 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | | 0.97 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.95 | | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1608 | 3561 | 1542 | 1723 | 3445 | | 3343 | 1716 | | 1666 | 1783 | |
| Flt Permitted | 0.05 | 1.00 | 1.00 | 0.30 | 1.00 | | 0.95 | 1.00 | | 1.00 | 1.00 | |
| Satd. Flow (perm) | 91 | 3561 | 1542 | 543 | 3445 | | 3343 | 1716 | | 1753 | 1783 | |
| Peak-hour factor, PHF | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Adj. Flow (vph) | 23 | 845 | 109 | 16 | 1736 | 4 | 225 | 66 | 37 | 19 | 31 | 4 |
| RTOR Reduction (vph) | 0 | 0 | 41 | 0 | 0 | 0 | 0 | 19 | 0 | 0 | 4 | 0 |
| Lane Group Flow (vph) | 23 | 845 | 68 | 16 | 1740 | 0 | 225 | 84 | 0 | 19 | 31 | 0 |
| Turn Type | pm+pt | NA | Perm | pm+pt | NA | | Prot | NA | | pm+pt | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | 6 | | 6 | 2 | | | | | | 4 | 4 | |
| Actuated Green, G (s) | 78.6 | 74.7 | 74.7 | 75.0 | 72.9 | | 13.7 | 17.3 | | 6.0 | 6.0 | |
| Effective Green, g (s) | 78.6 | 74.7 | 74.7 | 75.0 | 72.9 | | 13.7 | 17.3 | | 6.0 | 6.0 | |
| Actuated g/C Ratio | 0.65 | 0.62 | 0.62 | 0.62 | 0.61 | | 0.11 | 0.14 | | 0.05 | 0.05 | |
| Clearance Time (s) | 6.0 | 5.5 | 5.5 | 6.0 | 5.5 | | 6.0 | 5.5 | | 6.0 | 6.0 | |
| Vehicle Extension (s) | 3.0 | 2.0 | 2.0 | 2.0 | 2.0 | | 2.0 | 2.0 | | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | 108 | 2216 | 959 | 360 | 2092 | | 381 | 247 | | 87 | 89 | |
| v/s Ratio Prot | c0.01 | 0.24 | | 0.00 | c0.51 | | c0.07 | c0.05 | | 0.01 | c0.02 | |
| v/s Ratio Perm | 0.13 | | 0.04 | 0.03 | | | | | | 0.01 | | |
| v/c Ratio | 0.21 | 0.38 | 0.07 | 0.04 | 0.83 | | 0.59 | 0.34 | | 0.22 | 0.35 | |
| Uniform Delay, d1 | 16.7 | 11.2 | 8.9 | 8.8 | 18.7 | | 50.5 | 46.2 | | 54.8 | 55.1 | |
| Progression Factor | 1.25 | 0.71 | 1.00 | 0.60 | 0.78 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 0.9 | 0.5 | 0.1 | 0.0 | 3.3 | | 1.6 | 0.3 | | 0.5 | 0.9 | |
| Delay (s) | 21.7 | 8.4 | 9.1 | 5.2 | 17.8 | | 52.1 | 46.5 | | 55.2 | 56.0 | |
| Level of Service | C | A | A | A | B | | D | D | | E | E | |
| Approach Delay (s) | | 8.8 | | | 17.7 | | | 50.4 | | | 55.7 | |
| Approach LOS | | A | | | B | | | D | | | E | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 19.0 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.74 | | |
| Actuated Cycle Length (s) | 120.0 | Sum of lost time (s) | 23.5 |
| Intersection Capacity Utilization | 70.2% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

Description: Count Date: 1/21/2014

c Critical Lane Group

HCM 6th Signalized Intersection Summary
5: 9th Street & Idaho Street



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|-----|------|-----|------|------|------|-----|-----|-----|------|------|------|
| Lane Configurations | | | | | ↑↑↑ | | | | | | ↑↑↑ | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 290 | 1060 | 0 | 0 | 0 | 0 | 0 | 635 | 45 |
| Future Volume (veh/h) | 0 | 0 | 0 | 290 | 1060 | 0 | 0 | 0 | 0 | 0 | 635 | 45 |
| Initial Q (Qb), veh | | | | 0 | 0 | 0 | | | | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | | | | 1.00 | | 1.00 | | | | 1.00 | | 0.87 |
| Parking Bus, Adj | | | | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | | | No | | | | | | No | | |
| Adj Sat Flow, veh/h/ln | | | | 1639 | 1639 | 0 | | | | 0 | 1639 | 1639 |
| Adj Flow Rate, veh/h | | | | 305 | 1128 | 0 | | | | 0 | 738 | 56 |
| Peak Hour Factor | | | | 0.95 | 0.94 | 0.88 | | | | 0.88 | 0.86 | 0.80 |
| Percent Heavy Veh, % | | | | 2 | 2 | 0 | | | | 0 | 2 | 2 |
| Cap, veh/h | | | | 501 | 1639 | 0 | | | | 0 | 1498 | 113 |
| Arrive On Green | | | | 0.17 | 0.17 | 0.00 | | | | 0.00 | 0.12 | 0.12 |
| Sat Flow, veh/h | | | | 838 | 3411 | 0 | | | | 0 | 4342 | 315 |
| Grp Volume(v), veh/h | | | | 510 | 923 | 0 | | | | 0 | 523 | 271 |
| Grp Sat Flow(s),veh/h/ln | | | | 1400 | 1357 | 0 | | | | 0 | 1492 | 1526 |
| Q Serve(g_s), s | | | | 24.2 | 22.4 | 0.0 | | | | 0.0 | 11.5 | 11.7 |
| Cycle Q Clear(g_c), s | | | | 24.2 | 22.4 | 0.0 | | | | 0.0 | 11.5 | 11.7 |
| Prop In Lane | | | | 0.60 | | 0.00 | | | | 0.00 | | 0.21 |
| Lane Grp Cap(c), veh/h | | | | 782 | 1357 | 0 | | | | 0 | 1065 | 545 |
| V/C Ratio(X) | | | | 0.65 | 0.68 | 0.00 | | | | 0.00 | 0.49 | 0.50 |
| Avail Cap(c_a), veh/h | | | | 782 | 1357 | 0 | | | | 0 | 1065 | 545 |
| HCM Platoon Ratio | | | | 0.33 | 0.33 | 1.00 | | | | 1.00 | 0.33 | 0.33 |
| Upstream Filter(I) | | | | 1.00 | 1.00 | 0.00 | | | | 0.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | | | | 24.7 | 24.0 | 0.0 | | | | 0.0 | 24.9 | 25.0 |
| Incr Delay (d2), s/veh | | | | 4.2 | 2.8 | 0.0 | | | | 0.0 | 1.6 | 3.2 |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | | | | 9.8 | 8.5 | 0.0 | | | | 0.0 | 4.8 | 5.2 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 28.9 | 26.7 | 0.0 | | | | 0.0 | 26.5 | 28.2 |
| LnGrp LOS | | | | C | C | A | | | | A | C | C |
| Approach Vol, veh/h | | | | | 1433 | | | | | | 794 | |
| Approach Delay, s/veh | | | | | 27.5 | | | | | | 27.1 | |
| Approach LOS | | | | | C | | | | | | C | |
| Timer - Assigned Phs | | 2 | | 4 | | | | | | | | |
| Phs Duration (G+Y+Rc), s | | 40.0 | | 30.0 | | | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | | | | | | | |
| Max Green Setting (Gmax), s | | 35.0 | | 25.0 | | | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | | 0.0 | | | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | | 27.4 | | | | | | | |
| HCM 6th LOS | | | | | C | | | | | | | |

HCM 6th Signalized Intersection Summary
 6: 15th Street & Idaho Street















| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|-----|------|-----|------|------|------|------|------|------|-----|-----|-----|
| Lane Configurations | | | | | ↑↑↑ | | | ↑↑ | | | | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 0 | 780 | 130 | 75 | 755 | 0 | 0 | 0 | 0 |
| Future Volume (veh/h) | 0 | 0 | 0 | 0 | 780 | 130 | 75 | 755 | 0 | 0 | 0 | 0 |
| Initial Q (Qb), veh | | | | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| Ped-Bike Adj(A_pbT) | | | | 1.00 | | 1.00 | 1.00 | | 1.00 | | | |
| Parking Bus, Adj | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Work Zone On Approach | | | | | No | | | No | | | | |
| Adj Sat Flow, veh/h/ln | | | | 0 | 1639 | 1639 | 1639 | 1639 | 0 | | | |
| Adj Flow Rate, veh/h | | | | 0 | 848 | 141 | 82 | 821 | 0 | | | |
| Peak Hour Factor | | | | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | | | |
| Percent Heavy Veh, % | | | | 0 | 2 | 2 | 2 | 2 | 0 | | | |
| Cap, veh/h | | | | 0 | 1658 | 274 | 118 | 1245 | 0 | | | |
| Arrive On Green | | | | 0.00 | 0.14 | 0.14 | 0.14 | 0.14 | 0.00 | | | |
| Sat Flow, veh/h | | | | 0 | 4015 | 639 | 276 | 2988 | 0 | | | |
| Grp Volume(v), veh/h | | | | 0 | 653 | 336 | 482 | 421 | 0 | | | |
| Grp Sat Flow(s),veh/h/ln | | | | 0 | 1492 | 1524 | 1625 | 1557 | 0 | | | |
| Q Serve(g_s), s | | | | 0.0 | 14.2 | 14.3 | 19.8 | 17.8 | 0.0 | | | |
| Cycle Q Clear(g_c), s | | | | 0.0 | 14.2 | 14.3 | 19.8 | 17.8 | 0.0 | | | |
| Prop In Lane | | | | 0.00 | | 0.42 | 0.17 | | 0.00 | | | |
| Lane Grp Cap(c), veh/h | | | | 0 | 1278 | 653 | 697 | 667 | 0 | | | |
| V/C Ratio(X) | | | | 0.00 | 0.51 | 0.51 | 0.69 | 0.63 | 0.00 | | | |
| Avail Cap(c_a), veh/h | | | | 0 | 1278 | 653 | 697 | 667 | 0 | | | |
| HCM Platoon Ratio | | | | 1.00 | 0.33 | 0.33 | 0.33 | 0.33 | 1.00 | | | |
| Upstream Filter(l) | | | | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | | | |
| Uniform Delay (d), s/veh | | | | 0.0 | 23.3 | 23.3 | 25.7 | 24.8 | 0.0 | | | |
| Incr Delay (d2), s/veh | | | | 0.0 | 1.5 | 2.9 | 5.6 | 4.5 | 0.0 | | | |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| %ile BackOfQ(50%),veh/ln | | | | 0.0 | 5.8 | 6.3 | 9.5 | 8.1 | 0.0 | | | |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 0.0 | 24.7 | 26.2 | 31.3 | 29.3 | 0.0 | | | |
| LnGrp LOS | | | | A | C | C | C | C | A | | | |
| Approach Vol, veh/h | | | | | 989 | | | 903 | | | | |
| Approach Delay, s/veh | | | | | 25.2 | | | 30.3 | | | | |
| Approach LOS | | | | | C | | | C | | | | |
| Timer - Assigned Phs | | 2 | | 4 | | | | | | | | |
| Phs Duration (G+Y+Rc), s | | 35.0 | | 35.0 | | | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | | | | | | | |
| Max Green Setting (Gmax), s | | 30.0 | | 30.0 | | | | | | | | |
| Max Q Clear Time (g_c+l1), s | | 0.0 | | 0.0 | | | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | | 27.7 | | | | | | | |
| HCM 6th LOS | | | | | C | | | | | | | |

HCM 6th Signalized Intersection Summary
 7: 9th Street & Main Street

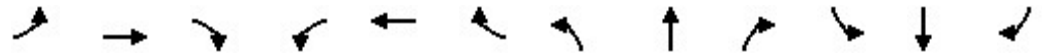


| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|------|------|------|------|-----|-----|-----|-----|-----|------|------|------|
| Lane Configurations | | ↑↑↑ | | | | | | | | | ↑↑↑ | |
| Traffic Volume (veh/h) | 0 | 590 | 270 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 1325 | 0 |
| Future Volume (veh/h) | 0 | 590 | 270 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 1325 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | | | | | | | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | | | | | | | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | | | | | | | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | | | | | | | No | |
| Adj Sat Flow, veh/h/ln | 0 | 1639 | 1639 | | | | | | | 1639 | 1639 | 0 |
| Adj Flow Rate, veh/h | 0 | 641 | 293 | | | | | | | 109 | 1440 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | | | | | | | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 0 | 2 | 2 | | | | | | | 2 | 2 | 0 |
| Cap, veh/h | 0 | 1080 | 484 | | | | | | | 185 | 2018 | 0 |
| Arrive On Green | 0.00 | 0.12 | 0.12 | | | | | | | 0.17 | 0.17 | 0.00 |
| Sat Flow, veh/h | 0 | 3170 | 1355 | | | | | | | 248 | 4170 | 0 |
| Grp Volume(v), veh/h | 0 | 632 | 302 | | | | | | | 573 | 976 | 0 |
| Grp Sat Flow(s),veh/h/ln | 0 | 1492 | 1395 | | | | | | | 1569 | 1357 | 0 |
| Q Serve(g_s), s | 0.0 | 14.1 | 14.4 | | | | | | | 18.4 | 23.9 | 0.0 |
| Cycle Q Clear(g_c), s | 0.0 | 14.1 | 14.4 | | | | | | | 24.2 | 23.9 | 0.0 |
| Prop In Lane | 0.00 | | 0.97 | | | | | | | 0.19 | | 0.00 |
| Lane Grp Cap(c), veh/h | 0 | 1065 | 498 | | | | | | | 845 | 1357 | 0 |
| V/C Ratio(X) | 0.00 | 0.59 | 0.61 | | | | | | | 0.68 | 0.72 | 0.00 |
| Avail Cap(c_a), veh/h | 0 | 1065 | 498 | | | | | | | 845 | 1357 | 0 |
| HCM Platoon Ratio | 1.00 | 0.33 | 0.33 | | | | | | | 0.33 | 0.33 | 1.00 |
| Upstream Filter(l) | 0.00 | 1.00 | 1.00 | | | | | | | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 0.0 | 26.1 | 26.2 | | | | | | | 24.6 | 24.6 | 0.0 |
| Incr Delay (d2), s/veh | 0.0 | 2.4 | 5.4 | | | | | | | 4.3 | 3.3 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | | | | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.0 | 5.9 | 6.0 | | | | | | | 11.0 | 9.1 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 0.0 | 28.5 | 31.6 | | | | | | | 28.9 | 27.9 | 0.0 |
| LnGrp LOS | A | C | C | | | | | | | C | C | A |
| Approach Vol, veh/h | | 934 | | | | | | | | | 1549 | |
| Approach Delay, s/veh | | 29.5 | | | | | | | | | 28.3 | |
| Approach LOS | | C | | | | | | | | | C | |
| Timer - Assigned Phs | | 2 | | 4 | | | | | | | | |
| Phs Duration (G+Y+Rc), s | | 30.0 | | 40.0 | | | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | | | | | | | |
| Max Green Setting (Gmax), s | | 25.0 | | 35.0 | | | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | | 0.0 | | | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 28.7 | | | | | | | | | |
| HCM 6th LOS | | | C | | | | | | | | | |

HCM 6th Signalized Intersection Summary
8: 15th Street & Main Street

| |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
| Lane Configurations | | ↑↑↑ | | | | | | ↑↑ | ↑ | | | |
| Traffic Volume (veh/h) | 95 | 500 | 0 | 0 | 0 | 0 | 0 | 700 | 155 | 0 | 0 | 0 |
| Future Volume (veh/h) | 95 | 500 | 0 | 0 | 0 | 0 | 0 | 700 | 155 | 0 | 0 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | | | | 0 | 0 | 0 | | | |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | | | | 1.00 | | 1.00 | | | |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 0.90 | | | |
| Work Zone On Approach | | No | | | | | | No | | | | |
| Adj Sat Flow, veh/h/ln | 1639 | 1639 | 0 | | | | 0 | 1639 | 1639 | | | |
| Adj Flow Rate, veh/h | 103 | 543 | 0 | | | | 0 | 761 | 168 | | | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | | | | 0.92 | 0.92 | 0.92 | | | |
| Percent Heavy Veh, % | 2 | 2 | 0 | | | | 0 | 2 | 2 | | | |
| Cap, veh/h | 291 | 1399 | 0 | | | | 0 | 1468 | 589 | | | |
| Arrive On Green | 0.39 | 0.39 | 0.00 | | | | 0.00 | 0.16 | 0.16 | | | |
| Sat Flow, veh/h | 565 | 3762 | 0 | | | | 0 | 3196 | 1250 | | | |
| Grp Volume(v), veh/h | 240 | 406 | 0 | | | | 0 | 761 | 168 | | | |
| Grp Sat Flow(s),veh/h/ln | 1478 | 1357 | 0 | | | | 0 | 1557 | 1250 | | | |
| Q Serve(g_s), s | 5.4 | 7.6 | 0.0 | | | | 0.0 | 15.7 | 8.3 | | | |
| Cycle Q Clear(g_c), s | 8.1 | 7.6 | 0.0 | | | | 0.0 | 15.7 | 8.3 | | | |
| Prop In Lane | 0.43 | | 0.00 | | | | 0.00 | | 1.00 | | | |
| Lane Grp Cap(c), veh/h | 644 | 1047 | 0 | | | | 0 | 1468 | 589 | | | |
| V/C Ratio(X) | 0.37 | 0.39 | 0.00 | | | | 0.00 | 0.52 | 0.29 | | | |
| Avail Cap(c_a), veh/h | 644 | 1047 | 0 | | | | 0 | 1468 | 589 | | | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | | | | 1.00 | 0.33 | 0.33 | | | |
| Upstream Filter(l) | 1.00 | 1.00 | 0.00 | | | | 0.00 | 1.00 | 1.00 | | | |
| Uniform Delay (d), s/veh | 15.6 | 15.5 | 0.0 | | | | 0.0 | 22.3 | 19.1 | | | |
| Incr Delay (d2), s/veh | 1.7 | 1.1 | 0.0 | | | | 0.0 | 1.3 | 1.2 | | | |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 | | | |
| %ile BackOfQ(50%),veh/ln | 2.9 | 2.3 | 0.0 | | | | 0.0 | 6.7 | 2.8 | | | |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 17.3 | 16.6 | 0.0 | | | | 0.0 | 23.6 | 20.3 | | | |
| LnGrp LOS | B | B | A | | | | A | C | C | | | |
| Approach Vol, veh/h | | 646 | | | | | | 929 | | | | |
| Approach Delay, s/veh | | 16.9 | | | | | | 23.0 | | | | |
| Approach LOS | | B | | | | | | C | | | | |
| Timer - Assigned Phs | | 2 | | 4 | | | | | | | | |
| Phs Duration (G+Y+Rc), s | | 32.0 | | 38.0 | | | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | | | | | | | |
| Max Green Setting (Gmax), s | | 27.0 | | 33.0 | | | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | | 0.0 | | | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 20.5 | | | | | | | | | |
| HCM 6th LOS | | | C | | | | | | | | | |

HCM 6th Signalized Intersection Summary
 9: 27th Street & Main Street



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|-----|------|------|-------|------|------|------|------|------|------|------|-------|
| Lane Configurations | | | | | ←←← | | ← | ↑ | | | ↑ | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 40 | 1765 | 80 | 455 | 610 | 0 | 0 | 235 | 120 |
| Future Volume (veh/h) | 0 | 0 | 0 | 40 | 1765 | 80 | 455 | 610 | 0 | 0 | 235 | 120 |
| Initial Q (Qb), veh | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | | | | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.98 |
| Parking Bus, Adj | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | | | No | | | No | | No | | | |
| Adj Sat Flow, veh/h/ln | | | | 1850 | 1821 | 1850 | 1821 | 1821 | 0 | 0 | 1821 | 1821 |
| Adj Flow Rate, veh/h | | | | 53 | 1961 | 99 | 535 | 685 | 0 | 0 | 283 | 150 |
| Peak Hour Factor | | | | 0.75 | 0.90 | 0.81 | 0.85 | 0.89 | 0.88 | 0.88 | 0.83 | 0.80 |
| Percent Heavy Veh, % | | | | 0 | 2 | 0 | 2 | 2 | 0 | 0 | 2 | 2 |
| Cap, veh/h | | | | 46 | 1808 | 94 | 498 | 971 | 0 | 0 | 265 | 140 |
| Arrive On Green | | | | 0.37 | 0.37 | 0.37 | 0.50 | 1.00 | 0.00 | 0.00 | 0.24 | 0.24 |
| Sat Flow, veh/h | | | | 124 | 4869 | 253 | 1734 | 1821 | 0 | 0 | 1112 | 589 |
| Grp Volume(v), veh/h | | | | 776 | 644 | 693 | 535 | 685 | 0 | 0 | 0 | 433 |
| Grp Sat Flow(s),veh/h/ln | | | | 1815 | 1657 | 1774 | 1734 | 1821 | 0 | 0 | 0 | 1702 |
| Q Serve(g_s), s | | | | 39.0 | 39.0 | 39.0 | 26.0 | 0.0 | 0.0 | 0.0 | 0.0 | 25.0 |
| Cycle Q Clear(g_c), s | | | | 39.0 | 39.0 | 39.0 | 26.0 | 0.0 | 0.0 | 0.0 | 0.0 | 25.0 |
| Prop In Lane | | | | 0.07 | | 0.14 | 1.00 | | 0.00 | 0.00 | | 0.35 |
| Lane Grp Cap(c), veh/h | | | | 674 | 616 | 659 | 498 | 971 | 0 | 0 | 0 | 405 |
| V/C Ratio(X) | | | | 1.15 | 1.05 | 1.05 | 1.07 | 0.71 | 0.00 | 0.00 | 0.00 | 1.07 |
| Avail Cap(c_a), veh/h | | | | 674 | 616 | 659 | 498 | 971 | 0 | 0 | 0 | 405 |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | 2.00 | 2.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | | | | 0.85 | 0.85 | 0.85 | 0.72 | 0.72 | 0.00 | 0.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | | | | 33.0 | 33.0 | 33.0 | 24.7 | 0.0 | 0.0 | 0.0 | 0.0 | 40.0 |
| Incr Delay (d2), s/veh | | | | 82.1 | 46.2 | 46.8 | 55.9 | 3.1 | 0.0 | 0.0 | 0.0 | 64.2 |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | | | | 31.7 | 22.8 | 24.5 | 14.7 | 0.8 | 0.0 | 0.0 | 0.0 | 17.6 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 115.1 | 79.2 | 79.8 | 80.6 | 3.1 | 0.0 | 0.0 | 0.0 | 104.2 |
| LnGrp LOS | | | | F | F | F | F | A | A | A | A | F |
| Approach Vol, veh/h | | | | | 2113 | | | 1220 | | | | 433 |
| Approach Delay, s/veh | | | | | 92.6 | | | 37.1 | | | | 104.2 |
| Approach LOS | | | | | F | | | D | | | | F |
| Timer - Assigned Phs | | 2 | 3 | 4 | | | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | | 44.0 | 31.0 | 30.0 | | | | 61.0 | | | | |
| Change Period (Y+Rc), s | | 5.0 | 5.0 | 5.0 | | | | 5.0 | | | | |
| Max Green Setting (Gmax), s | | 39.0 | 26.0 | 25.0 | | | | 56.0 | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | 0.0 | 0.0 | | | | 0.0 | | | | |
| Green Ext Time (p_c), s | | 0.0 | 0.0 | 0.0 | | | | 0.0 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | | 76.0 | | | | | | | |
| HCM 6th LOS | | | | | E | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 10: Whitewater Park Blvd. & Main Street



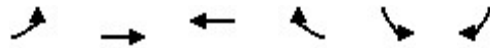
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|------------------------------------|------|------|-------|------|---------------------------|------|------|-------|------|------|------|-------|--|
| Lane Configurations | | | | | ↑↑↑ | ↑ | ↑ | ↑↑ | | | ↑↑ | ↑ | |
| Traffic Volume (vph) | 0 | 0 | 0 | 5 | 1820 | 290 | 15 | 420 | 0 | 0 | 135 | 300 | |
| Future Volume (vph) | 0 | 0 | 0 | 5 | 1820 | 290 | 15 | 420 | 0 | 0 | 135 | 300 | |
| Ideal Flow (vphpl) | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | |
| Lane Width | 12 | 12 | 12 | 12 | 12 | 12 | 11 | 11 | 12 | 12 | 11 | 11 | |
| Total Lost time (s) | | | | | 6.0 | 6.0 | 6.0 | 6.0 | | | 6.0 | 6.0 | |
| Lane Util. Factor | | | | | 0.91 | 1.00 | 1.00 | 0.95 | | | 0.95 | 1.00 | |
| Fr _t | | | | | 1.00 | 0.85 | 1.00 | 1.00 | | | 1.00 | 0.85 | |
| Fl _t Protected | | | | | 1.00 | 1.00 | 0.95 | 1.00 | | | 1.00 | 1.00 | |
| Satd. Flow (prot) | | | | | 4950 | 1542 | 1666 | 3331 | | | 3165 | 1490 | |
| Fl _t Permitted | | | | | 1.00 | 1.00 | 0.95 | 1.00 | | | 1.00 | 1.00 | |
| Satd. Flow (perm) | | | | | 4950 | 1542 | 1666 | 3331 | | | 3165 | 1490 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.42 | 0.92 | 0.85 | 0.57 | 0.79 | 0.92 | 0.92 | 0.90 | 0.85 | |
| Adj. Flow (vph) | 0 | 0 | 0 | 12 | 1978 | 341 | 26 | 532 | 0 | 0 | 150 | 353 | |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 74 | 0 | 0 | 0 | 0 | 0 | 88 | |
| Lane Group Flow (vph) | 0 | 0 | 0 | 0 | 1990 | 267 | 26 | 532 | 0 | 0 | 150 | 265 | |
| Parking (#/hr) | | | | | | | | | | | 0 | | |
| Turn Type | | | | Perm | NA | Perm | Prot | NA | | | NA | Perm | |
| Protected Phases | | | | | 2 | | 3 | 8 | | | 4 | | |
| Permitted Phases | | | | 2 | | 2 | | | | | | 4 | |
| Actuated Green, G (s) | | | | | 60.5 | 60.5 | 4.4 | 32.5 | | | 22.1 | 22.1 | |
| Effective Green, g (s) | | | | | 60.5 | 60.5 | 4.4 | 32.5 | | | 22.1 | 22.1 | |
| Actuated g/C Ratio | | | | | 0.58 | 0.58 | 0.04 | 0.31 | | | 0.21 | 0.21 | |
| Clearance Time (s) | | | | | 6.0 | 6.0 | 6.0 | 6.0 | | | 6.0 | 6.0 | |
| Vehicle Extension (s) | | | | | 2.0 | 2.0 | 2.0 | 2.0 | | | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | | | | | 2852 | 888 | 69 | 1031 | | | 666 | 313 | |
| v/s Ratio Prot | | | | | | | 0.02 | c0.16 | | | 0.05 | | |
| v/s Ratio Perm | | | | | 0.40 | 0.17 | | | | | | c0.18 | |
| v/c Ratio | | | | | 0.70 | 0.30 | 0.38 | 0.52 | | | 0.23 | 0.85 | |
| Uniform Delay, d ₁ | | | | | 15.8 | 11.4 | 49.0 | 29.8 | | | 34.4 | 39.8 | |
| Progression Factor | | | | | 0.27 | 0.06 | 1.26 | 1.20 | | | 1.00 | 1.00 | |
| Incremental Delay, d ₂ | | | | | 0.1 | 0.1 | 1.2 | 0.2 | | | 0.1 | 18.1 | |
| Delay (s) | | | | | 4.3 | 0.8 | 63.0 | 35.8 | | | 34.4 | 57.9 | |
| Level of Service | | | | | A | A | E | D | | | C | E | |
| Approach Delay (s) | | 0.0 | | | 3.8 | | | 37.1 | | | 50.9 | | |
| Approach LOS | | A | | | A | | | D | | | D | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 16.3 | | HCM 2000 Level of Service | | | | | | B | | |
| HCM 2000 Volume to Capacity ratio | | | 0.74 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 105.0 | | Sum of lost time (s) | | | | | | 18.0 | | |
| Intersection Capacity Utilization | | | 65.3% | | ICU Level of Service | | | | | | C | | |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| Description: Count Date: 11/9/2016 | | | | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

HCM 6th Signalized Intersection Summary
 11: 27th Street & Fairview Avenue



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|-----|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 255 | 680 | 185 | 0 | 0 | 0 | 0 | 705 | 55 | 55 | 225 | 0 |
| Future Volume (veh/h) | 255 | 680 | 185 | 0 | 0 | 0 | 0 | 705 | 55 | 55 | 225 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | | | | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | | | | 1.00 | | 0.99 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1821 | 1821 | 1821 | | | | 0 | 1821 | 1894 | 1821 | 1821 | 0 |
| Adj Flow Rate, veh/h | 283 | 731 | 257 | | | | 0 | 839 | 66 | 64 | 262 | 0 |
| Peak Hour Factor | 0.90 | 0.93 | 0.72 | | | | 0.92 | 0.84 | 0.83 | 0.86 | 0.86 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | | | | 0 | 2 | 2 | 2 | 2 | 0 |
| Cap, veh/h | 826 | 1732 | 601 | | | | 0 | 1055 | 484 | 251 | 780 | 0 |
| Arrive On Green | 0.16 | 0.16 | 0.16 | | | | 0.00 | 0.30 | 0.30 | 0.15 | 0.86 | 0.00 |
| Sat Flow, veh/h | 1734 | 3636 | 1263 | | | | 0 | 3551 | 1587 | 1734 | 1821 | 0 |
| Grp Volume(v), veh/h | 283 | 665 | 323 | | | | 0 | 839 | 66 | 64 | 262 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1734 | 1657 | 1584 | | | | 0 | 1730 | 1587 | 1734 | 1821 | 0 |
| Q Serve(g_s), s | 15.3 | 19.0 | 19.3 | | | | 0.0 | 23.4 | 3.2 | 0.0 | 3.0 | 0.0 |
| Cycle Q Clear(g_c), s | 15.3 | 19.0 | 19.3 | | | | 0.0 | 23.4 | 3.2 | 0.0 | 3.0 | 0.0 |
| Prop In Lane | 1.00 | | 0.80 | | | | 0.00 | | 1.00 | 1.00 | | 0.00 |
| Lane Grp Cap(c), veh/h | 826 | 1578 | 754 | | | | 0 | 1055 | 484 | 251 | 780 | 0 |
| V/C Ratio(X) | 0.34 | 0.42 | 0.43 | | | | 0.00 | 0.80 | 0.14 | 0.25 | 0.34 | 0.00 |
| Avail Cap(c_a), veh/h | 826 | 1578 | 754 | | | | 0 | 1055 | 484 | 251 | 780 | 0 |
| HCM Platoon Ratio | 0.33 | 0.33 | 0.33 | | | | 1.00 | 1.00 | 1.00 | 2.00 | 2.00 | 1.00 |
| Upstream Filter(l) | 0.95 | 0.95 | 0.95 | | | | 0.00 | 1.00 | 1.00 | 0.09 | 0.09 | 0.00 |
| Uniform Delay (d), s/veh | 29.6 | 31.2 | 31.3 | | | | 0.0 | 33.5 | 26.5 | 37.7 | 4.5 | 0.0 |
| Incr Delay (d2), s/veh | 1.1 | 0.8 | 1.7 | | | | 0.0 | 6.2 | 0.6 | 0.0 | 0.1 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 7.3 | 8.6 | 8.5 | | | | 0.0 | 10.7 | 1.3 | 1.4 | 1.0 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 30.7 | 32.0 | 33.0 | | | | 0.0 | 39.7 | 27.1 | 37.7 | 4.6 | 0.0 |
| LnGrp LOS | C | C | C | | | | A | D | C | D | A | A |
| Approach Vol, veh/h | | 1271 | | | | | | 905 | | | 326 | |
| Approach Delay, s/veh | | 32.0 | | | | | | 38.8 | | | 11.1 | |
| Approach LOS | | C | | | | | | D | | | B | |
| Timer - Assigned Phs | | | | 4 | | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | | | | 50.0 | | 55.0 | 13.0 | 37.0 | | | | |
| Change Period (Y+Rc), s | | | | 5.0 | | 5.0 | 5.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | | | | 45.0 | | 50.0 | 8.0 | 32.0 | | | | |
| Max Q Clear Time (g_c+I1), s | | | | 0.0 | | 0.0 | 0.0 | 0.0 | | | | |
| Green Ext Time (p_c), s | | | | 0.0 | | 0.0 | 0.0 | 0.0 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 31.7 | | | | | | | | | |
| HCM 6th LOS | | | C | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 12: Fairview Avenue & Whitewater Park Blvd.



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------------------|------|------|-------|------|---------------------------|------|
| Lane Configurations | | 4111 | | | 11 | |
| Traffic Volume (vph) | 430 | 860 | 0 | 0 | 160 | 0 |
| Future Volume (vph) | 430 | 860 | 0 | 0 | 160 | 0 |
| Ideal Flow (vphpl) | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 |
| Total Lost time (s) | | 5.5 | | | 6.0 | |
| Lane Util. Factor | | 0.86 | | | 0.97 | |
| Frt | | 1.00 | | | 1.00 | |
| Flt Protected | | 0.98 | | | 0.95 | |
| Satd. Flow (prot) | | 6134 | | | 3343 | |
| Flt Permitted | | 0.98 | | | 0.95 | |
| Satd. Flow (perm) | | 6134 | | | 3343 | |
| Peak-hour factor, PHF | 0.84 | 0.88 | 0.92 | 0.92 | 0.94 | 0.92 |
| Adj. Flow (vph) | 512 | 977 | 0 | 0 | 170 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 1489 | 0 | 0 | 170 | 0 |
| Turn Type | Perm | NA | | | Prot | |
| Protected Phases | | 6 | | | 4 | |
| Permitted Phases | 6 | | | | | |
| Actuated Green, G (s) | | 83.7 | | | 9.8 | |
| Effective Green, g (s) | | 83.7 | | | 9.8 | |
| Actuated g/C Ratio | | 0.80 | | | 0.09 | |
| Clearance Time (s) | | 5.5 | | | 6.0 | |
| Vehicle Extension (s) | | 2.0 | | | 2.0 | |
| Lane Grp Cap (vph) | | 4889 | | | 312 | |
| v/s Ratio Prot | | | | | 0.05 | |
| v/s Ratio Perm | | 0.24 | | | | |
| v/c Ratio | | 0.30 | | | 0.54 | |
| Uniform Delay, d1 | | 2.9 | | | 45.5 | |
| Progression Factor | | 1.00 | | | 1.67 | |
| Incremental Delay, d2 | | 0.2 | | | 1.0 | |
| Delay (s) | | 3.0 | | | 77.0 | |
| Level of Service | | A | | | E | |
| Approach Delay (s) | | 3.0 | 0.0 | | 77.0 | |
| Approach LOS | | A | A | | E | |
| Intersection Summary | | | | | | |
| HCM 2000 Control Delay | | | 10.6 | | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | | | 0.33 | | | |
| Actuated Cycle Length (s) | | | 105.0 | | Sum of lost time (s) | 11.5 |
| Intersection Capacity Utilization | | | 74.5% | | ICU Level of Service | D |
| Analysis Period (min) | | | 15 | | | |
| Description: Count Date: 11/9/2016 | | | | | | |
| c Critical Lane Group | | | | | | |

HCM 6th Signalized Intersection Summary
 1: 9th Street & State Street



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|------|------|------|------|------|------|-----|-----|-----|------|------|------|
| Lane Configurations | | ↑↑ | | | ↑↑ | | | | | | ↑↑ | ↑ |
| Traffic Volume (veh/h) | 0 | 430 | 130 | 35 | 740 | 0 | 0 | 0 | 0 | 20 | 570 | 130 |
| Future Volume (veh/h) | 0 | 430 | 130 | 35 | 740 | 0 | 0 | 0 | 0 | 20 | 570 | 130 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | | | | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | 1.00 | | 1.00 | | | | 1.00 | | 0.99 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | | | | No | |
| Adj Sat Flow, veh/h/ln | 0 | 1639 | 1639 | 1639 | 1639 | 0 | | | | 1639 | 1639 | 1639 |
| Adj Flow Rate, veh/h | 0 | 682 | 206 | 52 | 915 | 0 | | | | 41 | 833 | 201 |
| Peak Hour Factor | 0.93 | 0.87 | 0.87 | 0.77 | 0.93 | 0.93 | | | | 0.63 | 0.89 | 0.84 |
| Percent Heavy Veh, % | 0 | 2 | 2 | 2 | 2 | 0 | | | | 2 | 2 | 2 |
| Cap, veh/h | 0 | 1208 | 365 | 105 | 1432 | 0 | | | | 49 | 1044 | 472 |
| Arrive On Green | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | | | | 0.11 | 0.11 | 0.11 |
| Sat Flow, veh/h | 0 | 2430 | 709 | 93 | 2860 | 0 | | | | 143 | 3046 | 1376 |
| Grp Volume(v), veh/h | 0 | 452 | 436 | 493 | 474 | 0 | | | | 468 | 406 | 201 |
| Grp Sat Flow(s),veh/h/ln | 0 | 1557 | 1500 | 1461 | 1417 | 0 | | | | 1632 | 1557 | 1376 |
| Q Serve(g_s), s | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | 19.7 | 17.7 | 9.5 |
| Cycle Q Clear(g_c), s | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | 19.7 | 17.7 | 9.5 |
| Prop In Lane | 0.00 | | 0.47 | 0.11 | | 0.00 | | | | 0.09 | | 1.00 |
| Lane Grp Cap(c), veh/h | 0 | 801 | 771 | 808 | 729 | 0 | | | | 560 | 534 | 472 |
| V/C Ratio(X) | 0.00 | 0.56 | 0.57 | 0.61 | 0.65 | 0.00 | | | | 0.84 | 0.76 | 0.43 |
| Avail Cap(c_a), veh/h | 0 | 801 | 771 | 808 | 729 | 0 | | | | 560 | 534 | 472 |
| HCM Platoon Ratio | 1.00 | 2.00 | 2.00 | 2.00 | 2.00 | 1.00 | | | | 0.33 | 0.33 | 0.33 |
| Upstream Filter(I) | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | | | | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | 29.1 | 28.3 | 24.6 |
| Incr Delay (d2), s/veh | 0.0 | 2.9 | 3.0 | 3.4 | 4.5 | 0.0 | | | | 13.8 | 9.8 | 2.8 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.0 | 0.6 | 0.6 | 0.8 | 0.9 | 0.0 | | | | 10.6 | 8.7 | 3.8 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 0.0 | 2.9 | 3.0 | 3.4 | 4.5 | 0.0 | | | | 42.9 | 38.1 | 27.4 |
| LnGrp LOS | A | A | A | A | A | A | | | | D | D | C |
| Approach Vol, veh/h | | 888 | | | 967 | | | | | | 1075 | |
| Approach Delay, s/veh | | 2.9 | | | 3.9 | | | | | | 38.2 | |
| Approach LOS | | A | | | A | | | | | | D | |
| Timer - Assigned Phs | | 2 | | 4 | | 6 | | | | | | |
| Phs Duration (G+Y+Rc), s | | 41.0 | | 29.0 | | 41.0 | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | 5.0 | | | | | | |
| Max Green Setting (Gmax), s | | 36.0 | | 24.0 | | 36.0 | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | | 0.0 | | 0.0 | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | 0.0 | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 16.2 | | | | | | | | |
| HCM 6th LOS | | | | B | | | | | | | | |

HCM 6th Signalized Intersection Summary
2: 15th Street & State Street

ACHD Countywide Model
03/11/2021



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|------|------|------|------|------|------|------|------|------|-----|-----|-----|
| Lane Configurations | ↖ | ↗ | | | ↖ | | ↖ | ↗ | | | | |
| Traffic Volume (veh/h) | 95 | 580 | 0 | 0 | 1115 | 80 | 250 | 715 | 35 | 0 | 0 | 0 |
| Future Volume (veh/h) | 95 | 580 | 0 | 0 | 1115 | 80 | 250 | 715 | 35 | 0 | 0 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 0.99 | 1.00 | | 0.99 | | | |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Work Zone On Approach | | No | | | No | | | No | | | | |
| Adj Sat Flow, veh/h/ln | 1821 | 1894 | 0 | 0 | 1894 | 1821 | 1821 | 1821 | 1821 | | | |
| Adj Flow Rate, veh/h | 149 | 857 | 0 | 0 | 1345 | 112 | 288 | 833 | 44 | | | |
| Peak Hour Factor | 0.83 | 0.88 | 0.95 | 0.95 | 0.92 | 0.79 | 0.92 | 0.91 | 0.84 | | | |
| Percent Heavy Veh, % | 2 | 2 | 0 | 0 | 2 | 2 | 2 | 2 | 2 | | | |
| Cap, veh/h | 234 | 2193 | 0 | 0 | 1665 | 138 | 512 | 986 | 52 | | | |
| Arrive On Green | 0.13 | 1.00 | 0.00 | 0.00 | 0.50 | 0.50 | 0.30 | 0.30 | 0.30 | | | |
| Sat Flow, veh/h | 1734 | 3693 | 0 | 0 | 3457 | 279 | 1734 | 3341 | 176 | | | |
| Grp Volume(v), veh/h | 149 | 857 | 0 | 0 | 718 | 739 | 288 | 431 | 446 | | | |
| Grp Sat Flow(s),veh/h/ln | 1734 | 1799 | 0 | 0 | 1799 | 1842 | 1734 | 1730 | 1787 | | | |
| Q Serve(g_s), s | 0.8 | 0.0 | 0.0 | 0.0 | 35.2 | 35.6 | 14.7 | 24.6 | 24.6 | | | |
| Cycle Q Clear(g_c), s | 0.8 | 0.0 | 0.0 | 0.0 | 35.2 | 35.6 | 14.7 | 24.6 | 24.6 | | | |
| Prop In Lane | 1.00 | | 0.00 | 0.00 | | 0.15 | 1.00 | | 0.10 | | | |
| Lane Grp Cap(c), veh/h | 234 | 2193 | 0 | 0 | 891 | 912 | 512 | 511 | 528 | | | |
| V/C Ratio(X) | 0.64 | 0.39 | 0.00 | 0.00 | 0.81 | 0.81 | 0.56 | 0.84 | 0.84 | | | |
| Avail Cap(c_a), veh/h | 234 | 2193 | 0 | 0 | 891 | 912 | 512 | 511 | 528 | | | |
| HCM Platoon Ratio | 2.00 | 2.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Upstream Filter(l) | 0.82 | 0.82 | 0.00 | 0.00 | 1.00 | 1.00 | 0.73 | 0.73 | 0.73 | | | |
| Uniform Delay (d), s/veh | 40.1 | 0.0 | 0.0 | 0.0 | 22.2 | 22.3 | 31.3 | 34.7 | 34.7 | | | |
| Incr Delay (d2), s/veh | 3.6 | 0.4 | 0.0 | 0.0 | 7.7 | 7.7 | 3.2 | 11.9 | 11.6 | | | |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| %ile BackOfQ(50%),veh/ln | 3.6 | 0.1 | 0.0 | 0.0 | 16.3 | 16.9 | 6.6 | 12.0 | 12.3 | | | |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 43.6 | 0.4 | 0.0 | 0.0 | 29.9 | 30.1 | 34.5 | 46.7 | 46.3 | | | |
| LnGrp LOS | D | A | A | A | C | C | C | D | D | | | |
| Approach Vol, veh/h | | 1006 | | | 1457 | | | 1165 | | | | |
| Approach Delay, s/veh | | 6.8 | | | 30.0 | | | 43.5 | | | | |
| Approach LOS | | A | | | C | | | D | | | | |
| Timer - Assigned Phs | 1 | 2 | | | | 6 | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 12.0 | 57.0 | | | | 69.0 | | 36.0 | | | | |
| Change Period (Y+Rc), s | 5.0 | 5.0 | | | | 5.0 | | 5.0 | | | | |
| Max Green Setting (Gmax), s | 7.0 | 52.0 | | | | 64.0 | | 31.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 0.0 | 0.0 | | | | 0.0 | | 0.0 | | | | |
| Green Ext Time (p_c), s | 0.0 | 0.0 | | | | 0.0 | | 0.0 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | | 27.9 | | | | | | | |
| HCM 6th LOS | | | | | C | | | | | | | |

HCM Signalized Intersection Capacity Analysis
3: 27th Street/26th Street & State Street

ACHD Countywide Model
03/11/2021



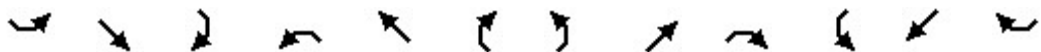
| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------|-------|------|------|-------|-------|------|-------|-------|------|-------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 25 | 695 | 170 | 45 | 1495 | 45 | 305 | 135 | 45 | 20 | 50 | 15 |
| Future Volume (vph) | 25 | 695 | 170 | 45 | 1495 | 45 | 305 | 135 | 45 | 20 | 50 | 15 |
| Ideal Flow (vphpl) | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 |
| Lane Width | 11 | 12 | 12 | 11 | 12 | 12 | 11 | 11 | 12 | 11 | 11 | 12 |
| Total Lost time (s) | 6.0 | 5.0 | 5.0 | 6.0 | 5.0 | | 6.0 | 6.0 | | 6.0 | 6.0 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.91 | | 0.95 | 0.95 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.97 | | 1.00 | 0.96 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 0.99 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1666 | 3446 | 1542 | 1666 | 4927 | | 1582 | 1598 | | 1666 | 1678 | |
| Flt Permitted | 0.08 | 1.00 | 1.00 | 0.09 | 1.00 | | 0.95 | 0.99 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 138 | 3446 | 1542 | 163 | 4927 | | 1582 | 1598 | | 1666 | 1678 | |
| Peak-hour factor, PHF | 0.82 | 0.90 | 0.84 | 0.67 | 0.94 | 0.83 | 0.86 | 0.77 | 0.73 | 0.68 | 0.89 | 0.67 |
| Growth Factor (vph) | 126% | 126% | 126% | 114% | 114% | 114% | 224% | 224% | 224% | 253% | 253% | 253% |
| Adj. Flow (vph) | 38 | 973 | 255 | 77 | 1813 | 62 | 794 | 393 | 138 | 74 | 142 | 57 |
| RTOR Reduction (vph) | 0 | 0 | 131 | 0 | 3 | 0 | 0 | 6 | 0 | 0 | 10 | 0 |
| Lane Group Flow (vph) | 38 | 973 | 124 | 77 | 1872 | 0 | 659 | 660 | 0 | 74 | 189 | 0 |
| Turn Type | pm+pt | NA | Perm | pm+pt | NA | | Split | NA | | Split | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | 8 | 8 | | 4 | 4 | |
| Permitted Phases | 6 | | 6 | 2 | | | | | | | | |
| Actuated Green, G (s) | 57.4 | 51.0 | 51.0 | 60.6 | 52.6 | | 55.0 | 55.0 | | 13.0 | 13.0 | |
| Effective Green, g (s) | 57.4 | 51.0 | 51.0 | 60.6 | 52.6 | | 55.0 | 55.0 | | 13.0 | 13.0 | |
| Actuated g/C Ratio | 0.38 | 0.34 | 0.34 | 0.40 | 0.35 | | 0.37 | 0.37 | | 0.09 | 0.09 | |
| Clearance Time (s) | 6.0 | 5.0 | 5.0 | 6.0 | 5.0 | | 6.0 | 6.0 | | 6.0 | 6.0 | |
| Vehicle Extension (s) | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | | 2.0 | 2.0 | | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | 118 | 1171 | 524 | 146 | 1727 | | 580 | 585 | | 144 | 145 | |
| v/s Ratio Prot | 0.01 | 0.28 | | c0.03 | c0.38 | | c0.42 | 0.41 | | 0.04 | c0.11 | |
| v/s Ratio Perm | 0.11 | | 0.08 | 0.18 | | | | | | | | |
| v/c Ratio | 0.32 | 0.83 | 0.24 | 0.53 | 1.08 | | 1.14 | 1.13 | | 0.51 | 1.30 | |
| Uniform Delay, d1 | 36.8 | 45.5 | 35.5 | 33.0 | 48.7 | | 47.5 | 47.5 | | 65.5 | 68.5 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 0.6 | 6.9 | 1.1 | 1.6 | 48.4 | | 80.9 | 77.6 | | 1.3 | 177.4 | |
| Delay (s) | 37.4 | 52.5 | 36.6 | 34.6 | 97.1 | | 128.4 | 125.1 | | 66.8 | 245.9 | |
| Level of Service | D | D | D | C | F | | F | F | | E | F | |
| Approach Delay (s) | | 48.8 | | | 94.6 | | | 126.7 | | | 197.4 | |
| Approach LOS | | D | | | F | | | F | | | F | |

Intersection Summary

| | | | |
|------------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 97.2 | HCM 2000 Level of Service | F |
| HCM 2000 Volume to Capacity ratio | 1.11 | | |
| Actuated Cycle Length (s) | 150.0 | Sum of lost time (s) | 23.0 |
| Intersection Capacity Utilization | 97.9% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |
| Description: Count Date: 1/22/2015 | | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
4: Whitewater Park Blvd./31st Street & State Street

ACHD Countywide Model
03/11/2021



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------|-------|------|------|-------|-------|------|-------|-------|------|-------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 22 | 820 | 106 | 16 | 1684 | 4 | 218 | 64 | 36 | 18 | 30 | 4 |
| Future Volume (vph) | 22 | 820 | 106 | 16 | 1684 | 4 | 218 | 64 | 36 | 18 | 30 | 4 |
| Ideal Flow (vphpl) | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 |
| Lane Width | 10 | 13 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 11 | 12 | 12 |
| Total Lost time (s) | 6.0 | 5.5 | 5.5 | 6.0 | 5.5 | 5.5 | 6.0 | 5.5 | | 6.0 | 6.0 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.97 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.95 | | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1608 | 3561 | 1542 | 1723 | 3446 | 1542 | 3343 | 1715 | | 1666 | 1783 | |
| Flt Permitted | 0.05 | 1.00 | 1.00 | 0.18 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.73 | 1.00 | |
| Satd. Flow (perm) | 78 | 3561 | 1542 | 334 | 3446 | 1542 | 3343 | 1715 | | 1275 | 1783 | |
| Peak-hour factor, PHF | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Growth Factor (vph) | 134% | 134% | 134% | 141% | 141% | 141% | 123% | 123% | 123% | 156% | 156% | 156% |
| Adj. Flow (vph) | 30 | 1133 | 146 | 23 | 2448 | 6 | 276 | 81 | 46 | 29 | 48 | 6 |
| RTOR Reduction (vph) | 0 | 0 | 59 | 0 | 0 | 2 | 0 | 14 | 0 | 0 | 4 | 0 |
| Lane Group Flow (vph) | 30 | 1133 | 87 | 23 | 2448 | 4 | 276 | 113 | 0 | 29 | 50 | 0 |
| Turn Type | pm+pt | NA | Perm | pm+pt | NA | Perm | Prot | NA | | pm+pt | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | 6 | | 6 | 2 | | 2 | | | | 4 | 4 | |
| Actuated Green, G (s) | 90.5 | 86.3 | 86.3 | 88.7 | 85.4 | 85.4 | 23.4 | 29.4 | | 8.5 | 8.5 | |
| Effective Green, g (s) | 90.5 | 86.3 | 86.3 | 88.7 | 85.4 | 85.4 | 23.4 | 29.4 | | 8.5 | 8.5 | |
| Actuated g/C Ratio | 0.62 | 0.60 | 0.60 | 0.61 | 0.59 | 0.59 | 0.16 | 0.20 | | 0.06 | 0.06 | |
| Clearance Time (s) | 6.0 | 5.5 | 5.5 | 6.0 | 5.5 | 5.5 | 6.0 | 5.5 | | 6.0 | 6.0 | |
| Vehicle Extension (s) | 3.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | 93 | 2119 | 917 | 235 | 2029 | 908 | 539 | 347 | | 82 | 104 | |
| v/s Ratio Prot | c0.01 | 0.32 | | 0.00 | c0.71 | | c0.08 | c0.07 | | 0.01 | c0.03 | |
| v/s Ratio Perm | 0.19 | | 0.06 | 0.06 | | 0.00 | | | | 0.01 | | |
| v/c Ratio | 0.32 | 0.53 | 0.09 | 0.10 | 1.21 | 0.00 | 0.51 | 0.32 | | 0.35 | 0.48 | |
| Uniform Delay, d1 | 34.2 | 17.4 | 12.6 | 12.9 | 29.8 | 12.3 | 55.6 | 49.3 | | 65.4 | 66.1 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.0 | 1.0 | 0.2 | 0.1 | 97.8 | 0.0 | 0.3 | 0.2 | | 1.0 | 1.3 | |
| Delay (s) | 36.2 | 18.4 | 12.8 | 13.0 | 127.6 | 12.3 | 55.9 | 49.5 | | 66.4 | 67.4 | |
| Level of Service | D | B | B | B | F | B | E | D | | E | E | |
| Approach Delay (s) | | 18.2 | | | 126.3 | | | 53.9 | | | 67.0 | |
| Approach LOS | | B | | | F | | | D | | | E | |

| Intersection Summary | | |
|------------------------------------|-------|---------------------------|
| HCM 2000 Control Delay | 85.2 | HCM 2000 Level of Service |
| HCM 2000 Volume to Capacity ratio | 0.99 | F |
| Actuated Cycle Length (s) | 145.0 | Sum of lost time (s) |
| Intersection Capacity Utilization | 98.2% | 23.5 |
| Analysis Period (min) | 15 | ICU Level of Service |
| Description: Count Date: 1/21/2014 | | F |
| c Critical Lane Group | | |

HCM 6th Signalized Intersection Summary
 5: 9th Street & Idaho Street



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|-----|------|-----|------|------|------|-----|-----|-----|------|------|------|
| Lane Configurations | | | | | ↑↑↑ | | | | | | ↑↑↑ | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 290 | 1060 | 0 | 0 | 0 | 0 | 0 | 635 | 45 |
| Future Volume (veh/h) | 0 | 0 | 0 | 290 | 1060 | 0 | 0 | 0 | 0 | 0 | 635 | 45 |
| Initial Q (Qb), veh | | | | 0 | 0 | 0 | | | | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | | | | 1.00 | | 1.00 | | | | 1.00 | | 0.88 |
| Parking Bus, Adj | | | | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | | | No | | | | | | No | | |
| Adj Sat Flow, veh/h/ln | | | | 1639 | 1639 | 0 | | | | 0 | 1639 | 1639 |
| Adj Flow Rate, veh/h | | | | 385 | 1421 | 0 | | | | 0 | 1432 | 109 |
| Peak Hour Factor | | | | 0.95 | 0.94 | 0.88 | | | | 0.88 | 0.86 | 0.80 |
| Percent Heavy Veh, % | | | | 2 | 2 | 0 | | | | 0 | 2 | 2 |
| Cap, veh/h | | | | 471 | 1517 | 0 | | | | 0 | 1613 | 123 |
| Arrive On Green | | | | 0.46 | 0.46 | 0.00 | | | | 0.00 | 0.38 | 0.38 |
| Sat Flow, veh/h | | | | 830 | 3421 | 0 | | | | 0 | 4341 | 319 |
| Grp Volume(v), veh/h | | | | 650 | 1156 | 0 | | | | 0 | 1019 | 522 |
| Grp Sat Flow(s),veh/h/ln | | | | 1403 | 1357 | 0 | | | | 0 | 1492 | 1529 |
| Q Serve(g_s), s | | | | 30.0 | 26.0 | 0.0 | | | | 0.0 | 20.7 | 20.8 |
| Cycle Q Clear(g_c), s | | | | 30.0 | 26.0 | 0.0 | | | | 0.0 | 20.7 | 20.8 |
| Prop In Lane | | | | 0.59 | | 0.00 | | | | 0.00 | | 0.21 |
| Lane Grp Cap(c), veh/h | | | | 736 | 1253 | 0 | | | | 0 | 1147 | 588 |
| V/C Ratio(X) | | | | 0.88 | 0.92 | 0.00 | | | | 0.00 | 0.89 | 0.89 |
| Avail Cap(c_a), veh/h | | | | 736 | 1253 | 0 | | | | 0 | 1147 | 588 |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | | | | 1.00 | 1.00 | 0.00 | | | | 0.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | | | | 17.6 | 16.4 | 0.0 | | | | 0.0 | 18.7 | 18.7 |
| Incr Delay (d2), s/veh | | | | 14.6 | 12.6 | 0.0 | | | | 0.0 | 10.3 | 17.9 |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | | | | 11.5 | 9.3 | 0.0 | | | | 0.0 | 8.2 | 9.6 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 32.1 | 29.0 | 0.0 | | | | 0.0 | 29.0 | 36.6 |
| LnGrp LOS | | | | C | C | A | | | | A | C | D |
| Approach Vol, veh/h | | | | | 1806 | | | | | | 1541 | |
| Approach Delay, s/veh | | | | | 30.1 | | | | | | 31.6 | |
| Approach LOS | | | | | C | | | | | | C | |
| Timer - Assigned Phs | | 2 | | 4 | | | | | | | | |
| Phs Duration (G+Y+Rc), s | | 35.0 | | 30.0 | | | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | | | | | | | |
| Max Green Setting (Gmax), s | | 30.0 | | 25.0 | | | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | | 0.0 | | | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 30.8 | | | | | | | | |
| HCM 6th LOS | | | | C | | | | | | | | |

HCM 6th Signalized Intersection Summary
6: 15th Street & Idaho Street

ACHD Countywide Model
03/11/2021



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|-----|------|-----|------|------|------|------|------|------|-----|-----|-----|
| Lane Configurations | | | | | ↑↑↑ | | | ↑↑ | | | | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 0 | 780 | 130 | 75 | 755 | 0 | 0 | 0 | 0 |
| Future Volume (veh/h) | 0 | 0 | 0 | 0 | 780 | 130 | 75 | 755 | 0 | 0 | 0 | 0 |
| Initial Q (Qb), veh | | | | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| Ped-Bike Adj(A_pbT) | | | | 1.00 | | 1.00 | 1.00 | | 1.00 | | | |
| Parking Bus, Adj | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Work Zone On Approach | | | | | No | | | No | | | | |
| Adj Sat Flow, veh/h/ln | | | | 0 | 1639 | 1639 | 1639 | 1639 | 0 | | | |
| Adj Flow Rate, veh/h | | | | 0 | 1043 | 174 | 111 | 1116 | 0 | | | |
| Peak Hour Factor | | | | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | | | |
| Percent Heavy Veh, % | | | | 0 | 2 | 2 | 2 | 2 | 0 | | | |
| Cap, veh/h | | | | 0 | 1352 | 225 | 133 | 1405 | 0 | | | |
| Arrive On Green | | | | 0.00 | 0.35 | 0.35 | 0.48 | 0.48 | 0.00 | | | |
| Sat Flow, veh/h | | | | 0 | 4010 | 643 | 275 | 2989 | 0 | | | |
| Grp Volume(v), veh/h | | | | 0 | 805 | 412 | 656 | 571 | 0 | | | |
| Grp Sat Flow(s),veh/h/ln | | | | 0 | 1492 | 1523 | 1625 | 1557 | 0 | | | |
| Q Serve(g_s), s | | | | 0.0 | 14.4 | 14.5 | 21.0 | 18.0 | 0.0 | | | |
| Cycle Q Clear(g_c), s | | | | 0.0 | 14.4 | 14.5 | 21.0 | 18.0 | 0.0 | | | |
| Prop In Lane | | | | 0.00 | | 0.42 | 0.17 | | 0.00 | | | |
| Lane Grp Cap(c), veh/h | | | | 0 | 1044 | 533 | 786 | 753 | 0 | | | |
| V/C Ratio(X) | | | | 0.00 | 0.77 | 0.77 | 0.83 | 0.76 | 0.00 | | | |
| Avail Cap(c_a), veh/h | | | | 0 | 1044 | 533 | 786 | 753 | 0 | | | |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Upstream Filter(l) | | | | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | | | |
| Uniform Delay (d), s/veh | | | | 0.0 | 17.4 | 17.4 | 13.4 | 12.6 | 0.0 | | | |
| Incr Delay (d2), s/veh | | | | 0.0 | 5.5 | 10.4 | 10.2 | 7.1 | 0.0 | | | |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| %ile BackOfQ(50%),veh/ln | | | | 0.0 | 5.3 | 6.1 | 8.5 | 6.6 | 0.0 | | | |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 0.0 | 22.9 | 27.8 | 23.6 | 19.7 | 0.0 | | | |
| LnGrp LOS | | | | A | C | C | C | B | A | | | |
| Approach Vol, veh/h | | | | | 1217 | | | 1227 | | | | |
| Approach Delay, s/veh | | | | | 24.5 | | | 21.8 | | | | |
| Approach LOS | | | | | C | | | C | | | | |
| Timer - Assigned Phs | | 2 | | 4 | | | | | | | | |
| Phs Duration (G+Y+Rc), s | | 26.0 | | 34.0 | | | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | | | | | | | |
| Max Green Setting (Gmax), s | | 21.0 | | 29.0 | | | | | | | | |
| Max Q Clear Time (g_c+l1), s | | 0.0 | | 0.0 | | | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 23.2 | | | | | | | | |
| HCM 6th LOS | | | | C | | | | | | | | |

HCM 6th Signalized Intersection Summary
 7: 9th Street & Main Street



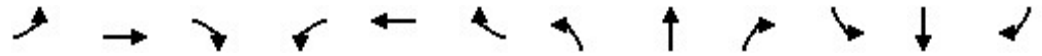
| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|------|------|------|------|-----|-----|-----|-----|-----|------|------|------|
| Lane Configurations | | ↑↑↑ | | | | | | | | | ↑↑↑ | |
| Traffic Volume (veh/h) | 0 | 590 | 270 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 1325 | 0 |
| Future Volume (veh/h) | 0 | 590 | 270 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 1325 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | | | | | | | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | | | | | | | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | | | | | | | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | | | | | | | No | |
| Adj Sat Flow, veh/h/ln | 0 | 1639 | 1639 | | | | | | | 1639 | 1639 | 0 |
| Adj Flow Rate, veh/h | 0 | 1013 | 464 | | | | | | | 151 | 2002 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | | | | | | | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 0 | 2 | 2 | | | | | | | 2 | 2 | 0 |
| Cap, veh/h | 0 | 1072 | 491 | | | | | | | 195 | 2005 | 0 |
| Arrive On Green | 0.00 | 0.12 | 0.12 | | | | | | | 0.50 | 0.50 | 0.00 |
| Sat Flow, veh/h | 0 | 3148 | 1374 | | | | | | | 267 | 4145 | 0 |
| Grp Volume(v), veh/h | 0 | 1007 | 470 | | | | | | | 799 | 1354 | 0 |
| Grp Sat Flow(s),veh/h/ln | 0 | 1492 | 1392 | | | | | | | 1563 | 1357 | 0 |
| Q Serve(g_s), s | 0.0 | 23.5 | 23.5 | | | | | | | 31.8 | 34.8 | 0.0 |
| Cycle Q Clear(g_c), s | 0.0 | 23.5 | 23.5 | | | | | | | 35.0 | 34.8 | 0.0 |
| Prop In Lane | 0.00 | | 0.99 | | | | | | | 0.19 | | 0.00 |
| Lane Grp Cap(c), veh/h | 0 | 1065 | 497 | | | | | | | 843 | 1357 | 0 |
| V/C Ratio(X) | 0.00 | 0.95 | 0.95 | | | | | | | 0.95 | 1.00 | 0.00 |
| Avail Cap(c_a), veh/h | 0 | 1065 | 497 | | | | | | | 843 | 1357 | 0 |
| HCM Platoon Ratio | 1.00 | 0.33 | 0.33 | | | | | | | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l) | 0.00 | 1.00 | 1.00 | | | | | | | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 0.0 | 30.2 | 30.2 | | | | | | | 17.8 | 17.5 | 0.0 |
| Incr Delay (d2), s/veh | 0.0 | 17.2 | 28.8 | | | | | | | 20.8 | 23.8 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | | | | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.0 | 11.7 | 12.5 | | | | | | | 16.4 | 14.0 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 0.0 | 47.4 | 59.0 | | | | | | | 38.6 | 41.3 | 0.0 |
| LnGrp LOS | A | D | E | | | | | | | D | D | A |
| Approach Vol, veh/h | | 1477 | | | | | | | | | 2153 | |
| Approach Delay, s/veh | | 51.1 | | | | | | | | | 40.3 | |
| Approach LOS | | D | | | | | | | | | D | |
| Timer - Assigned Phs | | 2 | | 4 | | | | | | | | |
| Phs Duration (G+Y+Rc), s | | 30.0 | | 40.0 | | | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | | | | | | | |
| Max Green Setting (Gmax), s | | 25.0 | | 35.0 | | | | | | | | |
| Max Q Clear Time (g_c+l1), s | | 0.0 | | 0.0 | | | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 44.7 | | | | | | | | | |
| HCM 6th LOS | | | D | | | | | | | | | |

HCM 6th Signalized Intersection Summary
 8: 15th Street & Main Street



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|------|------|------|------|-----|-----|------|------|------|-----|-----|-----|
| Lane Configurations | | ↑↑↑ | | | | | | ↑↑ | ↑ | | | |
| Traffic Volume (veh/h) | 95 | 500 | 0 | 0 | 0 | 0 | 0 | 700 | 155 | 0 | 0 | 0 |
| Future Volume (veh/h) | 95 | 500 | 0 | 0 | 0 | 0 | 0 | 700 | 155 | 0 | 0 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | | | | 0 | 0 | 0 | | | |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | | | | 1.00 | | 1.00 | | | |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 0.90 | | | |
| Work Zone On Approach | | No | | | | | | No | | | | |
| Adj Sat Flow, veh/h/ln | 1639 | 1639 | 0 | | | | 0 | 1639 | 1639 | | | |
| Adj Flow Rate, veh/h | 177 | 929 | 0 | | | | 0 | 1050 | 232 | | | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | | | | 0.92 | 0.92 | 0.92 | | | |
| Percent Heavy Veh, % | 2 | 2 | 0 | | | | 0 | 2 | 2 | | | |
| Cap, veh/h | 299 | 1241 | 0 | | | | 0 | 1472 | 591 | | | |
| Arrive On Green | 0.35 | 0.35 | 0.00 | | | | 0.00 | 0.47 | 0.47 | | | |
| Sat Flow, veh/h | 593 | 3726 | 0 | | | | 0 | 3196 | 1250 | | | |
| Grp Volume(v), veh/h | 410 | 696 | 0 | | | | 0 | 1050 | 232 | | | |
| Grp Sat Flow(s),veh/h/ln | 1470 | 1357 | 0 | | | | 0 | 1557 | 1250 | | | |
| Q Serve(g_s), s | 12.7 | 12.4 | 0.0 | | | | 0.0 | 14.8 | 6.6 | | | |
| Cycle Q Clear(g_c), s | 13.8 | 12.4 | 0.0 | | | | 0.0 | 14.8 | 6.6 | | | |
| Prop In Lane | 0.43 | | 0.00 | | | | 0.00 | | 1.00 | | | |
| Lane Grp Cap(c), veh/h | 602 | 938 | 0 | | | | 0 | 1472 | 591 | | | |
| V/C Ratio(X) | 0.68 | 0.74 | 0.00 | | | | 0.00 | 0.71 | 0.39 | | | |
| Avail Cap(c_a), veh/h | 602 | 938 | 0 | | | | 0 | 1472 | 591 | | | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 | | | |
| Upstream Filter(l) | 1.00 | 1.00 | 0.00 | | | | 0.00 | 1.00 | 1.00 | | | |
| Uniform Delay (d), s/veh | 16.3 | 15.8 | 0.0 | | | | 0.0 | 11.5 | 9.4 | | | |
| Incr Delay (d2), s/veh | 6.1 | 5.3 | 0.0 | | | | 0.0 | 3.0 | 2.0 | | | |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 | | | |
| %ile BackOfQ(50%),veh/ln | 5.0 | 4.0 | 0.0 | | | | 0.0 | 4.9 | 1.9 | | | |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 22.4 | 21.1 | 0.0 | | | | 0.0 | 14.5 | 11.3 | | | |
| LnGrp LOS | C | C | A | | | | A | B | B | | | |
| Approach Vol, veh/h | | 1106 | | | | | | 1282 | | | | |
| Approach Delay, s/veh | | 21.6 | | | | | | 13.9 | | | | |
| Approach LOS | | C | | | | | | B | | | | |
| Timer - Assigned Phs | | 2 | | 4 | | | | | | | | |
| Phs Duration (G+Y+Rc), s | | 24.0 | | 31.0 | | | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | | | | | | | |
| Max Green Setting (Gmax), s | | 19.0 | | 26.0 | | | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | | 0.0 | | | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 17.5 | | | | | | | | | |
| HCM 6th LOS | | | B | | | | | | | | | |

HCM 6th Signalized Intersection Summary
 9: 27th Street & Main Street



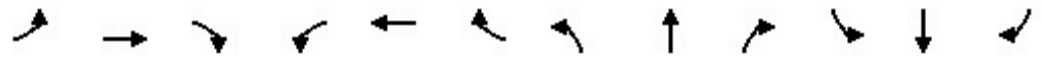
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|-----|------|------|-------|-------|-------|-------|-------|------|------|------|-------|
| Lane Configurations | | | | | ←←← | | ← | ↑ | | | ↑ | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 40 | 1765 | 80 | 455 | 610 | 0 | 0 | 235 | 120 |
| Future Volume (veh/h) | 0 | 0 | 0 | 40 | 1765 | 80 | 455 | 610 | 0 | 0 | 235 | 120 |
| Initial Q (Qb), veh | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | | | | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.98 |
| Parking Bus, Adj | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | | | No | | | No | | | No | | |
| Adj Sat Flow, veh/h/ln | | | | 1850 | 1821 | 1850 | 1821 | 1821 | 0 | 0 | 1821 | 1821 |
| Adj Flow Rate, veh/h | | | | 62 | 2294 | 116 | 680 | 870 | 0 | 0 | 388 | 206 |
| Peak Hour Factor | | | | 0.75 | 0.90 | 0.81 | 0.85 | 0.89 | 0.88 | 0.88 | 0.83 | 0.80 |
| Percent Heavy Veh, % | | | | 0 | 2 | 0 | 2 | 2 | 0 | 0 | 2 | 2 |
| Cap, veh/h | | | | 48 | 1873 | 97 | 469 | 981 | 0 | 0 | 291 | 154 |
| Arrive On Green | | | | 0.38 | 0.38 | 0.38 | 0.24 | 0.54 | 0.00 | 0.00 | 0.26 | 0.26 |
| Sat Flow, veh/h | | | | 124 | 4870 | 253 | 1734 | 1821 | 0 | 0 | 1112 | 590 |
| Grp Volume(v), veh/h | | | | 906 | 751 | 815 | 680 | 870 | 0 | 0 | 0 | 594 |
| Grp Sat Flow(s),veh/h/ln | | | | 1815 | 1657 | 1774 | 1734 | 1821 | 0 | 0 | 0 | 1703 |
| Q Serve(g_s), s | | | | 50.0 | 50.0 | 50.0 | 31.0 | 54.9 | 0.0 | 0.0 | 0.0 | 34.0 |
| Cycle Q Clear(g_c), s | | | | 50.0 | 50.0 | 50.0 | 31.0 | 54.9 | 0.0 | 0.0 | 0.0 | 34.0 |
| Prop In Lane | | | | 0.07 | | 0.14 | 1.00 | | 0.00 | 0.00 | | 0.35 |
| Lane Grp Cap(c), veh/h | | | | 698 | 637 | 682 | 469 | 981 | 0 | 0 | 0 | 445 |
| V/C Ratio(X) | | | | 1.30 | 1.18 | 1.19 | 1.45 | 0.89 | 0.00 | 0.00 | 0.00 | 1.33 |
| Avail Cap(c_a), veh/h | | | | 698 | 637 | 682 | 469 | 981 | 0 | 0 | 0 | 445 |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | | | | 0.85 | 0.85 | 0.85 | 0.41 | 0.41 | 0.00 | 0.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | | | | 40.0 | 40.0 | 40.0 | 47.7 | 26.5 | 0.0 | 0.0 | 0.0 | 48.0 |
| Incr Delay (d2), s/veh | | | | 142.9 | 94.1 | 99.3 | 207.4 | 5.4 | 0.0 | 0.0 | 0.0 | 165.0 |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | | | | 49.4 | 36.5 | 40.0 | 41.5 | 24.8 | 0.0 | 0.0 | 0.0 | 34.9 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 182.9 | 134.1 | 139.3 | 255.1 | 31.9 | 0.0 | 0.0 | 0.0 | 213.0 |
| LnGrp LOS | | | | F | F | F | F | C | A | A | A | F |
| Approach Vol, veh/h | | | | | 2472 | | | 1550 | | | | 594 |
| Approach Delay, s/veh | | | | | 153.7 | | | 129.8 | | | | 213.0 |
| Approach LOS | | | | | F | | | F | | | | F |
| Timer - Assigned Phs | | 2 | 3 | 4 | | | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | | 55.0 | 36.0 | 39.0 | | | | 75.0 | | | | |
| Change Period (Y+Rc), s | | 5.0 | 5.0 | 5.0 | | | | 5.0 | | | | |
| Max Green Setting (Gmax), s | | 50.0 | 31.0 | 34.0 | | | | 70.0 | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | 0.0 | 0.0 | | | | 0.0 | | | | |
| Green Ext Time (p_c), s | | 0.0 | 0.0 | 0.0 | | | | 0.0 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 153.3 | | | | | | | | |
| HCM 6th LOS | | | | F | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 10: Whitewater Park Blvd. & Main Street



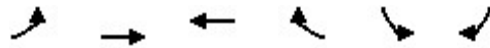
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR | |
|------------------------------------|------|------|-------|------|---------------------------|------|------|-------|------|------|------|-------|--|
| Lane Configurations | | | | | ↑↑↑ | ↑ | ↑ | ↑↑ | | | ↑↑ | ↑ | |
| Traffic Volume (vph) | 0 | 0 | 0 | 5 | 1820 | 290 | 15 | 420 | 0 | 0 | 135 | 300 | |
| Future Volume (vph) | 0 | 0 | 0 | 5 | 1820 | 290 | 15 | 420 | 0 | 0 | 135 | 300 | |
| Ideal Flow (vphpl) | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | |
| Lane Width | 12 | 12 | 12 | 12 | 12 | 12 | 11 | 11 | 12 | 12 | 11 | 11 | |
| Total Lost time (s) | | | | | 6.0 | 6.0 | 6.0 | 6.0 | | | 6.0 | 6.0 | |
| Lane Util. Factor | | | | | 0.91 | 1.00 | 1.00 | 0.95 | | | 0.95 | 1.00 | |
| Fr _t | | | | | 1.00 | 0.85 | 1.00 | 1.00 | | | 1.00 | 0.85 | |
| Fl _t Protected | | | | | 1.00 | 1.00 | 0.95 | 1.00 | | | 1.00 | 1.00 | |
| Satd. Flow (prot) | | | | | 4950 | 1542 | 1666 | 3331 | | | 3165 | 1490 | |
| Fl _t Permitted | | | | | 1.00 | 1.00 | 0.95 | 1.00 | | | 1.00 | 1.00 | |
| Satd. Flow (perm) | | | | | 4950 | 1542 | 1666 | 3331 | | | 3165 | 1490 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.42 | 0.92 | 0.85 | 0.57 | 0.79 | 0.92 | 0.92 | 0.90 | 0.85 | |
| Growth Factor (vph) | 100% | 100% | 100% | 112% | 112% | 112% | 180% | 180% | 180% | 166% | 166% | 166% | |
| Adj. Flow (vph) | 0 | 0 | 0 | 13 | 2216 | 382 | 47 | 957 | 0 | 0 | 249 | 586 | |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 53 | 0 | 0 | 0 | 0 | 0 | 67 | |
| Lane Group Flow (vph) | 0 | 0 | 0 | 0 | 2229 | 329 | 47 | 957 | 0 | 0 | 249 | 519 | |
| Parking (#/hr) | | | | | | | | | | | 0 | | |
| Turn Type | | | | Perm | NA | Perm | Prot | NA | | | NA | Perm | |
| Protected Phases | | | | | 2 | | 3 | 8 | | | 4 | | |
| Permitted Phases | | | | 2 | | 2 | | | | | | 4 | |
| Actuated Green, G (s) | | | | | 46.0 | 46.0 | 4.0 | 42.0 | | | 32.0 | 32.0 | |
| Effective Green, g (s) | | | | | 46.0 | 46.0 | 4.0 | 42.0 | | | 32.0 | 32.0 | |
| Actuated g/C Ratio | | | | | 0.46 | 0.46 | 0.04 | 0.42 | | | 0.32 | 0.32 | |
| Clearance Time (s) | | | | | 6.0 | 6.0 | 6.0 | 6.0 | | | 6.0 | 6.0 | |
| Vehicle Extension (s) | | | | | 2.0 | 2.0 | 2.0 | 2.0 | | | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | | | | | 2277 | 709 | 66 | 1399 | | | 1012 | 476 | |
| v/s Ratio Prot | | | | | | | 0.03 | c0.29 | | | 0.08 | | |
| v/s Ratio Perm | | | | | 0.45 | 0.21 | | | | | | c0.35 | |
| v/c Ratio | | | | | 0.98 | 0.46 | 0.71 | 0.68 | | | 0.25 | 1.09 | |
| Uniform Delay, d ₁ | | | | | 26.5 | 18.5 | 47.4 | 23.6 | | | 25.1 | 34.0 | |
| Progression Factor | | | | | 1.00 | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 | |
| Incremental Delay, d ₂ | | | | | 14.5 | 2.2 | 25.9 | 1.1 | | | 0.0 | 68.2 | |
| Delay (s) | | | | | 41.0 | 20.7 | 73.3 | 24.7 | | | 25.1 | 102.2 | |
| Level of Service | | | | | D | C | E | C | | | C | F | |
| Approach Delay (s) | | 0.0 | | | 38.1 | | | 27.0 | | | 79.2 | | |
| Approach LOS | | A | | | D | | | C | | | E | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 43.3 | | HCM 2000 Level of Service | | | | | | D | | |
| HCM 2000 Volume to Capacity ratio | | | 1.03 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 100.0 | | Sum of lost time (s) | | | | | | 18.0 | | |
| Intersection Capacity Utilization | | | 82.2% | | ICU Level of Service | | | | | | E | | |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| Description: Count Date: 11/9/2016 | | | | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

HCM 6th Signalized Intersection Summary
 11: 27th Street & Fairview Avenue



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|-----|------|------|------|------|------|------|------|
| Lane Configurations | ↗ | ↑↑↑ | | | | | | ↑↑ | ↗ | ↘ | ↑ | |
| Traffic Volume (veh/h) | 255 | 680 | 185 | 0 | 0 | 0 | 0 | 705 | 55 | 55 | 225 | 0 |
| Future Volume (veh/h) | 255 | 680 | 185 | 0 | 0 | 0 | 0 | 705 | 55 | 55 | 225 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | | | | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | | | | 1.00 | | 0.99 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1821 | 1821 | 1821 | | | | 0 | 1821 | 1894 | 1821 | 1821 | 0 |
| Adj Flow Rate, veh/h | 431 | 1111 | 391 | | | | 0 | 1041 | 82 | 100 | 411 | 0 |
| Peak Hour Factor | 0.90 | 0.93 | 0.72 | | | | 0.92 | 0.84 | 0.83 | 0.86 | 0.86 | 0.92 |
| Percent Heavy Veh, % | 2 | 2 | 2 | | | | 0 | 2 | 2 | 2 | 2 | 0 |
| Cap, veh/h | 768 | 1604 | 564 | | | | 0 | 989 | 453 | 202 | 754 | 0 |
| Arrive On Green | 0.44 | 0.44 | 0.44 | | | | 0.00 | 0.29 | 0.29 | 0.06 | 0.41 | 0.00 |
| Sat Flow, veh/h | 1734 | 3622 | 1274 | | | | 0 | 3551 | 1585 | 1734 | 1821 | 0 |
| Grp Volume(v), veh/h | 431 | 1017 | 485 | | | | 0 | 1041 | 82 | 100 | 411 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1734 | 1657 | 1581 | | | | 0 | 1730 | 1585 | 1734 | 1821 | 0 |
| Q Serve(g_s), s | 12.9 | 17.3 | 17.3 | | | | 0.0 | 20.0 | 2.7 | 0.0 | 11.9 | 0.0 |
| Cycle Q Clear(g_c), s | 12.9 | 17.3 | 17.3 | | | | 0.0 | 20.0 | 2.7 | 0.0 | 11.9 | 0.0 |
| Prop In Lane | 1.00 | | 0.81 | | | | 0.00 | | 1.00 | 1.00 | | 0.00 |
| Lane Grp Cap(c), veh/h | 768 | 1468 | 700 | | | | 0 | 989 | 453 | 202 | 754 | 0 |
| V/C Ratio(X) | 0.56 | 0.69 | 0.69 | | | | 0.00 | 1.05 | 0.18 | 0.50 | 0.54 | 0.00 |
| Avail Cap(c_a), veh/h | 768 | 1468 | 700 | | | | 0 | 989 | 453 | 202 | 754 | 0 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.86 | 0.86 | 0.86 | | | | 0.00 | 1.00 | 1.00 | 0.09 | 0.09 | 0.00 |
| Uniform Delay (d), s/veh | 14.5 | 15.7 | 15.7 | | | | 0.0 | 25.0 | 18.8 | 31.1 | 15.5 | 0.0 |
| Incr Delay (d2), s/veh | 2.5 | 2.3 | 4.8 | | | | 0.0 | 43.6 | 0.9 | 0.2 | 0.3 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 5.1 | 6.3 | 6.5 | | | | 0.0 | 13.7 | 1.1 | 1.6 | 4.7 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 17.0 | 18.0 | 20.5 | | | | 0.0 | 68.6 | 19.7 | 31.3 | 15.8 | 0.0 |
| LnGrp LOS | B | B | C | | | | A | F | B | C | B | A |
| Approach Vol, veh/h | | 1933 | | | | | | 1123 | | | 511 | |
| Approach Delay, s/veh | | 18.4 | | | | | | 65.0 | | | 18.8 | |
| Approach LOS | | B | | | | | | E | | | B | |
| Timer - Assigned Phs | | | | 4 | | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | | | | 34.0 | | 36.0 | 9.0 | 25.0 | | | | |
| Change Period (Y+Rc), s | | | | 5.0 | | 5.0 | 5.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | | | | 29.0 | | 31.0 | 4.0 | 20.0 | | | | |
| Max Q Clear Time (g_c+I1), s | | | | 0.0 | | 0.0 | 0.0 | 0.0 | | | | |
| Green Ext Time (p_c), s | | | | 0.0 | | 0.0 | 0.0 | 0.0 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 33.1 | | | | | | | | | |
| HCM 6th LOS | | | C | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 12: Fairview Avenue & Whitewater Park Blvd.



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------|------|------|------|------|-------|------|
| Lane Configurations | | 4111 | | | 11 | |
| Traffic Volume (vph) | 430 | 860 | 0 | 0 | 160 | 0 |
| Future Volume (vph) | 430 | 860 | 0 | 0 | 160 | 0 |
| Ideal Flow (vphpl) | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 |
| Total Lost time (s) | | 5.5 | | | 6.0 | |
| Lane Util. Factor | | 0.86 | | | 0.97 | |
| Frt | | 1.00 | | | 1.00 | |
| Flt Protected | | 0.98 | | | 0.95 | |
| Satd. Flow (prot) | | 6134 | | | 3343 | |
| Flt Permitted | | 0.98 | | | 0.95 | |
| Satd. Flow (perm) | | 6134 | | | 3343 | |
| Peak-hour factor, PHF | 0.84 | 0.88 | 0.92 | 0.92 | 0.94 | 0.92 |
| Growth Factor (vph) | 149% | 149% | 100% | 100% | 181% | 181% |
| Adj. Flow (vph) | 763 | 1456 | 0 | 0 | 308 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 2219 | 0 | 0 | 308 | 0 |
| Turn Type | Perm | NA | | | Prot | |
| Protected Phases | | 6 | | | 4 | |
| Permitted Phases | 6 | | | | | |
| Actuated Green, G (s) | | 79.4 | | | 14.1 | |
| Effective Green, g (s) | | 79.4 | | | 14.1 | |
| Actuated g/C Ratio | | 0.76 | | | 0.13 | |
| Clearance Time (s) | | 5.5 | | | 6.0 | |
| Vehicle Extension (s) | | 2.0 | | | 2.0 | |
| Lane Grp Cap (vph) | | 4638 | | | 448 | |
| v/s Ratio Prot | | | | | c0.09 | |
| v/s Ratio Perm | | 0.36 | | | | |
| v/c Ratio | | 0.48 | | | 0.69 | |
| Uniform Delay, d1 | | 4.9 | | | 43.3 | |
| Progression Factor | | 1.00 | | | 1.00 | |
| Incremental Delay, d2 | | 0.4 | | | 3.5 | |
| Delay (s) | | 5.2 | | | 46.8 | |
| Level of Service | | A | | | D | |
| Approach Delay (s) | | 5.2 | 0.0 | | 46.8 | |
| Approach LOS | | A | A | | D | |

| Intersection Summary | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 10.3 | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | 0.51 | | |
| Actuated Cycle Length (s) | 105.0 | Sum of lost time (s) | 11.5 |
| Intersection Capacity Utilization | 91.4% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |

Description: Count Date: 11/9/2016

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 4: Whitewater Park Blvd./31st Street & State Street



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------|-------|------|------|-------|-------|------|-------|-------|------|-------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 22 | 820 | 106 | 16 | 1684 | 4 | 218 | 64 | 36 | 18 | 30 | 4 |
| Future Volume (vph) | 22 | 820 | 106 | 16 | 1684 | 4 | 218 | 64 | 36 | 18 | 30 | 4 |
| Ideal Flow (vphpl) | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 |
| Lane Width | 10 | 13 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 11 | 12 | 12 |
| Total Lost time (s) | 6.0 | 5.5 | 5.5 | 6.0 | 5.5 | 5.5 | 6.0 | 5.5 | | 6.0 | 6.0 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.97 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.95 | | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1516 | 3526 | 1527 | 1706 | 3413 | 1527 | 3343 | 1716 | | 1666 | 1784 | |
| Flt Permitted | 0.05 | 1.00 | 1.00 | 0.18 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.73 | 1.00 | |
| Satd. Flow (perm) | 74 | 3526 | 1527 | 332 | 3413 | 1527 | 3343 | 1716 | | 1275 | 1784 | |
| Peak-hour factor, PHF | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Growth Factor (vph) | 134% | 134% | 134% | 141% | 141% | 141% | 122% | 122% | 122% | 157% | 157% | 157% |
| Adj. Flow (vph) | 30 | 1133 | 146 | 23 | 2448 | 6 | 274 | 80 | 45 | 29 | 49 | 6 |
| RTOR Reduction (vph) | 0 | 0 | 59 | 0 | 0 | 2 | 0 | 14 | 0 | 0 | 4 | 0 |
| Lane Group Flow (vph) | 30 | 1133 | 87 | 23 | 2448 | 4 | 274 | 111 | 0 | 29 | 51 | 0 |
| Heavy Vehicles (%) | 3% | 3% | 3% | 3% | 3% | 3% | 2% | 2% | 2% | 2% | 2% | 2% |
| Bus Blockages (#/hr) | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Turn Type | pm+pt | NA | Perm | pm+pt | NA | Perm | Prot | NA | | pm+pt | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | 6 | | 6 | 2 | | 2 | | | | 4 | 4 | |
| Actuated Green, G (s) | 90.7 | 86.5 | 86.5 | 88.9 | 85.6 | 85.6 | 23.2 | 29.2 | | 8.5 | 8.5 | |
| Effective Green, g (s) | 90.7 | 86.5 | 86.5 | 88.9 | 85.6 | 85.6 | 23.2 | 29.2 | | 8.5 | 8.5 | |
| Actuated g/C Ratio | 0.63 | 0.60 | 0.60 | 0.61 | 0.59 | 0.59 | 0.16 | 0.20 | | 0.06 | 0.06 | |
| Clearance Time (s) | 6.0 | 5.5 | 5.5 | 6.0 | 5.5 | 5.5 | 6.0 | 5.5 | | 6.0 | 6.0 | |
| Vehicle Extension (s) | 3.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | 88 | 2103 | 910 | 234 | 2014 | 901 | 534 | 345 | | 82 | 104 | |
| v/s Ratio Prot | c0.01 | 0.32 | | 0.00 | c0.72 | | c0.08 | c0.06 | | 0.01 | c0.03 | |
| v/s Ratio Perm | 0.20 | | 0.06 | 0.06 | | 0.00 | | | | 0.01 | | |
| v/c Ratio | 0.34 | 0.54 | 0.10 | 0.10 | 1.22 | 0.00 | 0.51 | 0.32 | | 0.35 | 0.49 | |
| Uniform Delay, d1 | 34.3 | 17.4 | 12.5 | 12.9 | 29.7 | 12.2 | 55.7 | 49.4 | | 65.4 | 66.2 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.3 | 1.0 | 0.2 | 0.1 | 101.8 | 0.0 | 0.3 | 0.2 | | 1.0 | 1.3 | |
| Delay (s) | 36.6 | 18.4 | 12.7 | 12.9 | 131.5 | 12.2 | 56.1 | 49.6 | | 66.4 | 67.5 | |
| Level of Service | D | B | B | B | F | B | E | D | | E | E | |
| Approach Delay (s) | | 18.2 | | | 130.1 | | | 54.1 | | | 67.1 | |
| Approach LOS | | B | | | F | | | D | | | E | |

Intersection Summary

| | | | |
|------------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 87.4 | HCM 2000 Level of Service | F |
| HCM 2000 Volume to Capacity ratio | 1.00 | | |
| Actuated Cycle Length (s) | 145.0 | Sum of lost time (s) | 23.5 |
| Intersection Capacity Utilization | 98.1% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |
| Description: Count Date: 1/21/2014 | | | |
| c Critical Lane Group | | | |

HCM 6th Signalized Intersection Summary
5: 9th Street & Idaho Street



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|-----|------|-----|------|------|------|-----|-----|-----|------|------|------|
| Lane Configurations | | | | | ↑↑↑ | | | | | | ↑↑↑ | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 290 | 1060 | 0 | 0 | 0 | 0 | 0 | 635 | 45 |
| Future Volume (veh/h) | 0 | 0 | 0 | 290 | 1060 | 0 | 0 | 0 | 0 | 0 | 635 | 45 |
| Initial Q (Qb), veh | | | | 0 | 0 | 0 | | | | | 0 | 0 |
| Ped-Bike Adj(A_pbT) | | | | 1.00 | | 1.00 | | | | 1.00 | | 0.88 |
| Parking Bus, Adj | | | | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | | | | No | | | | | | No | |
| Adj Sat Flow, veh/h/ln | | | | 1626 | 1626 | 0 | | | | 0 | 1639 | 1639 |
| Adj Flow Rate, veh/h | | | | 388 | 1432 | 0 | | | | 0 | 1447 | 110 |
| Peak Hour Factor | | | | 0.95 | 0.94 | 0.88 | | | | 0.88 | 0.86 | 0.80 |
| Percent Heavy Veh, % | | | | 3 | 3 | 0 | | | | 0 | 2 | 2 |
| Cap, veh/h | | | | 468 | 1505 | 0 | | | | 0 | 1613 | 123 |
| Arrive On Green | | | | 0.46 | 0.46 | 0.00 | | | | 0.00 | 0.38 | 0.38 |
| Sat Flow, veh/h | | | | 823 | 3394 | 0 | | | | 0 | 4341 | 319 |
| Grp Volume(v), veh/h | | | | 656 | 1164 | 0 | | | | 0 | 1029 | 528 |
| Grp Sat Flow(s),veh/h/ln | | | | 1392 | 1347 | 0 | | | | 0 | 1492 | 1529 |
| Q Serve(g_s), s | | | | 30.0 | 26.7 | 0.0 | | | | 0.0 | 21.1 | 21.1 |
| Cycle Q Clear(g_c), s | | | | 30.0 | 26.7 | 0.0 | | | | 0.0 | 21.1 | 21.1 |
| Prop In Lane | | | | 0.59 | | 0.00 | | | | 0.00 | | 0.21 |
| Lane Grp Cap(c), veh/h | | | | 730 | 1243 | 0 | | | | 0 | 1147 | 588 |
| V/C Ratio(X) | | | | 0.90 | 0.94 | 0.00 | | | | 0.00 | 0.90 | 0.90 |
| Avail Cap(c_a), veh/h | | | | 730 | 1243 | 0 | | | | 0 | 1147 | 588 |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l) | | | | 1.00 | 1.00 | 0.00 | | | | 0.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | | | | 17.8 | 16.6 | 0.0 | | | | 0.0 | 18.8 | 18.8 |
| Incr Delay (d2), s/veh | | | | 16.0 | 14.3 | 0.0 | | | | 0.0 | 11.0 | 19.0 |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | | | | 12.0 | 9.7 | 0.0 | | | | 0.0 | 8.4 | 9.9 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 33.9 | 30.9 | 0.0 | | | | 0.0 | 29.8 | 37.8 |
| LnGrp LOS | | | | C | C | A | | | | A | C | D |
| Approach Vol, veh/h | | | | | 1820 | | | | | | 1557 | |
| Approach Delay, s/veh | | | | | 31.9 | | | | | | 32.5 | |
| Approach LOS | | | | | C | | | | | | C | |
| Timer - Assigned Phs | | 2 | | 4 | | | | | | | | |
| Phs Duration (G+Y+Rc), s | | 35.0 | | 30.0 | | | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | | | | | | | |
| Max Green Setting (Gmax), s | | 30.0 | | 25.0 | | | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | | 0.0 | | | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | | | | | | | | 32.2 | |
| HCM 6th LOS | | | | | | | | | | | C | |

HCM 6th Signalized Intersection Summary
 6: 15th Street & Idaho Street



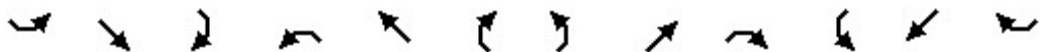
| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|-----|------|-----|------|------|------|------|------|------|-----|-----|-----|
| Lane Configurations | | | | | ↑↑↑ | | | ↑↑ | | | | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 0 | 780 | 130 | 75 | 755 | 0 | 0 | 0 | 0 |
| Future Volume (veh/h) | 0 | 0 | 0 | 0 | 780 | 130 | 75 | 755 | 0 | 0 | 0 | 0 |
| Initial Q (Qb), veh | | | | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| Ped-Bike Adj(A_pbT) | | | | 1.00 | | 1.00 | 1.00 | | 1.00 | | | |
| Parking Bus, Adj | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Work Zone On Approach | | | | No | | | No | | | | | |
| Adj Sat Flow, veh/h/ln | | | | 0 | 1626 | 1626 | 1639 | 1639 | 0 | | | |
| Adj Flow Rate, veh/h | | | | 0 | 1051 | 175 | 112 | 1124 | 0 | | | |
| Peak Hour Factor | | | | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | | | |
| Percent Heavy Veh, % | | | | 0 | 3 | 3 | 2 | 2 | 0 | | | |
| Cap, veh/h | | | | 0 | 1342 | 223 | 133 | 1405 | 0 | | | |
| Arrive On Green | | | | 0.00 | 0.35 | 0.35 | 0.48 | 0.48 | 0.00 | | | |
| Sat Flow, veh/h | | | | 0 | 3980 | 637 | 276 | 2989 | 0 | | | |
| Grp Volume(v), veh/h | | | | 0 | 811 | 415 | 661 | 575 | 0 | | | |
| Grp Sat Flow(s),veh/h/ln | | | | 0 | 1480 | 1511 | 1625 | 1557 | 0 | | | |
| Q Serve(g_s), s | | | | 0.0 | 14.7 | 14.8 | 21.2 | 18.2 | 0.0 | | | |
| Cycle Q Clear(g_c), s | | | | 0.0 | 14.7 | 14.8 | 21.2 | 18.2 | 0.0 | | | |
| Prop In Lane | | | | 0.00 | | 0.42 | 0.17 | | 0.00 | | | |
| Lane Grp Cap(c), veh/h | | | | 0 | 1036 | 529 | 786 | 753 | 0 | | | |
| V/C Ratio(X) | | | | 0.00 | 0.78 | 0.78 | 0.84 | 0.76 | 0.00 | | | |
| Avail Cap(c_a), veh/h | | | | 0 | 1036 | 529 | 786 | 753 | 0 | | | |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Upstream Filter(l) | | | | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | | | |
| Uniform Delay (d), s/veh | | | | 0.0 | 17.5 | 17.5 | 13.5 | 12.7 | 0.0 | | | |
| Incr Delay (d2), s/veh | | | | 0.0 | 5.9 | 11.1 | 10.6 | 7.3 | 0.0 | | | |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| %ile BackOfQ(50%),veh/ln | | | | 0.0 | 5.4 | 6.3 | 8.7 | 6.7 | 0.0 | | | |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 0.0 | 23.4 | 28.6 | 24.0 | 20.0 | 0.0 | | | |
| LnGrp LOS | | | | A | C | C | C | B | A | | | |
| Approach Vol, veh/h | | | | | 1226 | | | 1236 | | | | |
| Approach Delay, s/veh | | | | | 25.1 | | | 22.1 | | | | |
| Approach LOS | | | | | C | | | C | | | | |
| Timer - Assigned Phs | | 2 | | 4 | | | | | | | | |
| Phs Duration (G+Y+Rc), s | | 26.0 | | 34.0 | | | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | | | | | | | |
| Max Green Setting (Gmax), s | | 21.0 | | 29.0 | | | | | | | | |
| Max Q Clear Time (g_c+l1), s | | 0.0 | | 0.0 | | | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 23.6 | | | | | | | | |
| HCM 6th LOS | | | | C | | | | | | | | |

HCM 6th Signalized Intersection Summary
 7: 9th Street & Main Street



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|------|------|------|------|-----|-----|-----|-----|-----|------|------|------|
| Lane Configurations | | ↑↑↑ | | | | | | | | | ↑↑↑ | |
| Traffic Volume (veh/h) | 0 | 590 | 270 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 1325 | 0 |
| Future Volume (veh/h) | 0 | 590 | 270 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 1325 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | | | | | | | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | | | | | | | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | | | | | | | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | | | | | | | No | |
| Adj Sat Flow, veh/h/ln | 0 | 1626 | 1626 | | | | | | | 1639 | 1639 | 0 |
| Adj Flow Rate, veh/h | 0 | 1032 | 472 | | | | | | | 152 | 2016 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | | | | | | | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 0 | 3 | 3 | | | | | | | 2 | 2 | 0 |
| Cap, veh/h | 0 | 1064 | 486 | | | | | | | 195 | 2005 | 0 |
| Arrive On Green | 0.00 | 0.12 | 0.12 | | | | | | | 0.50 | 0.50 | 0.00 |
| Sat Flow, veh/h | 0 | 3125 | 1362 | | | | | | | 267 | 4144 | 0 |
| Grp Volume(v), veh/h | 0 | 1025 | 479 | | | | | | | 805 | 1363 | 0 |
| Grp Sat Flow(s),veh/h/ln | 0 | 1480 | 1381 | | | | | | | 1563 | 1357 | 0 |
| Q Serve(g_s), s | 0.0 | 24.2 | 24.2 | | | | | | | 31.9 | 35.0 | 0.0 |
| Cycle Q Clear(g_c), s | 0.0 | 24.2 | 24.2 | | | | | | | 35.0 | 35.0 | 0.0 |
| Prop In Lane | 0.00 | | 0.99 | | | | | | | 0.19 | | 0.00 |
| Lane Grp Cap(c), veh/h | 0 | 1057 | 493 | | | | | | | 843 | 1357 | 0 |
| V/C Ratio(X) | 0.00 | 0.97 | 0.97 | | | | | | | 0.96 | 1.00 | 0.00 |
| Avail Cap(c_a), veh/h | 0 | 1057 | 493 | | | | | | | 843 | 1357 | 0 |
| HCM Platoon Ratio | 1.00 | 0.33 | 0.33 | | | | | | | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l) | 0.00 | 1.00 | 1.00 | | | | | | | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 0.0 | 30.5 | 30.5 | | | | | | | 17.9 | 17.5 | 0.0 |
| Incr Delay (d2), s/veh | 0.0 | 21.4 | 33.8 | | | | | | | 21.9 | 25.4 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | | | | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.0 | 12.5 | 13.4 | | | | | | | 16.8 | 14.4 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 0.0 | 51.9 | 64.3 | | | | | | | 39.8 | 42.9 | 0.0 |
| LnGrp LOS | A | D | E | | | | | | | D | F | A |
| Approach Vol, veh/h | | 1504 | | | | | | | | | 2168 | |
| Approach Delay, s/veh | | 55.8 | | | | | | | | | 41.8 | |
| Approach LOS | | E | | | | | | | | | D | |
| Timer - Assigned Phs | | 2 | | 4 | | | | | | | | |
| Phs Duration (G+Y+Rc), s | | 30.0 | | 40.0 | | | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | | | | | | | |
| Max Green Setting (Gmax), s | | 25.0 | | 35.0 | | | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | | 0.0 | | | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 47.5 | | | | | | | | | |
| HCM 6th LOS | | | D | | | | | | | | | |

HCM 6th Signalized Intersection Summary
 8: 15th Street & Main Street



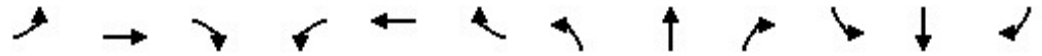
| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|------|------|------|------|-----|-----|------|------|------|-----|-----|-----|
| Lane Configurations | | ↑↑↑ | | | | | | ↑↑ | ↑ | | | |
| Traffic Volume (veh/h) | 95 | 500 | 0 | 0 | 0 | 0 | 0 | 700 | 155 | 0 | 0 | 0 |
| Future Volume (veh/h) | 95 | 500 | 0 | 0 | 0 | 0 | 0 | 700 | 155 | 0 | 0 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | | | | 0 | 0 | 0 | | | |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | | | | 1.00 | | 1.00 | | | |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 0.90 | | | |
| Work Zone On Approach | | No | | | | | | No | | | | |
| Adj Sat Flow, veh/h/ln | 1613 | 1613 | 0 | | | | 0 | 1639 | 1639 | | | |
| Adj Flow Rate, veh/h | 179 | 940 | 0 | | | | 0 | 1058 | 234 | | | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | | | | 0.92 | 0.92 | 0.92 | | | |
| Percent Heavy Veh, % | 4 | 4 | 0 | | | | 0 | 2 | 2 | | | |
| Cap, veh/h | 296 | 1221 | 0 | | | | 0 | 1472 | 591 | | | |
| Arrive On Green | 0.35 | 0.35 | 0.00 | | | | 0.00 | 0.47 | 0.47 | | | |
| Sat Flow, veh/h | 585 | 3666 | 0 | | | | 0 | 3196 | 1250 | | | |
| Grp Volume(v), veh/h | 415 | 704 | 0 | | | | 0 | 1058 | 234 | | | |
| Grp Sat Flow(s),veh/h/ln | 1447 | 1336 | 0 | | | | 0 | 1557 | 1250 | | | |
| Q Serve(g_s), s | 13.3 | 12.9 | 0.0 | | | | 0.0 | 14.9 | 6.7 | | | |
| Cycle Q Clear(g_c), s | 14.4 | 12.9 | 0.0 | | | | 0.0 | 14.9 | 6.7 | | | |
| Prop In Lane | 0.43 | | 0.00 | | | | 0.00 | | 1.00 | | | |
| Lane Grp Cap(c), veh/h | 593 | 923 | 0 | | | | 0 | 1472 | 591 | | | |
| V/C Ratio(X) | 0.70 | 0.76 | 0.00 | | | | 0.00 | 0.72 | 0.40 | | | |
| Avail Cap(c_a), veh/h | 593 | 923 | 0 | | | | 0 | 1472 | 591 | | | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 | | | |
| Upstream Filter(l) | 1.00 | 1.00 | 0.00 | | | | 0.00 | 1.00 | 1.00 | | | |
| Uniform Delay (d), s/veh | 16.4 | 16.0 | 0.0 | | | | 0.0 | 11.6 | 9.4 | | | |
| Incr Delay (d2), s/veh | 6.7 | 6.0 | 0.0 | | | | 0.0 | 3.1 | 2.0 | | | |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 | | | |
| %ile BackOfQ(50%),veh/ln | 5.2 | 4.2 | 0.0 | | | | 0.0 | 4.9 | 1.9 | | | |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 23.1 | 22.0 | 0.0 | | | | 0.0 | 14.6 | 11.4 | | | |
| LnGrp LOS | C | C | A | | | | A | B | B | | | |
| Approach Vol, veh/h | | 1119 | | | | | | 1292 | | | | |
| Approach Delay, s/veh | | 22.4 | | | | | | 14.0 | | | | |
| Approach LOS | | C | | | | | | B | | | | |
| Timer - Assigned Phs | | 2 | | 4 | | | | | | | | |
| Phs Duration (G+Y+Rc), s | | 24.0 | | 31.0 | | | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | | | | | | | |
| Max Green Setting (Gmax), s | | 19.0 | | 26.0 | | | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | | 0.0 | | | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 17.9 | | | | | | | | | |
| HCM 6th LOS | | | B | | | | | | | | | |

HCM 6th Signalized Intersection Summary
 9: 27th Street & Main Street



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|-----|------|------|-------|-------|-------|-------|-------|------|------|-------|-------|
| Lane Configurations | | | | | ←←← | | ← | ↑ | | | ↑ | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 40 | 1765 | 80 | 455 | 610 | 0 | 0 | 235 | 120 |
| Future Volume (veh/h) | 0 | 0 | 0 | 40 | 1765 | 80 | 455 | 610 | 0 | 0 | 235 | 120 |
| Initial Q (Qb), veh | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | | | | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.98 |
| Parking Bus, Adj | | | | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | | | No | | | No | | No | | | No |
| Adj Sat Flow, veh/h/ln | | | | 1850 | 1807 | 1850 | 1821 | 1821 | 0 | 0 | 1821 | 1821 |
| Adj Flow Rate, veh/h | | | | 62 | 2294 | 116 | 680 | 870 | 0 | 0 | 388 | 206 |
| Peak Hour Factor | | | | 0.75 | 0.90 | 0.81 | 0.85 | 0.89 | 0.88 | 0.88 | 0.83 | 0.80 |
| Percent Heavy Veh, % | | | | 0 | 3 | 0 | 2 | 2 | 0 | 0 | 2 | 2 |
| Cap, veh/h | | | | 47 | 1828 | 95 | 469 | 981 | 0 | 0 | 291 | 154 |
| Arrive On Green | | | | 0.38 | 0.38 | 0.38 | 0.24 | 0.54 | 0.00 | 0.00 | 0.26 | 0.26 |
| Sat Flow, veh/h | | | | 121 | 4752 | 246 | 1734 | 1821 | 0 | 0 | 1112 | 590 |
| Grp Volume(v), veh/h | | | | 878 | 765 | 829 | 680 | 870 | 0 | 0 | 0 | 594 |
| Grp Sat Flow(s),veh/h/ln | | | | 1714 | 1644 | 1761 | 1734 | 1821 | 0 | 0 | 0 | 1703 |
| Q Serve(g_s), s | | | | 50.0 | 50.0 | 50.0 | 31.0 | 54.9 | 0.0 | 0.0 | 0.0 | 34.0 |
| Cycle Q Clear(g_c), s | | | | 50.0 | 50.0 | 50.0 | 31.0 | 54.9 | 0.0 | 0.0 | 0.0 | 34.0 |
| Prop In Lane | | | | 0.07 | | 0.14 | 1.00 | | 0.00 | 0.00 | | 0.35 |
| Lane Grp Cap(c), veh/h | | | | 659 | 632 | 677 | 469 | 981 | 0 | 0 | 0 | 445 |
| V/C Ratio(X) | | | | 1.33 | 1.21 | 1.22 | 1.45 | 0.89 | 0.00 | 0.00 | 0.00 | 1.33 |
| Avail Cap(c_a), veh/h | | | | 659 | 632 | 677 | 469 | 981 | 0 | 0 | 0 | 445 |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | | | | 0.85 | 0.85 | 0.85 | 0.40 | 0.40 | 0.00 | 0.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | | | | 40.0 | 40.0 | 40.0 | 47.7 | 26.5 | 0.0 | 0.0 | 0.0 | 48.0 |
| Incr Delay (d2), s/veh | | | | 158.0 | 106.7 | 112.1 | 207.3 | 5.2 | 0.0 | 0.0 | 0.0 | 165.0 |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | | | | 49.4 | 38.4 | 42.1 | 41.5 | 24.7 | 0.0 | 0.0 | 0.0 | 34.9 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 198.0 | 146.7 | 152.1 | 255.0 | 31.7 | 0.0 | 0.0 | 0.0 | 213.0 |
| LnGrp LOS | | | | F | F | F | F | C | A | A | A | F |
| Approach Vol, veh/h | | | | | 2472 | | | 1550 | | | 594 | |
| Approach Delay, s/veh | | | | | 166.7 | | | 129.7 | | | 213.0 | |
| Approach LOS | | | | | F | | | F | | | F | |
| Timer - Assigned Phs | | 2 | 3 | 4 | | | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | | 55.0 | 36.0 | 39.0 | | | | 75.0 | | | | |
| Change Period (Y+Rc), s | | 5.0 | 5.0 | 5.0 | | | | 5.0 | | | | |
| Max Green Setting (Gmax), s | | 50.0 | 31.0 | 34.0 | | | | 70.0 | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | 0.0 | 0.0 | | | | 0.0 | | | | |
| Green Ext Time (p_c), s | | 0.0 | 0.0 | 0.0 | | | | 0.0 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 160.2 | | | | | | | | |
| HCM 6th LOS | | | | F | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 10: Whitewater Park Blvd. & Main Street



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------|------|------|------|------|------|------|------|-------|------|------|------|-------|
| Lane Configurations | | | | | ↑↑↑ | ↑ | ↑ | ↑↑ | | | ↑↑ | ↑ |
| Traffic Volume (vph) | 0 | 0 | 0 | 5 | 1820 | 290 | 15 | 420 | 0 | 0 | 135 | 300 |
| Future Volume (vph) | 0 | 0 | 0 | 5 | 1820 | 290 | 15 | 420 | 0 | 0 | 135 | 300 |
| Ideal Flow (vphpl) | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 |
| Lane Width | 12 | 12 | 12 | 12 | 12 | 12 | 11 | 11 | 12 | 12 | 11 | 11 |
| Total Lost time (s) | | | | | 6.0 | 6.0 | 6.0 | 6.0 | | | 6.0 | 6.0 |
| Lane Util. Factor | | | | | 0.91 | 1.00 | 1.00 | 0.95 | | | 0.95 | 1.00 |
| Flt | | | | | 1.00 | 0.85 | 1.00 | 1.00 | | | 1.00 | 0.85 |
| Flt Protected | | | | | 1.00 | 1.00 | 0.95 | 1.00 | | | 1.00 | 1.00 |
| Satd. Flow (prot) | | | | | 4902 | 1453 | 1666 | 3331 | | | 3074 | 1448 |
| Flt Permitted | | | | | 1.00 | 1.00 | 0.95 | 1.00 | | | 1.00 | 1.00 |
| Satd. Flow (perm) | | | | | 4902 | 1453 | 1666 | 3331 | | | 3074 | 1448 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.42 | 0.92 | 0.85 | 0.57 | 0.79 | 0.92 | 0.92 | 0.90 | 0.85 |
| Growth Factor (vph) | 100% | 100% | 100% | 112% | 112% | 112% | 185% | 185% | 185% | 166% | 166% | 166% |
| Adj. Flow (vph) | 0 | 0 | 0 | 13 | 2216 | 382 | 49 | 984 | 0 | 0 | 249 | 586 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 53 | 0 | 0 | 0 | 0 | 0 | 67 |
| Lane Group Flow (vph) | 0 | 0 | 0 | 0 | 2229 | 329 | 49 | 984 | 0 | 0 | 249 | 519 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 3% | 3% | 3% | 2% | 2% | 2% | 5% | 5% | 5% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 |
| Parking (#/hr) | | | | | | | | | | | | 0 |
| Turn Type | | | | Perm | NA | Perm | Prot | NA | | | NA | Perm |
| Protected Phases | | | | | 2 | | 3 | 8 | | | 4 | |
| Permitted Phases | | | | 2 | | 2 | | | | | | 4 |
| Actuated Green, G (s) | | | | | 46.0 | 46.0 | 4.0 | 42.0 | | | 32.0 | 32.0 |
| Effective Green, g (s) | | | | | 46.0 | 46.0 | 4.0 | 42.0 | | | 32.0 | 32.0 |
| Actuated g/C Ratio | | | | | 0.46 | 0.46 | 0.04 | 0.42 | | | 0.32 | 0.32 |
| Clearance Time (s) | | | | | 6.0 | 6.0 | 6.0 | 6.0 | | | 6.0 | 6.0 |
| Vehicle Extension (s) | | | | | 2.0 | 2.0 | 2.0 | 2.0 | | | 2.0 | 2.0 |
| Lane Grp Cap (vph) | | | | | 2254 | 668 | 66 | 1399 | | | 983 | 463 |
| v/s Ratio Prot | | | | | | | 0.03 | c0.30 | | | 0.08 | |
| v/s Ratio Perm | | | | | 0.45 | 0.23 | | | | | | c0.36 |
| v/c Ratio | | | | | 0.99 | 0.49 | 0.74 | 0.70 | | | 0.25 | 1.12 |
| Uniform Delay, d1 | | | | | 26.7 | 18.9 | 47.5 | 23.9 | | | 25.2 | 34.0 |
| Progression Factor | | | | | 1.00 | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 |
| Incremental Delay, d2 | | | | | 16.5 | 2.6 | 32.0 | 1.3 | | | 0.0 | 79.5 |
| Delay (s) | | | | | 43.3 | 21.4 | 79.5 | 25.2 | | | 25.2 | 113.5 |
| Level of Service | | | | | D | C | E | C | | | C | F |
| Approach Delay (s) | | 0.0 | | | 40.1 | | | 27.8 | | | 87.2 | |
| Approach LOS | | A | | | D | | | C | | | F | |

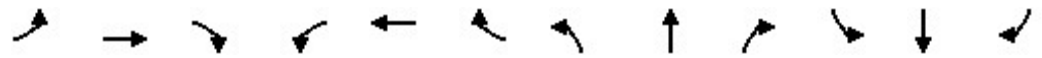
Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 46.0 | HCM 2000 Level of Service | D |
| HCM 2000 Volume to Capacity ratio | 1.05 | | |
| Actuated Cycle Length (s) | 100.0 | Sum of lost time (s) | 18.0 |
| Intersection Capacity Utilization | 82.2% | ICU Level of Service | E |
| Analysis Period (min) | 15 | | |

Description: Count Date: 11/9/2016

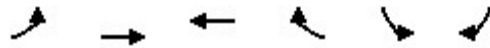
c Critical Lane Group

HCM 6th Signalized Intersection Summary
 11: 27th Street & Fairview Avenue



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|-----|------|------|------|------|------|------|------|
| Lane Configurations | ↗ | ↑↑↑ | | | | | | ↑↑ | ↗ | ↘ | ↑ | |
| Traffic Volume (veh/h) | 255 | 680 | 185 | 0 | 0 | 0 | 0 | 705 | 55 | 55 | 225 | 0 |
| Future Volume (veh/h) | 255 | 680 | 185 | 0 | 0 | 0 | 0 | 705 | 55 | 55 | 225 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | | | | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | | | | 1.00 | | 0.99 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1807 | 1807 | 1807 | | | | 0 | 1821 | 1894 | 1821 | 1821 | 0 |
| Adj Flow Rate, veh/h | 431 | 1111 | 391 | | | | 0 | 1041 | 82 | 100 | 411 | 0 |
| Peak Hour Factor | 0.90 | 0.93 | 0.72 | | | | 0.92 | 0.84 | 0.83 | 0.86 | 0.86 | 0.92 |
| Percent Heavy Veh, % | 3 | 3 | 3 | | | | 0 | 2 | 2 | 2 | 2 | 0 |
| Cap, veh/h | 762 | 1591 | 560 | | | | 0 | 989 | 453 | 202 | 754 | 0 |
| Arrive On Green | 0.44 | 0.44 | 0.44 | | | | 0.00 | 0.29 | 0.29 | 0.06 | 0.41 | 0.00 |
| Sat Flow, veh/h | 1721 | 3593 | 1264 | | | | 0 | 3551 | 1585 | 1734 | 1821 | 0 |
| Grp Volume(v), veh/h | 431 | 1017 | 485 | | | | 0 | 1041 | 82 | 100 | 411 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1721 | 1644 | 1569 | | | | 0 | 1730 | 1585 | 1734 | 1821 | 0 |
| Q Serve(g_s), s | 13.0 | 17.5 | 17.5 | | | | 0.0 | 20.0 | 2.7 | 0.0 | 11.9 | 0.0 |
| Cycle Q Clear(g_c), s | 13.0 | 17.5 | 17.5 | | | | 0.0 | 20.0 | 2.7 | 0.0 | 11.9 | 0.0 |
| Prop In Lane | 1.00 | | 0.81 | | | | 0.00 | | 1.00 | 1.00 | | 0.00 |
| Lane Grp Cap(c), veh/h | 762 | 1456 | 695 | | | | 0 | 989 | 453 | 202 | 754 | 0 |
| V/C Ratio(X) | 0.57 | 0.70 | 0.70 | | | | 0.00 | 1.05 | 0.18 | 0.50 | 0.54 | 0.00 |
| Avail Cap(c_a), veh/h | 762 | 1456 | 695 | | | | 0 | 989 | 453 | 202 | 754 | 0 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l) | 0.84 | 0.84 | 0.84 | | | | 0.00 | 1.00 | 1.00 | 0.09 | 0.09 | 0.00 |
| Uniform Delay (d), s/veh | 14.5 | 15.7 | 15.7 | | | | 0.0 | 25.0 | 18.8 | 31.1 | 15.5 | 0.0 |
| Incr Delay (d2), s/veh | 2.6 | 2.4 | 4.9 | | | | 0.0 | 43.6 | 0.9 | 0.2 | 0.3 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 5.1 | 6.3 | 6.5 | | | | 0.0 | 13.7 | 1.1 | 1.6 | 4.7 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 17.0 | 18.1 | 20.6 | | | | 0.0 | 68.6 | 19.7 | 31.3 | 15.8 | 0.0 |
| LnGrp LOS | B | B | C | | | | A | F | B | C | B | A |
| Approach Vol, veh/h | | 1933 | | | | | | 1123 | | | 511 | |
| Approach Delay, s/veh | | 18.5 | | | | | | 65.0 | | | 18.8 | |
| Approach LOS | | B | | | | | | E | | | B | |
| Timer - Assigned Phs | | | | 4 | | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | | | | 34.0 | | 36.0 | 9.0 | 25.0 | | | | |
| Change Period (Y+Rc), s | | | | 5.0 | | 5.0 | 5.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | | | | 29.0 | | 31.0 | 4.0 | 20.0 | | | | |
| Max Q Clear Time (g_c+I1), s | | | | 0.0 | | 0.0 | 0.0 | 0.0 | | | | |
| Green Ext Time (p_c), s | | | | 0.0 | | 0.0 | 0.0 | 0.0 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 33.2 | | | | | | | | | |
| HCM 6th LOS | | | C | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 12: Fairview Avenue & Whitewater Park Blvd.



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------------------|------|------|-------|------|---------------------------|------|
| Lane Configurations | | 4111 | | | 11 | |
| Traffic Volume (vph) | 430 | 860 | 0 | 0 | 160 | 0 |
| Future Volume (vph) | 430 | 860 | 0 | 0 | 160 | 0 |
| Ideal Flow (vphpl) | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 |
| Total Lost time (s) | | 5.5 | | | 6.0 | |
| Lane Util. Factor | | 0.86 | | | 0.97 | |
| Frt | | 1.00 | | | 1.00 | |
| Flt Protected | | 0.98 | | | 0.95 | |
| Satd. Flow (prot) | | 6134 | | | 3100 | |
| Flt Permitted | | 0.98 | | | 0.95 | |
| Satd. Flow (perm) | | 6134 | | | 3100 | |
| Peak-hour factor, PHF | 0.84 | 0.88 | 0.92 | 0.92 | 0.94 | 0.92 |
| Growth Factor (vph) | 151% | 151% | 100% | 100% | 185% | 185% |
| Adj. Flow (vph) | 773 | 1476 | 0 | 0 | 315 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 2249 | 0 | 0 | 315 | 0 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 10% | 10% |
| Turn Type | Perm | NA | | | Prot | |
| Protected Phases | | 6 | | | 4 | |
| Permitted Phases | 6 | | | | | |
| Actuated Green, G (s) | | 78.4 | | | 15.1 | |
| Effective Green, g (s) | | 78.4 | | | 15.1 | |
| Actuated g/C Ratio | | 0.75 | | | 0.14 | |
| Clearance Time (s) | | 5.5 | | | 6.0 | |
| Vehicle Extension (s) | | 2.0 | | | 2.0 | |
| Lane Grp Cap (vph) | | 4580 | | | 445 | |
| v/s Ratio Prot | | | | | c0.10 | |
| v/s Ratio Perm | | 0.37 | | | | |
| v/c Ratio | | 0.49 | | | 0.71 | |
| Uniform Delay, d1 | | 5.3 | | | 42.8 | |
| Progression Factor | | 1.00 | | | 1.00 | |
| Incremental Delay, d2 | | 0.4 | | | 4.2 | |
| Delay (s) | | 5.7 | | | 47.0 | |
| Level of Service | | A | | | D | |
| Approach Delay (s) | | 5.7 | 0.0 | | 47.0 | |
| Approach LOS | | A | A | | D | |
| Intersection Summary | | | | | | |
| HCM 2000 Control Delay | | | 10.8 | | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | | | 0.53 | | | |
| Actuated Cycle Length (s) | | | 105.0 | | Sum of lost time (s) | 11.5 |
| Intersection Capacity Utilization | | | 91.4% | | ICU Level of Service | F |
| Analysis Period (min) | | | 15 | | | |
| Description: Count Date: 11/9/2016 | | | | | | |
| c Critical Lane Group | | | | | | |

HCM Signalized Intersection Capacity Analysis
 4: Whitewater Park Blvd./31st Street & State Street















03/11/2021



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR | |
|------------------------------------|-------|-------|-------|---------------------------|-------|------|-------|-------|------|-------|-------|------|--|
| Lane Configurations | | | | | | | | | | | | | |
| Traffic Volume (vph) | 22 | 820 | 106 | 16 | 1684 | 4 | 218 | 64 | 36 | 18 | 30 | 4 | |
| Future Volume (vph) | 22 | 820 | 106 | 16 | 1684 | 4 | 218 | 64 | 36 | 18 | 30 | 4 | |
| Ideal Flow (vphpl) | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | |
| Lane Width | 10 | 13 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 11 | 12 | 12 | |
| Total Lost time (s) | 12.0 | 5.5 | 5.5 | 6.0 | 5.5 | 5.5 | 6.0 | 5.5 | | 6.0 | 6.0 | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.97 | 1.00 | | 1.00 | 1.00 | | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.95 | | 1.00 | 0.98 | | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | |
| Satd. Flow (prot) | 1516 | 3526 | 1527 | 1706 | 3413 | 1527 | 3343 | 1716 | | 1666 | 1784 | | |
| Flt Permitted | 0.05 | 1.00 | 1.00 | 0.20 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.73 | 1.00 | | |
| Satd. Flow (perm) | 74 | 3526 | 1527 | 357 | 3413 | 1527 | 3343 | 1716 | | 1275 | 1784 | | |
| Peak-hour factor, PHF | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | |
| Growth Factor (vph) | 134% | 134% | 134% | 141% | 141% | 141% | 122% | 122% | 122% | 157% | 157% | 157% | |
| Adj. Flow (vph) | 30 | 1133 | 146 | 23 | 2448 | 6 | 274 | 80 | 45 | 29 | 49 | 6 | |
| RTOR Reduction (vph) | 0 | 0 | 59 | 0 | 0 | 3 | 0 | 14 | 0 | 0 | 4 | 0 | |
| Lane Group Flow (vph) | 30 | 1133 | 87 | 23 | 2448 | 3 | 274 | 111 | 0 | 29 | 51 | 0 | |
| Heavy Vehicles (%) | 3% | 3% | 3% | 3% | 3% | 3% | 2% | 2% | 2% | 2% | 2% | 2% | |
| Bus Blockages (#/hr) | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Turn Type | pm+pt | NA | Perm | pm+pt | NA | Perm | Prot | NA | | pm+pt | NA | | |
| Protected Phases | 1 | 6 | | 5 | 2 | | 3 | 8 | | 7 | 4 | | |
| Permitted Phases | 6 | | 6 | 2 | | 2 | | | | 4 | 4 | | |
| Actuated Green, G (s) | 90.8 | 86.5 | 86.5 | 82.8 | 79.5 | 79.5 | 23.2 | 29.2 | | 8.5 | 8.5 | | |
| Effective Green, g (s) | 90.8 | 86.5 | 86.5 | 82.8 | 79.5 | 79.5 | 23.2 | 29.2 | | 8.5 | 8.5 | | |
| Actuated g/C Ratio | 0.63 | 0.60 | 0.60 | 0.57 | 0.55 | 0.55 | 0.16 | 0.20 | | 0.06 | 0.06 | | |
| Clearance Time (s) | 12.0 | 5.5 | 5.5 | 6.0 | 5.5 | 5.5 | 6.0 | 5.5 | | 6.0 | 6.0 | | |
| Vehicle Extension (s) | 3.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | | 2.0 | 2.0 | | |
| Lane Grp Cap (vph) | 89 | 2103 | 910 | 234 | 1871 | 837 | 534 | 345 | | 82 | 104 | | |
| v/s Ratio Prot | c0.01 | c0.32 | | 0.00 | c0.72 | | c0.08 | c0.06 | | 0.01 | c0.03 | | |
| v/s Ratio Perm | 0.20 | | 0.06 | 0.05 | | 0.00 | | | | 0.01 | | | |
| v/c Ratio | 0.34 | 0.54 | 0.10 | 0.10 | 1.31 | 0.00 | 0.51 | 0.32 | | 0.35 | 0.49 | | |
| Uniform Delay, d1 | 34.3 | 17.4 | 12.5 | 14.5 | 32.8 | 14.8 | 55.7 | 49.4 | | 65.4 | 66.2 | | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 2.2 | 1.0 | 0.2 | 0.1 | 142.7 | 0.0 | 0.3 | 0.2 | | 1.0 | 1.3 | | |
| Delay (s) | 36.5 | 18.4 | 12.7 | 14.6 | 175.5 | 14.8 | 56.1 | 49.6 | | 66.4 | 67.5 | | |
| Level of Service | D | B | B | B | F | B | E | D | | E | E | | |
| Approach Delay (s) | | 18.2 | | | 173.6 | | | 54.1 | | | 67.1 | | |
| Approach LOS | | B | | | F | | | D | | | E | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 112.7 | HCM 2000 Level of Service | | | | | | F | | | |
| HCM 2000 Volume to Capacity ratio | | | 1.07 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 145.0 | Sum of lost time (s) | | | | | 29.5 | | | | |
| Intersection Capacity Utilization | | | 98.1% | ICU Level of Service | | | | | | F | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| Description: Count Date: 1/21/2014 | | | | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |


















HCM 6th Signalized Intersection Summary
 5: 9th Street & Idaho Street

03/11/2021

| |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
| Lane Configurations | | | | |  | | | | | |  | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 290 | 1060 | 0 | 0 | 0 | 0 | 0 | 635 | 45 |
| Future Volume (veh/h) | 0 | 0 | 0 | 290 | 1060 | 0 | 0 | 0 | 0 | 0 | 635 | 45 |
| Initial Q (Qb), veh | | | | 0 | 0 | 0 | | | | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | | | | 1.00 | | 1.00 | | | | 1.00 | | 0.88 |
| Parking Bus, Adj | | | | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | | | No | | | | | | No | | |
| Adj Sat Flow, veh/h/ln | | | | 1626 | 1626 | 0 | | | | 0 | 1639 | 1639 |
| Adj Flow Rate, veh/h | | | | 388 | 1432 | 0 | | | | 0 | 1447 | 110 |
| Peak Hour Factor | | | | 0.95 | 0.94 | 0.88 | | | | 0.88 | 0.86 | 0.80 |
| Percent Heavy Veh, % | | | | 3 | 3 | 0 | | | | 0 | 2 | 2 |
| Cap, veh/h | | | | 468 | 1505 | 0 | | | | 0 | 1613 | 123 |
| Arrive On Green | | | | 0.46 | 0.46 | 0.00 | | | | 0.00 | 0.38 | 0.38 |
| Sat Flow, veh/h | | | | 823 | 3394 | 0 | | | | 0 | 4341 | 319 |
| Grp Volume(v), veh/h | | | | 656 | 1164 | 0 | | | | 0 | 1029 | 528 |
| Grp Sat Flow(s),veh/h/ln | | | | 1392 | 1347 | 0 | | | | 0 | 1492 | 1529 |
| Q Serve(g_s), s | | | | 30.0 | 26.7 | 0.0 | | | | 0.0 | 21.1 | 21.1 |
| Cycle Q Clear(g_c), s | | | | 30.0 | 26.7 | 0.0 | | | | 0.0 | 21.1 | 21.1 |
| Prop In Lane | | | | 0.59 | | 0.00 | | | | 0.00 | | 0.21 |
| Lane Grp Cap(c), veh/h | | | | 730 | 1243 | 0 | | | | 0 | 1147 | 588 |
| V/C Ratio(X) | | | | 0.90 | 0.94 | 0.00 | | | | 0.00 | 0.90 | 0.90 |
| Avail Cap(c_a), veh/h | | | | 730 | 1243 | 0 | | | | 0 | 1147 | 588 |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | | | | 1.00 | 1.00 | 0.00 | | | | 0.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | | | | 17.8 | 16.6 | 0.0 | | | | 0.0 | 18.8 | 18.8 |
| Incr Delay (d2), s/veh | | | | 16.0 | 14.3 | 0.0 | | | | 0.0 | 11.0 | 19.0 |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | | | | 12.0 | 9.7 | 0.0 | | | | 0.0 | 8.4 | 9.9 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 33.9 | 30.9 | 0.0 | | | | 0.0 | 29.8 | 37.8 |
| LnGrp LOS | | | | C | C | A | | | | A | C | D |
| Approach Vol, veh/h | | | | | 1820 | | | | | | 1557 | |
| Approach Delay, s/veh | | | | | 31.9 | | | | | | 32.5 | |
| Approach LOS | | | | | C | | | | | | C | |
| Timer - Assigned Phs | | 2 | | 4 | | | | | | | | |
| Phs Duration (G+Y+Rc), s | | 35.0 | | 30.0 | | | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | | | | | | | |
| Max Green Setting (Gmax), s | | 30.0 | | 25.0 | | | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | | 0.0 | | | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 32.2 | | | | | | | | |
| HCM 6th LOS | | | | C | | | | | | | | |

HCM 6th Signalized Intersection Summary
 6: 15th Street & Idaho Street

03/11/2021

| |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
| Lane Configurations | | | | |    | | |   | | | | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 0 | 780 | 130 | 75 | 755 | 0 | 0 | 0 | 0 |
| Future Volume (veh/h) | 0 | 0 | 0 | 0 | 780 | 130 | 75 | 755 | 0 | 0 | 0 | 0 |
| Initial Q (Qb), veh | | | | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| Ped-Bike Adj(A_pbT) | | | | 1.00 | | 1.00 | 1.00 | | 1.00 | | | |
| Parking Bus, Adj | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Work Zone On Approach | | | | No | | | | No | | | | |
| Adj Sat Flow, veh/h/ln | | | | 0 | 1626 | 1626 | 1639 | 1639 | 0 | | | |
| Adj Flow Rate, veh/h | | | | 0 | 1051 | 175 | 112 | 1124 | 0 | | | |
| Peak Hour Factor | | | | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | | | |
| Percent Heavy Veh, % | | | | 0 | 3 | 3 | 2 | 2 | 0 | | | |
| Cap, veh/h | | | | 0 | 1342 | 223 | 133 | 1405 | 0 | | | |
| Arrive On Green | | | | 0.00 | 0.35 | 0.35 | 0.48 | 0.48 | 0.00 | | | |
| Sat Flow, veh/h | | | | 0 | 3980 | 637 | 276 | 2989 | 0 | | | |
| Grp Volume(v), veh/h | | | | 0 | 811 | 415 | 661 | 575 | 0 | | | |
| Grp Sat Flow(s),veh/h/ln | | | | 0 | 1480 | 1511 | 1625 | 1557 | 0 | | | |
| Q Serve(g_s), s | | | | 0.0 | 14.7 | 14.8 | 21.2 | 18.2 | 0.0 | | | |
| Cycle Q Clear(g_c), s | | | | 0.0 | 14.7 | 14.8 | 21.2 | 18.2 | 0.0 | | | |
| Prop In Lane | | | | 0.00 | | 0.42 | 0.17 | | 0.00 | | | |
| Lane Grp Cap(c), veh/h | | | | 0 | 1036 | 529 | 786 | 753 | 0 | | | |
| V/C Ratio(X) | | | | 0.00 | 0.78 | 0.78 | 0.84 | 0.76 | 0.00 | | | |
| Avail Cap(c_a), veh/h | | | | 0 | 1036 | 529 | 786 | 753 | 0 | | | |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Upstream Filter(l) | | | | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | | | |
| Uniform Delay (d), s/veh | | | | 0.0 | 17.5 | 17.5 | 13.5 | 12.7 | 0.0 | | | |
| Incr Delay (d2), s/veh | | | | 0.0 | 5.9 | 11.1 | 10.6 | 7.3 | 0.0 | | | |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| %ile BackOfQ(50%),veh/ln | | | | 0.0 | 5.4 | 6.3 | 8.7 | 6.7 | 0.0 | | | |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 0.0 | 23.4 | 28.6 | 24.0 | 20.0 | 0.0 | | | |
| LnGrp LOS | | | | A | C | C | C | B | A | | | |
| Approach Vol, veh/h | | | | | 1226 | | | 1236 | | | | |
| Approach Delay, s/veh | | | | | 25.1 | | | 22.1 | | | | |
| Approach LOS | | | | | C | | | C | | | | |
| Timer - Assigned Phs | | 2 | | 4 | | | | | | | | |
| Phs Duration (G+Y+Rc), s | | 26.0 | | 34.0 | | | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | | | | | | | |
| Max Green Setting (Gmax), s | | 21.0 | | 29.0 | | | | | | | | |
| Max Q Clear Time (g_c+l1), s | | 0.0 | | 0.0 | | | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 23.6 | | | | | | | | |
| HCM 6th LOS | | | | C | | | | | | | | |

HCM 6th Signalized Intersection Summary

7: 9th Street & Main Street

03/11/2021















| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|------|------|------|------|-----|-----|-----|-----|-----|------|------|------|
| Lane Configurations | | ↑↑↑ | | | | | | | | | ↑↑↑ | |
| Traffic Volume (veh/h) | 0 | 590 | 270 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 1325 | 0 |
| Future Volume (veh/h) | 0 | 590 | 270 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 1325 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | | | | | | | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | | | | | | | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | | | | | | | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | | | | | | | No | |
| Adj Sat Flow, veh/h/ln | 0 | 1626 | 1626 | | | | | | | 1639 | 1639 | 0 |
| Adj Flow Rate, veh/h | 0 | 1032 | 472 | | | | | | | 152 | 2016 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | | | | | | | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 0 | 3 | 3 | | | | | | | 2 | 2 | 0 |
| Cap, veh/h | 0 | 1064 | 486 | | | | | | | 195 | 2005 | 0 |
| Arrive On Green | 0.00 | 0.12 | 0.12 | | | | | | | 0.50 | 0.50 | 0.00 |
| Sat Flow, veh/h | 0 | 3125 | 1362 | | | | | | | 267 | 4144 | 0 |
| Grp Volume(v), veh/h | 0 | 1025 | 479 | | | | | | | 805 | 1363 | 0 |
| Grp Sat Flow(s),veh/h/ln | 0 | 1480 | 1381 | | | | | | | 1563 | 1357 | 0 |
| Q Serve(g_s), s | 0.0 | 24.2 | 24.2 | | | | | | | 31.9 | 35.0 | 0.0 |
| Cycle Q Clear(g_c), s | 0.0 | 24.2 | 24.2 | | | | | | | 35.0 | 35.0 | 0.0 |
| Prop In Lane | 0.00 | | 0.99 | | | | | | | 0.19 | | 0.00 |
| Lane Grp Cap(c), veh/h | 0 | 1057 | 493 | | | | | | | 843 | 1357 | 0 |
| V/C Ratio(X) | 0.00 | 0.97 | 0.97 | | | | | | | 0.96 | 1.00 | 0.00 |
| Avail Cap(c_a), veh/h | 0 | 1057 | 493 | | | | | | | 843 | 1357 | 0 |
| HCM Platoon Ratio | 1.00 | 0.33 | 0.33 | | | | | | | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.00 | 1.00 | 1.00 | | | | | | | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 0.0 | 30.5 | 30.5 | | | | | | | 17.9 | 17.5 | 0.0 |
| Incr Delay (d2), s/veh | 0.0 | 21.4 | 33.8 | | | | | | | 21.9 | 25.4 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | | | | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.0 | 12.5 | 13.4 | | | | | | | 16.8 | 14.4 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 0.0 | 51.9 | 64.3 | | | | | | | 39.8 | 42.9 | 0.0 |
| LnGrp LOS | A | D | E | | | | | | | D | F | A |
| Approach Vol, veh/h | | 1504 | | | | | | | | | 2168 | |
| Approach Delay, s/veh | | 55.8 | | | | | | | | | 41.8 | |
| Approach LOS | | E | | | | | | | | | D | |
| Timer - Assigned Phs | | 2 | | 4 | | | | | | | | |
| Phs Duration (G+Y+Rc), s | | 30.0 | | 40.0 | | | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | | | | | | | |
| Max Green Setting (Gmax), s | | 25.0 | | 35.0 | | | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | | 0.0 | | | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 47.5 | | | | | | | | | |
| HCM 6th LOS | | | D | | | | | | | | | |

HCM 6th Signalized Intersection Summary



















8: 15th Street & Main Street

03/11/2021

| |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
| Lane Configurations | | ↑↑↑ | | | | | | ↑↑ | ↑ | | | |
| Traffic Volume (veh/h) | 95 | 500 | 0 | 0 | 0 | 0 | 0 | 700 | 155 | 0 | 0 | 0 |
| Future Volume (veh/h) | 95 | 500 | 0 | 0 | 0 | 0 | 0 | 700 | 155 | 0 | 0 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | | | | 0 | 0 | 0 | | | |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | | | | 1.00 | | 1.00 | | | |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 0.90 | | | |
| Work Zone On Approach | | No | | | | | | No | | | | |
| Adj Sat Flow, veh/h/ln | 1613 | 1613 | 0 | | | | 0 | 1639 | 1639 | | | |
| Adj Flow Rate, veh/h | 179 | 940 | 0 | | | | 0 | 1058 | 234 | | | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | | | | 0.92 | 0.92 | 0.92 | | | |
| Percent Heavy Veh, % | 4 | 4 | 0 | | | | 0 | 2 | 2 | | | |
| Cap, veh/h | 296 | 1221 | 0 | | | | 0 | 1472 | 591 | | | |
| Arrive On Green | 0.35 | 0.35 | 0.00 | | | | 0.00 | 0.47 | 0.47 | | | |
| Sat Flow, veh/h | 585 | 3666 | 0 | | | | 0 | 3196 | 1250 | | | |
| Grp Volume(v), veh/h | 415 | 704 | 0 | | | | 0 | 1058 | 234 | | | |
| Grp Sat Flow(s),veh/h/ln | 1447 | 1336 | 0 | | | | 0 | 1557 | 1250 | | | |
| Q Serve(g_s), s | 13.3 | 12.9 | 0.0 | | | | 0.0 | 14.9 | 6.7 | | | |
| Cycle Q Clear(g_c), s | 14.4 | 12.9 | 0.0 | | | | 0.0 | 14.9 | 6.7 | | | |
| Prop In Lane | 0.43 | | 0.00 | | | | 0.00 | | 1.00 | | | |
| Lane Grp Cap(c), veh/h | 593 | 923 | 0 | | | | 0 | 1472 | 591 | | | |
| V/C Ratio(X) | 0.70 | 0.76 | 0.00 | | | | 0.00 | 0.72 | 0.40 | | | |
| Avail Cap(c_a), veh/h | 593 | 923 | 0 | | | | 0 | 1472 | 591 | | | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 | | | |
| Upstream Filter(l) | 1.00 | 1.00 | 0.00 | | | | 0.00 | 1.00 | 1.00 | | | |
| Uniform Delay (d), s/veh | 16.4 | 16.0 | 0.0 | | | | 0.0 | 11.6 | 9.4 | | | |
| Incr Delay (d2), s/veh | 6.7 | 6.0 | 0.0 | | | | 0.0 | 3.1 | 2.0 | | | |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 | | | |
| %ile BackOfQ(50%),veh/ln | 5.2 | 4.2 | 0.0 | | | | 0.0 | 4.9 | 1.9 | | | |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 23.1 | 22.0 | 0.0 | | | | 0.0 | 14.6 | 11.4 | | | |
| LnGrp LOS | C | C | A | | | | A | B | B | | | |
| Approach Vol, veh/h | | 1119 | | | | | | 1292 | | | | |
| Approach Delay, s/veh | | 22.4 | | | | | | 14.0 | | | | |
| Approach LOS | | C | | | | | | B | | | | |
| Timer - Assigned Phs | | 2 | | 4 | | | | | | | | |
| Phs Duration (G+Y+Rc), s | | 24.0 | | 31.0 | | | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | | | | | | | |
| Max Green Setting (Gmax), s | | 19.0 | | 26.0 | | | | | | | | |
| Max Q Clear Time (g_c+l1), s | | 0.0 | | 0.0 | | | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 17.9 | | | | | | | | | |
| HCM 6th LOS | | | B | | | | | | | | | |

HCM 6th Signalized Intersection Summary
 9: 27th Street & Main Street

03/11/2021

| |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | | | | |    | |  |  | | |  | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 40 | 1765 | 80 | 455 | 610 | 0 | 0 | 235 | 120 |
| Future Volume (veh/h) | 0 | 0 | 0 | 40 | 1765 | 80 | 455 | 610 | 0 | 0 | 235 | 120 |
| Initial Q (Qb), veh | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | | | | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.98 |
| Parking Bus, Adj | | | | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | | | No | | | No | | | No | | |
| Adj Sat Flow, veh/h/ln | | | | 1850 | 1807 | 1850 | 1821 | 1821 | 0 | 0 | 1821 | 1821 |
| Adj Flow Rate, veh/h | | | | 62 | 2294 | 116 | 680 | 870 | 0 | 0 | 388 | 206 |
| Peak Hour Factor | | | | 0.75 | 0.90 | 0.81 | 0.85 | 0.89 | 0.88 | 0.88 | 0.83 | 0.80 |
| Percent Heavy Veh, % | | | | 0 | 3 | 0 | 2 | 2 | 0 | 0 | 2 | 2 |
| Cap, veh/h | | | | 52 | 2047 | 106 | 469 | 897 | 0 | 0 | 239 | 127 |
| Arrive On Green | | | | 0.43 | 0.43 | 0.43 | 0.24 | 0.49 | 0.00 | 0.00 | 0.22 | 0.22 |
| Sat Flow, veh/h | | | | 121 | 4752 | 246 | 1734 | 1821 | 0 | 0 | 1111 | 590 |
| Grp Volume(v), veh/h | | | | 878 | 765 | 829 | 680 | 870 | 0 | 0 | 0 | 594 |
| Grp Sat Flow(s),veh/h/ln | | | | 1714 | 1644 | 1761 | 1734 | 1821 | 0 | 0 | 0 | 1700 |
| Q Serve(g_s), s | | | | 56.0 | 56.0 | 56.0 | 31.0 | 60.4 | 0.0 | 0.0 | 0.0 | 28.0 |
| Cycle Q Clear(g_c), s | | | | 56.0 | 56.0 | 56.0 | 31.0 | 60.4 | 0.0 | 0.0 | 0.0 | 28.0 |
| Prop In Lane | | | | 0.07 | | 0.14 | 1.00 | | 0.00 | 0.00 | | 0.35 |
| Lane Grp Cap(c), veh/h | | | | 738 | 708 | 759 | 469 | 897 | 0 | 0 | 0 | 366 |
| V/C Ratio(X) | | | | 1.19 | 1.08 | 1.09 | 1.45 | 0.97 | 0.00 | 0.00 | 0.00 | 1.62 |
| Avail Cap(c_a), veh/h | | | | 738 | 708 | 759 | 469 | 897 | 0 | 0 | 0 | 366 |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l) | | | | 0.85 | 0.85 | 0.85 | 0.40 | 0.40 | 0.00 | 0.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | | | | 37.0 | 37.0 | 37.0 | 47.7 | 32.1 | 0.0 | 0.0 | 0.0 | 51.0 |
| Incr Delay (d2), s/veh | | | | 96.5 | 55.1 | 58.8 | 207.3 | 13.2 | 0.0 | 0.0 | 0.0 | 292.2 |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | | | | 42.4 | 32.5 | 35.6 | 41.5 | 29.4 | 0.0 | 0.0 | 0.0 | 41.7 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 133.5 | 92.1 | 95.8 | 255.0 | 45.3 | 0.0 | 0.0 | 0.0 | 343.2 |
| LnGrp LOS | | | | F | F | F | F | D | A | A | A | F |
| Approach Vol, veh/h | | | | | 2472 | | | 1550 | | | 594 | |
| Approach Delay, s/veh | | | | | 108.0 | | | 137.3 | | | 343.2 | |
| Approach LOS | | | | | F | | | F | | | F | |
| Timer - Assigned Phs | | 2 | 3 | 4 | | | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | | 61.0 | 36.0 | 33.0 | | | | 69.0 | | | | |
| Change Period (Y+Rc), s | | 5.0 | 5.0 | 5.0 | | | | 5.0 | | | | |
| Max Green Setting (Gmax), s | | 56.0 | 31.0 | 28.0 | | | | 64.0 | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | 0.0 | 0.0 | | | | 0.0 | | | | |
| Green Ext Time (p_c), s | | 0.0 | 0.0 | 0.0 | | | | 0.0 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 148.1 | | | | | | | | |
| HCM 6th LOS | | | | F | | | | | | | | |

HCM Signalized Intersection Capacity Analysis

10: Whitewater Park Blvd. & Main Street

03/11/2021



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------------------------------|------|------|------|------|------|------|------|-------|------|------|-------|-------|
| Lane Configurations | | | | | ↑↑↑ | ↑ | ↑ | ↑↑ | | | ↑↑ | ↑ |
| Traffic Volume (vph) | 0 | 0 | 0 | 5 | 1820 | 290 | 15 | 420 | 0 | 0 | 135 | 300 |
| Future Volume (vph) | 0 | 0 | 0 | 5 | 1820 | 290 | 15 | 420 | 0 | 0 | 135 | 300 |
| Ideal Flow (vphpl) | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 |
| Lane Width | 12 | 12 | 12 | 12 | 12 | 12 | 11 | 11 | 12 | 12 | 11 | 11 |
| Total Lost time (s) | | | | | 12.0 | 12.0 | 6.0 | 6.0 | | | 6.0 | 6.0 |
| Lane Util. Factor | | | | | 0.91 | 1.00 | 1.00 | 0.95 | | | 0.95 | 1.00 |
| Fr _t | | | | | 1.00 | 0.85 | 1.00 | 1.00 | | | 1.00 | 0.85 |
| Fl _t Protected | | | | | 1.00 | 1.00 | 0.95 | 1.00 | | | 1.00 | 1.00 |
| Satd. Flow (prot) | | | | | 4902 | 1453 | 1666 | 3331 | | | 3074 | 1448 |
| Fl _t Permitted | | | | | 1.00 | 1.00 | 0.95 | 1.00 | | | 1.00 | 1.00 |
| Satd. Flow (perm) | | | | | 4902 | 1453 | 1666 | 3331 | | | 3074 | 1448 |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.42 | 0.92 | 0.85 | 0.57 | 0.79 | 0.92 | 0.92 | 0.90 | 0.85 |
| Growth Factor (vph) | 100% | 100% | 100% | 112% | 112% | 112% | 185% | 185% | 185% | 166% | 166% | 166% |
| Adj. Flow (vph) | 0 | 0 | 0 | 13 | 2216 | 382 | 49 | 984 | 0 | 0 | 249 | 586 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 54 | 0 | 0 | 0 | 0 | 0 | 119 |
| Lane Group Flow (vph) | 0 | 0 | 0 | 0 | 2229 | 328 | 49 | 984 | 0 | 0 | 249 | 467 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 3% | 3% | 3% | 2% | 2% | 2% | 5% | 5% | 5% |
| Bus Blockages (#/hr) | 0 | 0 | 0 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 |
| Parking (#/hr) | | | | | | | | | | | | 0 |
| Turn Type | | | | Perm | NA | Perm | Prot | NA | | | NA | Perm |
| Protected Phases | | | | | 2 | | 3 | 8 | | | 4 | |
| Permitted Phases | | | | 2 | | 2 | | | | | | 4 |
| Actuated Green, G (s) | | | | | 44.6 | 44.6 | 4.0 | 37.4 | | | 27.4 | 27.4 |
| Effective Green, g (s) | | | | | 44.6 | 44.6 | 4.0 | 37.4 | | | 27.4 | 27.4 |
| Actuated g/C Ratio | | | | | 0.45 | 0.45 | 0.04 | 0.37 | | | 0.27 | 0.27 |
| Clearance Time (s) | | | | | 12.0 | 12.0 | 6.0 | 6.0 | | | 6.0 | 6.0 |
| Vehicle Extension (s) | | | | | 2.0 | 2.0 | 2.0 | 2.0 | | | 2.0 | 2.0 |
| Lane Grp Cap (vph) | | | | | 2186 | 648 | 66 | 1245 | | | 842 | 396 |
| v/s Ratio Prot | | | | | | | 0.03 | c0.30 | | | 0.08 | |
| v/s Ratio Perm | | | | | 0.45 | 0.23 | | | | | | c0.32 |
| v/c Ratio | | | | | 1.02 | 0.51 | 0.74 | 0.79 | | | 0.30 | 1.18 |
| Uniform Delay, d ₁ | | | | | 27.7 | 19.8 | 47.5 | 27.8 | | | 28.7 | 36.3 |
| Progression Factor | | | | | 1.00 | 1.00 | 1.00 | 1.00 | | | 1.00 | 1.00 |
| Incremental Delay, d ₂ | | | | | 24.4 | 2.8 | 32.0 | 3.3 | | | 0.1 | 103.8 |
| Delay (s) | | | | | 52.1 | 22.6 | 79.5 | 31.1 | | | 28.7 | 140.1 |
| Level of Service | | | | | D | C | E | C | | | C | F |
| Approach Delay (s) | | 0.0 | | | 47.8 | | | 33.4 | | | 106.9 | |
| Approach LOS | | A | | | D | | | C | | | F | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 55.5 | HCM 2000 Level of Service | E |
| HCM 2000 Volume to Capacity ratio | 1.09 | | |
| Actuated Cycle Length (s) | 100.0 | Sum of lost time (s) | 24.0 |
| Intersection Capacity Utilization | 91.6% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |

Description: Count Date: 11/9/2016

c Critical Lane Group

HCM 6th Signalized Intersection Summary
 11: 27th Street & Fairview Avenue

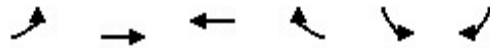
03/11/2021



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|-----|------|------|------|------|------|------|------|
| Lane Configurations | ↗ | ↑↑↑ | | | | | | ↑↑ | ↗ | ↘ | ↑ | |
| Traffic Volume (veh/h) | 255 | 680 | 185 | 0 | 0 | 0 | 0 | 705 | 55 | 55 | 225 | 0 |
| Future Volume (veh/h) | 255 | 680 | 185 | 0 | 0 | 0 | 0 | 705 | 55 | 55 | 225 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | | | | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | | | | 1.00 | | 0.99 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1807 | 1807 | 1807 | | | | 0 | 1821 | 1894 | 1821 | 1821 | 0 |
| Adj Flow Rate, veh/h | 431 | 1111 | 391 | | | | 0 | 1041 | 82 | 100 | 411 | 0 |
| Peak Hour Factor | 0.90 | 0.93 | 0.72 | | | | 0.92 | 0.84 | 0.83 | 0.86 | 0.86 | 0.92 |
| Percent Heavy Veh, % | 3 | 3 | 3 | | | | 0 | 2 | 2 | 2 | 2 | 0 |
| Cap, veh/h | 762 | 1591 | 560 | | | | 0 | 989 | 453 | 202 | 754 | 0 |
| Arrive On Green | 0.44 | 0.44 | 0.44 | | | | 0.00 | 0.29 | 0.29 | 0.06 | 0.41 | 0.00 |
| Sat Flow, veh/h | 1721 | 3593 | 1264 | | | | 0 | 3551 | 1585 | 1734 | 1821 | 0 |
| Grp Volume(v), veh/h | 431 | 1017 | 485 | | | | 0 | 1041 | 82 | 100 | 411 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1721 | 1644 | 1569 | | | | 0 | 1730 | 1585 | 1734 | 1821 | 0 |
| Q Serve(g_s), s | 13.0 | 17.5 | 17.5 | | | | 0.0 | 20.0 | 2.7 | 0.0 | 11.9 | 0.0 |
| Cycle Q Clear(g_c), s | 13.0 | 17.5 | 17.5 | | | | 0.0 | 20.0 | 2.7 | 0.0 | 11.9 | 0.0 |
| Prop In Lane | 1.00 | | 0.81 | | | | 0.00 | | 1.00 | 1.00 | | 0.00 |
| Lane Grp Cap(c), veh/h | 762 | 1456 | 695 | | | | 0 | 989 | 453 | 202 | 754 | 0 |
| V/C Ratio(X) | 0.57 | 0.70 | 0.70 | | | | 0.00 | 1.05 | 0.18 | 0.50 | 0.54 | 0.00 |
| Avail Cap(c_a), veh/h | 762 | 1456 | 695 | | | | 0 | 989 | 453 | 202 | 754 | 0 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.81 | 0.81 | 0.81 | | | | 0.00 | 1.00 | 1.00 | 0.09 | 0.09 | 0.00 |
| Uniform Delay (d), s/veh | 14.5 | 15.7 | 15.7 | | | | 0.0 | 25.0 | 18.8 | 31.1 | 15.5 | 0.0 |
| Incr Delay (d2), s/veh | 2.5 | 2.3 | 4.7 | | | | 0.0 | 43.6 | 0.9 | 0.2 | 0.3 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 5.1 | 6.3 | 6.5 | | | | 0.0 | 13.7 | 1.1 | 1.6 | 4.7 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 17.0 | 18.0 | 20.4 | | | | 0.0 | 68.6 | 19.7 | 31.3 | 15.8 | 0.0 |
| LnGrp LOS | B | B | C | | | | A | F | B | C | B | A |
| Approach Vol, veh/h | | 1933 | | | | | | 1123 | | | 511 | |
| Approach Delay, s/veh | | 18.4 | | | | | | 65.0 | | | 18.8 | |
| Approach LOS | | B | | | | | | E | | | B | |
| Timer - Assigned Phs | | | | 4 | | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | | | | 34.0 | | 36.0 | 9.0 | 25.0 | | | | |
| Change Period (Y+Rc), s | | | | 5.0 | | 5.0 | 5.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | | | | 29.0 | | 31.0 | 4.0 | 20.0 | | | | |
| Max Q Clear Time (g_c+I1), s | | | | 0.0 | | 0.0 | 0.0 | 0.0 | | | | |
| Green Ext Time (p_c), s | | | | 0.0 | | 0.0 | 0.0 | 0.0 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 33.1 | | | | | | | | | |
| HCM 6th LOS | | | C | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 12: Fairview Avenue & Whitewater Park Blvd.

03/11/2021



| Movement | EBL | EBT | WBT | WBR | SBL | SBR |
|------------------------------------|------|------|-------|------|---------------------------|------|
| Lane Configurations | | 4111 | | | 11 | |
| Traffic Volume (vph) | 430 | 860 | 0 | 0 | 160 | 0 |
| Future Volume (vph) | 430 | 860 | 0 | 0 | 160 | 0 |
| Ideal Flow (vphpl) | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 |
| Total Lost time (s) | | 11.5 | | | 6.0 | |
| Lane Util. Factor | | 0.86 | | | 0.97 | |
| Frt | | 1.00 | | | 1.00 | |
| Flt Protected | | 0.98 | | | 0.95 | |
| Satd. Flow (prot) | | 6134 | | | 3100 | |
| Flt Permitted | | 0.98 | | | 0.95 | |
| Satd. Flow (perm) | | 6134 | | | 3100 | |
| Peak-hour factor, PHF | 0.84 | 0.88 | 0.92 | 0.92 | 0.94 | 0.92 |
| Growth Factor (vph) | 151% | 151% | 100% | 100% | 185% | 185% |
| Adj. Flow (vph) | 773 | 1476 | 0 | 0 | 315 | 0 |
| RTOR Reduction (vph) | 0 | 0 | 0 | 0 | 0 | 0 |
| Lane Group Flow (vph) | 0 | 2249 | 0 | 0 | 315 | 0 |
| Heavy Vehicles (%) | 2% | 2% | 2% | 2% | 10% | 10% |
| Turn Type | Perm | NA | | | Prot | |
| Protected Phases | | 6 | | | 4 | |
| Permitted Phases | 6 | | | | | |
| Actuated Green, G (s) | | 72.4 | | | 15.1 | |
| Effective Green, g (s) | | 72.4 | | | 15.1 | |
| Actuated g/C Ratio | | 0.69 | | | 0.14 | |
| Clearance Time (s) | | 11.5 | | | 6.0 | |
| Vehicle Extension (s) | | 2.0 | | | 2.0 | |
| Lane Grp Cap (vph) | | 4229 | | | 445 | |
| v/s Ratio Prot | | | | | c0.10 | |
| v/s Ratio Perm | | 0.37 | | | | |
| v/c Ratio | | 0.53 | | | 0.71 | |
| Uniform Delay, d1 | | 8.0 | | | 42.8 | |
| Progression Factor | | 1.00 | | | 1.00 | |
| Incremental Delay, d2 | | 0.5 | | | 4.2 | |
| Delay (s) | | 8.5 | | | 47.0 | |
| Level of Service | | A | | | D | |
| Approach Delay (s) | | 8.5 | 0.0 | | 47.0 | |
| Approach LOS | | A | A | | D | |
| Intersection Summary | | | | | | |
| HCM 2000 Control Delay | | | 13.2 | | HCM 2000 Level of Service | B |
| HCM 2000 Volume to Capacity ratio | | | 0.56 | | | |
| Actuated Cycle Length (s) | | | 105.0 | | Sum of lost time (s) | 17.5 |
| Intersection Capacity Utilization | | | 96.4% | | ICU Level of Service | F |
| Analysis Period (min) | | | 15 | | | |
| Description: Count Date: 11/9/2016 | | | | | | |
| c Critical Lane Group | | | | | | |

HCM Signalized Intersection Capacity Analysis
 3: 27th Street/26th Street & State Street



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------|-------|------|------|-------|-------|------|-------|-------|------|-------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 25 | 695 | 170 | 45 | 1495 | 45 | 305 | 135 | 45 | 20 | 50 | 15 |
| Future Volume (vph) | 25 | 695 | 170 | 45 | 1495 | 45 | 305 | 135 | 45 | 20 | 50 | 15 |
| Ideal Flow (vphpl) | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 |
| Lane Width | 11 | 12 | 12 | 11 | 12 | 12 | 11 | 11 | 12 | 11 | 11 | 12 |
| Total Lost time (s) | 6.0 | 5.0 | 5.0 | 6.0 | 5.0 | | 6.0 | 6.0 | | 6.0 | 6.0 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.91 | | 0.95 | 0.95 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.97 | | 1.00 | 0.96 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 0.99 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1649 | 3413 | 1527 | 1649 | 4879 | | 1582 | 1597 | | 1666 | 1678 | |
| Flt Permitted | 0.08 | 1.00 | 1.00 | 0.09 | 1.00 | | 0.95 | 0.99 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 136 | 3413 | 1527 | 162 | 4879 | | 1582 | 1597 | | 1666 | 1678 | |
| Peak-hour factor, PHF | 0.82 | 0.90 | 0.84 | 0.67 | 0.94 | 0.83 | 0.86 | 0.77 | 0.73 | 0.68 | 0.89 | 0.67 |
| Growth Factor (vph) | 126% | 126% | 126% | 114% | 114% | 114% | 228% | 228% | 228% | 250% | 250% | 250% |
| Adj. Flow (vph) | 38 | 973 | 255 | 77 | 1813 | 62 | 809 | 400 | 141 | 74 | 140 | 56 |
| RTOR Reduction (vph) | 0 | 0 | 131 | 0 | 3 | 0 | 0 | 6 | 0 | 0 | 10 | 0 |
| Lane Group Flow (vph) | 38 | 973 | 124 | 77 | 1872 | 0 | 671 | 673 | 0 | 74 | 186 | 0 |
| Heavy Vehicles (%) | 3% | 3% | 3% | 3% | 3% | 3% | 2% | 2% | 2% | 2% | 2% | 2% |
| Turn Type | pm+pt | NA | Perm | pm+pt | NA | | Split | NA | | Split | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | 8 | 8 | | 4 | 4 | |
| Permitted Phases | 6 | | 6 | 2 | | | | | | | | |
| Actuated Green, G (s) | 57.4 | 51.0 | 51.0 | 60.6 | 52.6 | | 55.0 | 55.0 | | 13.0 | 13.0 | |
| Effective Green, g (s) | 57.4 | 51.0 | 51.0 | 60.6 | 52.6 | | 55.0 | 55.0 | | 13.0 | 13.0 | |
| Actuated g/C Ratio | 0.38 | 0.34 | 0.34 | 0.40 | 0.35 | | 0.37 | 0.37 | | 0.09 | 0.09 | |
| Clearance Time (s) | 6.0 | 5.0 | 5.0 | 6.0 | 5.0 | | 6.0 | 6.0 | | 6.0 | 6.0 | |
| Vehicle Extension (s) | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | | 2.0 | 2.0 | | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | 116 | 1160 | 519 | 144 | 1710 | | 580 | 585 | | 144 | 145 | |
| v/s Ratio Prot | 0.01 | 0.29 | | c0.03 | c0.38 | | c0.42 | 0.42 | | 0.04 | c0.11 | |
| v/s Ratio Perm | 0.11 | | 0.08 | 0.19 | | | | | | | | |
| v/c Ratio | 0.33 | 0.84 | 0.24 | 0.53 | 1.09 | | 1.16 | 1.15 | | 0.51 | 1.28 | |
| Uniform Delay, d1 | 36.8 | 45.7 | 35.5 | 33.0 | 48.7 | | 47.5 | 47.5 | | 65.5 | 68.5 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 0.6 | 7.3 | 1.1 | 1.9 | 52.6 | | 88.8 | 86.0 | | 1.3 | 169.4 | |
| Delay (s) | 37.4 | 53.0 | 36.6 | 34.9 | 101.3 | | 136.3 | 133.5 | | 66.8 | 237.9 | |
| Level of Service | D | D | D | C | F | | F | F | | E | F | |
| Approach Delay (s) | | 49.3 | | | 98.7 | | | 134.9 | | | 191.0 | |
| Approach LOS | | D | | | F | | | F | | | F | |

| Intersection Summary | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 101.0 | HCM 2000 Level of Service | F |
| HCM 2000 Volume to Capacity ratio | 1.12 | | |
| Actuated Cycle Length (s) | 150.0 | Sum of lost time (s) | 23.0 |
| Intersection Capacity Utilization | 98.3% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |

Description: Count Date: 1/22/2015

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
4: Whitewater Park Blvd./31st Street & State Street

ACHD Countywide Model
03/11/2021



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------|-------|------|------|-------|-------|------|-------|-------|------|-------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 22 | 820 | 106 | 16 | 1684 | 4 | 218 | 64 | 36 | 18 | 30 | 4 |
| Future Volume (vph) | 22 | 820 | 106 | 16 | 1684 | 4 | 218 | 64 | 36 | 18 | 30 | 4 |
| Ideal Flow (vphpl) | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 |
| Lane Width | 10 | 13 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 11 | 12 | 12 |
| Total Lost time (s) | 6.0 | 5.5 | 5.5 | 6.0 | 5.5 | 5.5 | 6.0 | 5.5 | | 6.0 | 6.0 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.97 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.95 | | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1516 | 3526 | 1527 | 1706 | 3413 | 1527 | 3343 | 1716 | | 1666 | 1784 | |
| Flt Permitted | 0.05 | 1.00 | 1.00 | 0.18 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.73 | 1.00 | |
| Satd. Flow (perm) | 74 | 3526 | 1527 | 332 | 3413 | 1527 | 3343 | 1716 | | 1275 | 1784 | |
| Peak-hour factor, PHF | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Growth Factor (vph) | 134% | 134% | 134% | 141% | 141% | 141% | 122% | 122% | 122% | 157% | 157% | 157% |
| Adj. Flow (vph) | 30 | 1133 | 146 | 23 | 2448 | 6 | 274 | 80 | 45 | 29 | 49 | 6 |
| RTOR Reduction (vph) | 0 | 0 | 59 | 0 | 0 | 2 | 0 | 14 | 0 | 0 | 4 | 0 |
| Lane Group Flow (vph) | 30 | 1133 | 87 | 23 | 2448 | 4 | 274 | 111 | 0 | 29 | 51 | 0 |
| Heavy Vehicles (%) | 3% | 3% | 3% | 3% | 3% | 3% | 2% | 2% | 2% | 2% | 2% | 2% |
| Bus Blockages (#/hr) | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Turn Type | pm+pt | NA | Perm | pm+pt | NA | Perm | Prot | NA | | pm+pt | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | 6 | | 6 | 2 | | 2 | | | | 4 | 4 | |
| Actuated Green, G (s) | 90.7 | 86.5 | 86.5 | 88.9 | 85.6 | 85.6 | 23.2 | 29.2 | | 8.5 | 8.5 | |
| Effective Green, g (s) | 90.7 | 86.5 | 86.5 | 88.9 | 85.6 | 85.6 | 23.2 | 29.2 | | 8.5 | 8.5 | |
| Actuated g/C Ratio | 0.63 | 0.60 | 0.60 | 0.61 | 0.59 | 0.59 | 0.16 | 0.20 | | 0.06 | 0.06 | |
| Clearance Time (s) | 6.0 | 5.5 | 5.5 | 6.0 | 5.5 | 5.5 | 6.0 | 5.5 | | 6.0 | 6.0 | |
| Vehicle Extension (s) | 3.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | 88 | 2103 | 910 | 234 | 2014 | 901 | 534 | 345 | | 82 | 104 | |
| v/s Ratio Prot | c0.01 | 0.32 | | 0.00 | c0.72 | | c0.08 | c0.06 | | 0.01 | c0.03 | |
| v/s Ratio Perm | 0.20 | | 0.06 | 0.06 | | 0.00 | | | | 0.01 | | |
| v/c Ratio | 0.34 | 0.54 | 0.10 | 0.10 | 1.22 | 0.00 | 0.51 | 0.32 | | 0.35 | 0.49 | |
| Uniform Delay, d1 | 34.3 | 17.4 | 12.5 | 12.9 | 29.7 | 12.2 | 55.7 | 49.4 | | 65.4 | 66.2 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.3 | 1.0 | 0.2 | 0.1 | 101.8 | 0.0 | 0.3 | 0.2 | | 1.0 | 1.3 | |
| Delay (s) | 36.6 | 18.4 | 12.7 | 12.9 | 131.5 | 12.2 | 56.1 | 49.6 | | 66.4 | 67.5 | |
| Level of Service | D | B | B | B | F | B | E | D | | E | E | |
| Approach Delay (s) | | 18.2 | | | 130.1 | | | 54.1 | | | 67.1 | |
| Approach LOS | | B | | | F | | | D | | | E | |

Intersection Summary

| | | | |
|------------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 87.4 | HCM 2000 Level of Service | F |
| HCM 2000 Volume to Capacity ratio | 1.00 | | |
| Actuated Cycle Length (s) | 145.0 | Sum of lost time (s) | 23.5 |
| Intersection Capacity Utilization | 98.1% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |
| Description: Count Date: 1/21/2014 | | | |
| c Critical Lane Group | | | |

HCM 6th Signalized Intersection Summary
5: 9th Street & Idaho Street



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|-----|------|-----|------|------|------|-----|-----|-----|------|------|------|
| Lane Configurations | | | | | ↑↑↑ | | | | | | ↑↑↑ | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 290 | 1060 | 0 | 0 | 0 | 0 | 0 | 635 | 45 |
| Future Volume (veh/h) | 0 | 0 | 0 | 290 | 1060 | 0 | 0 | 0 | 0 | 0 | 635 | 45 |
| Initial Q (Qb), veh | | | | 0 | 0 | 0 | | | | | 0 | 0 |
| Ped-Bike Adj(A_pbT) | | | | 1.00 | | 1.00 | | | | 1.00 | | 0.88 |
| Parking Bus, Adj | | | | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | | | No | | | | | | No | | |
| Adj Sat Flow, veh/h/ln | | | | 1626 | 1626 | 0 | | | | 0 | 1639 | 1639 |
| Adj Flow Rate, veh/h | | | | 385 | 1421 | 0 | | | | 0 | 1432 | 109 |
| Peak Hour Factor | | | | 0.95 | 0.94 | 0.88 | | | | 0.88 | 0.86 | 0.80 |
| Percent Heavy Veh, % | | | | 3 | 3 | 0 | | | | 0 | 2 | 2 |
| Cap, veh/h | | | | 468 | 1505 | 0 | | | | 0 | 1613 | 123 |
| Arrive On Green | | | | 0.46 | 0.46 | 0.00 | | | | 0.00 | 0.38 | 0.38 |
| Sat Flow, veh/h | | | | 824 | 3394 | 0 | | | | 0 | 4341 | 319 |
| Grp Volume(v), veh/h | | | | 650 | 1156 | 0 | | | | 0 | 1019 | 522 |
| Grp Sat Flow(s),veh/h/ln | | | | 1392 | 1347 | 0 | | | | 0 | 1492 | 1529 |
| Q Serve(g_s), s | | | | 30.0 | 26.3 | 0.0 | | | | 0.0 | 20.7 | 20.8 |
| Cycle Q Clear(g_c), s | | | | 30.0 | 26.3 | 0.0 | | | | 0.0 | 20.7 | 20.8 |
| Prop In Lane | | | | 0.59 | | 0.00 | | | | 0.00 | | 0.21 |
| Lane Grp Cap(c), veh/h | | | | 730 | 1243 | 0 | | | | 0 | 1147 | 588 |
| V/C Ratio(X) | | | | 0.89 | 0.93 | 0.00 | | | | 0.00 | 0.89 | 0.89 |
| Avail Cap(c_a), veh/h | | | | 730 | 1243 | 0 | | | | 0 | 1147 | 588 |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l) | | | | 1.00 | 1.00 | 0.00 | | | | 0.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | | | | 17.7 | 16.5 | 0.0 | | | | 0.0 | 18.7 | 18.7 |
| Incr Delay (d2), s/veh | | | | 15.3 | 13.4 | 0.0 | | | | 0.0 | 10.3 | 17.9 |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | | | | 11.7 | 9.4 | 0.0 | | | | 0.0 | 8.2 | 9.6 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 33.0 | 29.9 | 0.0 | | | | 0.0 | 29.0 | 36.6 |
| LnGrp LOS | | | | C | C | A | | | | A | C | D |
| Approach Vol, veh/h | | | | | 1806 | | | | | | 1541 | |
| Approach Delay, s/veh | | | | | 31.0 | | | | | | 31.6 | |
| Approach LOS | | | | | C | | | | | | C | |
| Timer - Assigned Phs | | 2 | | 4 | | | | | | | | |
| Phs Duration (G+Y+Rc), s | | 35.0 | | 30.0 | | | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | | | | | | | |
| Max Green Setting (Gmax), s | | 30.0 | | 25.0 | | | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | | 0.0 | | | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 31.3 | | | | | | | | |
| HCM 6th LOS | | | | C | | | | | | | | |

HCM 6th Signalized Intersection Summary
 6: 15th Street & Idaho Street



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|-----|------|-----|------|------|------|------|------|------|-----|-----|-----|
| Lane Configurations | | | | | ↑↑↑ | | | ↑↑ | | | | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 0 | 780 | 130 | 75 | 755 | 0 | 0 | 0 | 0 |
| Future Volume (veh/h) | 0 | 0 | 0 | 0 | 780 | 130 | 75 | 755 | 0 | 0 | 0 | 0 |
| Initial Q (Qb), veh | | | | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| Ped-Bike Adj(A_pbT) | | | | 1.00 | | 1.00 | 1.00 | | 1.00 | | | |
| Parking Bus, Adj | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Work Zone On Approach | | | | No | | | | No | | | | |
| Adj Sat Flow, veh/h/ln | | | | 0 | 1626 | 1626 | 1639 | 1639 | 0 | | | |
| Adj Flow Rate, veh/h | | | | 0 | 1043 | 174 | 111 | 1116 | 0 | | | |
| Peak Hour Factor | | | | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | | | |
| Percent Heavy Veh, % | | | | 0 | 3 | 3 | 2 | 2 | 0 | | | |
| Cap, veh/h | | | | 0 | 1341 | 223 | 133 | 1405 | 0 | | | |
| Arrive On Green | | | | 0.00 | 0.35 | 0.35 | 0.48 | 0.48 | 0.00 | | | |
| Sat Flow, veh/h | | | | 0 | 3979 | 638 | 275 | 2989 | 0 | | | |
| Grp Volume(v), veh/h | | | | 0 | 805 | 412 | 656 | 571 | 0 | | | |
| Grp Sat Flow(s),veh/h/ln | | | | 0 | 1480 | 1511 | 1625 | 1557 | 0 | | | |
| Q Serve(g_s), s | | | | 0.0 | 14.6 | 14.6 | 21.0 | 18.0 | 0.0 | | | |
| Cycle Q Clear(g_c), s | | | | 0.0 | 14.6 | 14.6 | 21.0 | 18.0 | 0.0 | | | |
| Prop In Lane | | | | 0.00 | | 0.42 | 0.17 | | 0.00 | | | |
| Lane Grp Cap(c), veh/h | | | | 0 | 1036 | 529 | 786 | 753 | 0 | | | |
| V/C Ratio(X) | | | | 0.00 | 0.78 | 0.78 | 0.83 | 0.76 | 0.00 | | | |
| Avail Cap(c_a), veh/h | | | | 0 | 1036 | 529 | 786 | 753 | 0 | | | |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Upstream Filter(l) | | | | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | | | |
| Uniform Delay (d), s/veh | | | | 0.0 | 17.4 | 17.4 | 13.4 | 12.6 | 0.0 | | | |
| Incr Delay (d2), s/veh | | | | 0.0 | 5.7 | 10.8 | 10.2 | 7.1 | 0.0 | | | |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| %ile BackOfQ(50%),veh/ln | | | | 0.0 | 5.3 | 6.2 | 8.5 | 6.6 | 0.0 | | | |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 0.0 | 23.1 | 28.2 | 23.6 | 19.7 | 0.0 | | | |
| LnGrp LOS | | | | A | C | C | C | B | A | | | |
| Approach Vol, veh/h | | | | | 1217 | | | 1227 | | | | |
| Approach Delay, s/veh | | | | | 24.9 | | | 21.8 | | | | |
| Approach LOS | | | | | C | | | C | | | | |
| Timer - Assigned Phs | | 2 | | 4 | | | | | | | | |
| Phs Duration (G+Y+Rc), s | | 26.0 | | 34.0 | | | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | | | | | | | |
| Max Green Setting (Gmax), s | | 21.0 | | 29.0 | | | | | | | | |
| Max Q Clear Time (g_c+l1), s | | 0.0 | | 0.0 | | | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 23.3 | | | | | | | | |
| HCM 6th LOS | | | | C | | | | | | | | |

HCM 6th Signalized Intersection Summary
 7: 9th Street & Main Street



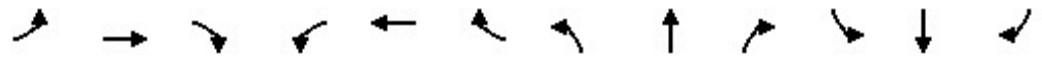
| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|------|------|------|------|-----|-----|-----|-----|-----|------|------|------|
| Lane Configurations | | ↑↑↑ | | | | | | | | | ↑↑↑ | |
| Traffic Volume (veh/h) | 0 | 590 | 270 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 1325 | 0 |
| Future Volume (veh/h) | 0 | 590 | 270 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 1325 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | | | | | | | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | | | | | | | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | | | | | | | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | | | | | | | No | |
| Adj Sat Flow, veh/h/ln | 0 | 1626 | 1626 | | | | | | | 1639 | 1639 | 0 |
| Adj Flow Rate, veh/h | 0 | 1026 | 470 | | | | | | | 151 | 2002 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | | | | | | | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 0 | 3 | 3 | | | | | | | 2 | 2 | 0 |
| Cap, veh/h | 0 | 1063 | 487 | | | | | | | 195 | 2005 | 0 |
| Arrive On Green | 0.00 | 0.12 | 0.12 | | | | | | | 0.50 | 0.50 | 0.00 |
| Sat Flow, veh/h | 0 | 3123 | 1363 | | | | | | | 267 | 4145 | 0 |
| Grp Volume(v), veh/h | 0 | 1020 | 476 | | | | | | | 799 | 1354 | 0 |
| Grp Sat Flow(s),veh/h/ln | 0 | 1480 | 1381 | | | | | | | 1563 | 1357 | 0 |
| Q Serve(g_s), s | 0.0 | 24.0 | 24.0 | | | | | | | 31.8 | 34.8 | 0.0 |
| Cycle Q Clear(g_c), s | 0.0 | 24.0 | 24.0 | | | | | | | 35.0 | 34.8 | 0.0 |
| Prop In Lane | 0.00 | | 0.99 | | | | | | | 0.19 | | 0.00 |
| Lane Grp Cap(c), veh/h | 0 | 1057 | 493 | | | | | | | 843 | 1357 | 0 |
| V/C Ratio(X) | 0.00 | 0.97 | 0.97 | | | | | | | 0.95 | 1.00 | 0.00 |
| Avail Cap(c_a), veh/h | 0 | 1057 | 493 | | | | | | | 843 | 1357 | 0 |
| HCM Platoon Ratio | 1.00 | 0.33 | 0.33 | | | | | | | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l) | 0.00 | 1.00 | 1.00 | | | | | | | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 0.0 | 30.4 | 30.4 | | | | | | | 17.8 | 17.5 | 0.0 |
| Incr Delay (d2), s/veh | 0.0 | 20.5 | 32.8 | | | | | | | 20.8 | 23.8 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | | | | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.0 | 12.3 | 13.2 | | | | | | | 16.4 | 14.0 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 0.0 | 50.9 | 63.2 | | | | | | | 38.6 | 41.3 | 0.0 |
| LnGrp LOS | A | D | E | | | | | | | D | D | A |
| Approach Vol, veh/h | | 1496 | | | | | | | | | 2153 | |
| Approach Delay, s/veh | | 54.8 | | | | | | | | | 40.3 | |
| Approach LOS | | D | | | | | | | | | D | |
| Timer - Assigned Phs | | 2 | | 4 | | | | | | | | |
| Phs Duration (G+Y+Rc), s | | 30.0 | | 40.0 | | | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | | | | | | | |
| Max Green Setting (Gmax), s | | 25.0 | | 35.0 | | | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | | 0.0 | | | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 46.2 | | | | | | | | | |
| HCM 6th LOS | | | D | | | | | | | | | |

HCM 6th Signalized Intersection Summary
 8: 15th Street & Main Street



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|------|------|------|------|-----|-----|------|------|------|-----|-----|-----|
| Lane Configurations | | ↑↑↑ | | | | | | ↑↑ | ↑ | | | |
| Traffic Volume (veh/h) | 95 | 500 | 0 | 0 | 0 | 0 | 0 | 700 | 155 | 0 | 0 | 0 |
| Future Volume (veh/h) | 95 | 500 | 0 | 0 | 0 | 0 | 0 | 700 | 155 | 0 | 0 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | | | | 0 | 0 | 0 | | | |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | | | | 1.00 | | 1.00 | | | |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 0.90 | | | |
| Work Zone On Approach | | No | | | | | | No | | | | |
| Adj Sat Flow, veh/h/ln | 1613 | 1613 | 0 | | | | 0 | 1639 | 1639 | | | |
| Adj Flow Rate, veh/h | 179 | 940 | 0 | | | | 0 | 1058 | 234 | | | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | | | | 0.92 | 0.92 | 0.92 | | | |
| Percent Heavy Veh, % | 4 | 4 | 0 | | | | 0 | 2 | 2 | | | |
| Cap, veh/h | 296 | 1221 | 0 | | | | 0 | 1472 | 591 | | | |
| Arrive On Green | 0.35 | 0.35 | 0.00 | | | | 0.00 | 0.47 | 0.47 | | | |
| Sat Flow, veh/h | 585 | 3666 | 0 | | | | 0 | 3196 | 1250 | | | |
| Grp Volume(v), veh/h | 415 | 704 | 0 | | | | 0 | 1058 | 234 | | | |
| Grp Sat Flow(s),veh/h/ln | 1447 | 1336 | 0 | | | | 0 | 1557 | 1250 | | | |
| Q Serve(g_s), s | 13.3 | 12.9 | 0.0 | | | | 0.0 | 14.9 | 6.7 | | | |
| Cycle Q Clear(g_c), s | 14.4 | 12.9 | 0.0 | | | | 0.0 | 14.9 | 6.7 | | | |
| Prop In Lane | 0.43 | | 0.00 | | | | 0.00 | | 1.00 | | | |
| Lane Grp Cap(c), veh/h | 593 | 923 | 0 | | | | 0 | 1472 | 591 | | | |
| V/C Ratio(X) | 0.70 | 0.76 | 0.00 | | | | 0.00 | 0.72 | 0.40 | | | |
| Avail Cap(c_a), veh/h | 593 | 923 | 0 | | | | 0 | 1472 | 591 | | | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 | | | |
| Upstream Filter(l) | 1.00 | 1.00 | 0.00 | | | | 0.00 | 1.00 | 1.00 | | | |
| Uniform Delay (d), s/veh | 16.4 | 16.0 | 0.0 | | | | 0.0 | 11.6 | 9.4 | | | |
| Incr Delay (d2), s/veh | 6.7 | 6.0 | 0.0 | | | | 0.0 | 3.1 | 2.0 | | | |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 | | | |
| %ile BackOfQ(50%),veh/ln | 5.2 | 4.2 | 0.0 | | | | 0.0 | 4.9 | 1.9 | | | |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 23.1 | 22.0 | 0.0 | | | | 0.0 | 14.6 | 11.4 | | | |
| LnGrp LOS | C | C | A | | | | A | B | B | | | |
| Approach Vol, veh/h | | 1119 | | | | | | 1292 | | | | |
| Approach Delay, s/veh | | 22.4 | | | | | | 14.0 | | | | |
| Approach LOS | | C | | | | | | B | | | | |
| Timer - Assigned Phs | | 2 | | 4 | | | | | | | | |
| Phs Duration (G+Y+Rc), s | | 24.0 | | 31.0 | | | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | | | | | | | |
| Max Green Setting (Gmax), s | | 19.0 | | 26.0 | | | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | | 0.0 | | | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 17.9 | | | | | | | | | |
| HCM 6th LOS | | | B | | | | | | | | | |

HCM 6th Signalized Intersection Summary
 9: 27th Street & Main Street



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|-----|------|------|-------|-------|-------|-------|-------|------|------|-------|-------|
| Lane Configurations | | | | | ←←← | | ← | ↑ | | | ↑ | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 40 | 1765 | 80 | 455 | 610 | 0 | 0 | 235 | 120 |
| Future Volume (veh/h) | 0 | 0 | 0 | 40 | 1765 | 80 | 455 | 610 | 0 | 0 | 235 | 120 |
| Initial Q (Qb), veh | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | | | | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.98 |
| Parking Bus, Adj | | | | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | | | No | | | No | | No | | | No |
| Adj Sat Flow, veh/h/ln | | | | 1850 | 1807 | 1850 | 1821 | 1821 | 0 | 0 | 1821 | 1821 |
| Adj Flow Rate, veh/h | | | | 62 | 2294 | 116 | 685 | 877 | 0 | 0 | 388 | 206 |
| Peak Hour Factor | | | | 0.75 | 0.90 | 0.81 | 0.85 | 0.89 | 0.88 | 0.88 | 0.83 | 0.80 |
| Percent Heavy Veh, % | | | | 0 | 3 | 0 | 2 | 2 | 0 | 0 | 2 | 2 |
| Cap, veh/h | | | | 47 | 1828 | 95 | 469 | 981 | 0 | 0 | 291 | 154 |
| Arrive On Green | | | | 0.38 | 0.38 | 0.38 | 0.24 | 0.54 | 0.00 | 0.00 | 0.26 | 0.26 |
| Sat Flow, veh/h | | | | 121 | 4752 | 246 | 1734 | 1821 | 0 | 0 | 1112 | 590 |
| Grp Volume(v), veh/h | | | | 878 | 765 | 829 | 685 | 877 | 0 | 0 | 0 | 594 |
| Grp Sat Flow(s),veh/h/ln | | | | 1714 | 1644 | 1761 | 1734 | 1821 | 0 | 0 | 0 | 1703 |
| Q Serve(g_s), s | | | | 50.0 | 50.0 | 50.0 | 31.0 | 55.7 | 0.0 | 0.0 | 0.0 | 34.0 |
| Cycle Q Clear(g_c), s | | | | 50.0 | 50.0 | 50.0 | 31.0 | 55.7 | 0.0 | 0.0 | 0.0 | 34.0 |
| Prop In Lane | | | | 0.07 | | 0.14 | 1.00 | | 0.00 | 0.00 | | 0.35 |
| Lane Grp Cap(c), veh/h | | | | 659 | 632 | 677 | 469 | 981 | 0 | 0 | 0 | 445 |
| V/C Ratio(X) | | | | 1.33 | 1.21 | 1.22 | 1.46 | 0.89 | 0.00 | 0.00 | 0.00 | 1.33 |
| Avail Cap(c_a), veh/h | | | | 659 | 632 | 677 | 469 | 981 | 0 | 0 | 0 | 445 |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | | | | 0.85 | 0.85 | 0.85 | 0.39 | 0.39 | 0.00 | 0.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | | | | 40.0 | 40.0 | 40.0 | 47.7 | 26.7 | 0.0 | 0.0 | 0.0 | 48.0 |
| Incr Delay (d2), s/veh | | | | 158.0 | 106.7 | 112.1 | 211.9 | 5.4 | 0.0 | 0.0 | 0.0 | 165.0 |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | | | | 49.4 | 38.4 | 42.1 | 42.1 | 25.2 | 0.0 | 0.0 | 0.0 | 34.9 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 198.0 | 146.7 | 152.1 | 259.6 | 32.1 | 0.0 | 0.0 | 0.0 | 213.0 |
| LnGrp LOS | | | | F | F | F | F | C | A | A | A | F |
| Approach Vol, veh/h | | | | | 2472 | | | 1562 | | | 594 | |
| Approach Delay, s/veh | | | | | 166.7 | | | 131.9 | | | 213.0 | |
| Approach LOS | | | | | F | | | F | | | F | |
| Timer - Assigned Phs | | 2 | 3 | 4 | | | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | | 55.0 | 36.0 | 39.0 | | | | 75.0 | | | | |
| Change Period (Y+Rc), s | | 5.0 | 5.0 | 5.0 | | | | 5.0 | | | | |
| Max Green Setting (Gmax), s | | 50.0 | 31.0 | 34.0 | | | | 70.0 | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | 0.0 | 0.0 | | | | 0.0 | | | | |
| Green Ext Time (p_c), s | | 0.0 | 0.0 | 0.0 | | | | 0.0 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 160.9 | | | | | | | | |
| HCM 6th LOS | | | | F | | | | | | | | |

HCM 6th Signalized Intersection Summary
 11: 27th Street & Fairview Avenue



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|-----|------|------|------|------|------|------|------|
| Lane Configurations | ↗ | ↑↑↑ | | | | | | ↑↑ | ↗ | ↘ | ↑ | |
| Traffic Volume (veh/h) | 255 | 680 | 185 | 0 | 0 | 0 | 0 | 705 | 55 | 55 | 225 | 0 |
| Future Volume (veh/h) | 255 | 680 | 185 | 0 | 0 | 0 | 0 | 705 | 55 | 55 | 225 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | | | | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | | | | 1.00 | | 0.99 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1807 | 1807 | 1807 | | | | 0 | 1821 | 1894 | 1821 | 1821 | 0 |
| Adj Flow Rate, veh/h | 431 | 1111 | 391 | | | | 0 | 1049 | 83 | 100 | 411 | 0 |
| Peak Hour Factor | 0.90 | 0.93 | 0.72 | | | | 0.92 | 0.84 | 0.83 | 0.86 | 0.86 | 0.92 |
| Percent Heavy Veh, % | 3 | 3 | 3 | | | | 0 | 2 | 2 | 2 | 2 | 0 |
| Cap, veh/h | 762 | 1591 | 560 | | | | 0 | 989 | 453 | 202 | 754 | 0 |
| Arrive On Green | 0.44 | 0.44 | 0.44 | | | | 0.00 | 0.29 | 0.29 | 0.06 | 0.41 | 0.00 |
| Sat Flow, veh/h | 1721 | 3593 | 1264 | | | | 0 | 3551 | 1585 | 1734 | 1821 | 0 |
| Grp Volume(v), veh/h | 431 | 1017 | 485 | | | | 0 | 1049 | 83 | 100 | 411 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1721 | 1644 | 1569 | | | | 0 | 1730 | 1585 | 1734 | 1821 | 0 |
| Q Serve(g_s), s | 13.0 | 17.5 | 17.5 | | | | 0.0 | 20.0 | 2.8 | 0.0 | 11.9 | 0.0 |
| Cycle Q Clear(g_c), s | 13.0 | 17.5 | 17.5 | | | | 0.0 | 20.0 | 2.8 | 0.0 | 11.9 | 0.0 |
| Prop In Lane | 1.00 | | 0.81 | | | | 0.00 | | 1.00 | 1.00 | | 0.00 |
| Lane Grp Cap(c), veh/h | 762 | 1456 | 695 | | | | 0 | 989 | 453 | 202 | 754 | 0 |
| V/C Ratio(X) | 0.57 | 0.70 | 0.70 | | | | 0.00 | 1.06 | 0.18 | 0.50 | 0.54 | 0.00 |
| Avail Cap(c_a), veh/h | 762 | 1456 | 695 | | | | 0 | 989 | 453 | 202 | 754 | 0 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l) | 0.85 | 0.85 | 0.85 | | | | 0.00 | 1.00 | 1.00 | 0.09 | 0.09 | 0.00 |
| Uniform Delay (d), s/veh | 14.5 | 15.7 | 15.7 | | | | 0.0 | 25.0 | 18.8 | 31.1 | 15.5 | 0.0 |
| Incr Delay (d2), s/veh | 2.6 | 2.4 | 4.9 | | | | 0.0 | 46.3 | 0.9 | 0.2 | 0.3 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 5.1 | 6.3 | 6.5 | | | | 0.0 | 14.1 | 1.1 | 1.6 | 4.7 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 17.1 | 18.1 | 20.6 | | | | 0.0 | 71.3 | 19.7 | 31.3 | 15.8 | 0.0 |
| LnGrp LOS | B | B | C | | | | A | F | B | C | B | A |
| Approach Vol, veh/h | | 1933 | | | | | | 1132 | | | 511 | |
| Approach Delay, s/veh | | 18.5 | | | | | | 67.5 | | | 18.8 | |
| Approach LOS | | B | | | | | | E | | | B | |
| Timer - Assigned Phs | | | | 4 | | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | | | | 34.0 | | 36.0 | 9.0 | 25.0 | | | | |
| Change Period (Y+Rc), s | | | | 5.0 | | 5.0 | 5.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | | | | 29.0 | | 31.0 | 4.0 | 20.0 | | | | |
| Max Q Clear Time (g_c+I1), s | | | | 0.0 | | 0.0 | 0.0 | 0.0 | | | | |
| Green Ext Time (p_c), s | | | | 0.0 | | 0.0 | 0.0 | 0.0 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 34.1 | | | | | | | | | |
| HCM 6th LOS | | | C | | | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 3: 27th Street/26th Street & State Street



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------|-------|------|------|-------|-------|------|-------|-------|------|-------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 25 | 695 | 170 | 45 | 1495 | 45 | 305 | 135 | 45 | 20 | 50 | 15 |
| Future Volume (vph) | 25 | 695 | 170 | 45 | 1495 | 45 | 305 | 135 | 45 | 20 | 50 | 15 |
| Ideal Flow (vphpl) | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 |
| Lane Width | 11 | 12 | 12 | 11 | 12 | 12 | 11 | 11 | 12 | 11 | 11 | 12 |
| Total Lost time (s) | 6.0 | 5.0 | 5.0 | 6.0 | 5.0 | | 6.0 | 6.0 | | 12.0 | 12.0 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.91 | | 0.95 | 0.95 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.97 | | 1.00 | 0.96 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 0.99 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1649 | 3413 | 1527 | 1649 | 4879 | | 1582 | 1597 | | 1666 | 1678 | |
| Flt Permitted | 0.08 | 1.00 | 1.00 | 0.08 | 1.00 | | 0.95 | 0.99 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 145 | 3413 | 1527 | 140 | 4879 | | 1582 | 1597 | | 1666 | 1678 | |
| Peak-hour factor, PHF | 0.82 | 0.90 | 0.84 | 0.67 | 0.94 | 0.83 | 0.86 | 0.77 | 0.73 | 0.68 | 0.89 | 0.67 |
| Growth Factor (vph) | 126% | 126% | 126% | 114% | 114% | 114% | 228% | 228% | 228% | 250% | 250% | 250% |
| Adj. Flow (vph) | 38 | 973 | 255 | 77 | 1813 | 62 | 809 | 400 | 141 | 74 | 140 | 56 |
| RTOR Reduction (vph) | 0 | 0 | 130 | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 9 | 0 |
| Lane Group Flow (vph) | 38 | 973 | 125 | 77 | 1873 | 0 | 671 | 673 | 0 | 74 | 187 | 0 |
| Heavy Vehicles (%) | 3% | 3% | 3% | 3% | 3% | 3% | 2% | 2% | 2% | 2% | 2% | 2% |
| Turn Type | pm+pt | NA | Perm | pm+pt | NA | | Split | NA | | Split | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | 8 | 8 | | 4 | 4 | |
| Permitted Phases | 6 | | 6 | 2 | | | | | | | | |
| Actuated Green, G (s) | 54.4 | 48.0 | 48.0 | 57.6 | 49.6 | | 54.0 | 54.0 | | 12.0 | 12.0 | |
| Effective Green, g (s) | 54.4 | 48.0 | 48.0 | 57.6 | 49.6 | | 54.0 | 54.0 | | 12.0 | 12.0 | |
| Actuated g/C Ratio | 0.36 | 0.32 | 0.32 | 0.38 | 0.33 | | 0.36 | 0.36 | | 0.08 | 0.08 | |
| Clearance Time (s) | 6.0 | 5.0 | 5.0 | 6.0 | 5.0 | | 6.0 | 6.0 | | 12.0 | 12.0 | |
| Vehicle Extension (s) | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | | 2.0 | 2.0 | | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | 115 | 1084 | 485 | 133 | 1602 | | 565 | 571 | | 132 | 133 | |
| v/s Ratio Prot | 0.01 | 0.29 | | c0.03 | c0.38 | | c0.42 | 0.42 | | 0.04 | c0.11 | |
| v/s Ratio Perm | 0.10 | | 0.08 | 0.19 | | | | | | | | |
| v/c Ratio | 0.33 | 0.90 | 0.26 | 0.58 | 1.17 | | 1.19 | 1.18 | | 0.56 | 1.40 | |
| Uniform Delay, d1 | 38.2 | 49.2 | 38.3 | 35.7 | 50.7 | | 48.5 | 48.5 | | 67.0 | 69.5 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 0.6 | 11.6 | 1.3 | 3.8 | 83.2 | | 101.2 | 97.2 | | 3.2 | 220.8 | |
| Delay (s) | 38.8 | 60.8 | 39.5 | 39.4 | 133.9 | | 149.7 | 145.7 | | 70.2 | 290.3 | |
| Level of Service | D | E | D | D | F | | F | F | | E | F | |
| Approach Delay (s) | | 55.8 | | | 130.2 | | | 147.7 | | | 229.9 | |
| Approach LOS | | E | | | F | | | F | | | F | |

Intersection Summary

| | | | |
|-----------------------------------|--------|---------------------------|------|
| HCM 2000 Control Delay | 121.2 | HCM 2000 Level of Service | F |
| HCM 2000 Volume to Capacity ratio | 1.18 | | |
| Actuated Cycle Length (s) | 151.0 | Sum of lost time (s) | 29.0 |
| Intersection Capacity Utilization | 103.3% | ICU Level of Service | G |
| Analysis Period (min) | 15 | | |

Description: Count Date: 1/22/2015

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 4: Whitewater Park Blvd./31st Street & State Street



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR | |
|------------------------------------|-------|-------|-------|-------|---------------------------|------|-------|-------|------|-------|-------|------|--|
| Lane Configurations | | | | | | | | | | | | | |
| Traffic Volume (vph) | 22 | 820 | 106 | 16 | 1684 | 4 | 218 | 64 | 36 | 18 | 30 | 4 | |
| Future Volume (vph) | 22 | 820 | 106 | 16 | 1684 | 4 | 218 | 64 | 36 | 18 | 30 | 4 | |
| Ideal Flow (vphpl) | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | |
| Lane Width | 10 | 13 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 11 | 12 | 12 | |
| Total Lost time (s) | 12.0 | 5.5 | 5.5 | 6.0 | 5.5 | 5.5 | 6.0 | 5.5 | | 6.0 | 6.0 | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.97 | 1.00 | | 1.00 | 1.00 | | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.95 | | 1.00 | 0.98 | | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | |
| Satd. Flow (prot) | 1516 | 3526 | 1527 | 1706 | 3413 | 1527 | 3343 | 1716 | | 1666 | 1784 | | |
| Flt Permitted | 0.05 | 1.00 | 1.00 | 0.20 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.73 | 1.00 | | |
| Satd. Flow (perm) | 74 | 3526 | 1527 | 357 | 3413 | 1527 | 3343 | 1716 | | 1275 | 1784 | | |
| Peak-hour factor, PHF | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | |
| Growth Factor (vph) | 134% | 134% | 134% | 141% | 141% | 141% | 122% | 122% | 122% | 157% | 157% | 157% | |
| Adj. Flow (vph) | 30 | 1133 | 146 | 23 | 2448 | 6 | 274 | 80 | 45 | 29 | 49 | 6 | |
| RTOR Reduction (vph) | 0 | 0 | 59 | 0 | 0 | 3 | 0 | 14 | 0 | 0 | 4 | 0 | |
| Lane Group Flow (vph) | 30 | 1133 | 87 | 23 | 2448 | 3 | 274 | 111 | 0 | 29 | 51 | 0 | |
| Heavy Vehicles (%) | 3% | 3% | 3% | 3% | 3% | 3% | 2% | 2% | 2% | 2% | 2% | 2% | |
| Bus Blockages (#/hr) | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Turn Type | pm+pt | NA | Perm | pm+pt | NA | Perm | Prot | NA | | pm+pt | NA | | |
| Protected Phases | 1 | 6 | | 5 | 2 | | 3 | 8 | | 7 | 4 | | |
| Permitted Phases | 6 | | 6 | 2 | | 2 | | | | 4 | 4 | | |
| Actuated Green, G (s) | 90.8 | 86.5 | 86.5 | 82.8 | 79.5 | 79.5 | 23.2 | 29.2 | | 8.5 | 8.5 | | |
| Effective Green, g (s) | 90.8 | 86.5 | 86.5 | 82.8 | 79.5 | 79.5 | 23.2 | 29.2 | | 8.5 | 8.5 | | |
| Actuated g/C Ratio | 0.63 | 0.60 | 0.60 | 0.57 | 0.55 | 0.55 | 0.16 | 0.20 | | 0.06 | 0.06 | | |
| Clearance Time (s) | 12.0 | 5.5 | 5.5 | 6.0 | 5.5 | 5.5 | 6.0 | 5.5 | | 6.0 | 6.0 | | |
| Vehicle Extension (s) | 3.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | | 2.0 | 2.0 | | |
| Lane Grp Cap (vph) | 89 | 2103 | 910 | 234 | 1871 | 837 | 534 | 345 | | 82 | 104 | | |
| v/s Ratio Prot | c0.01 | c0.32 | | 0.00 | c0.72 | | c0.08 | c0.06 | | 0.01 | c0.03 | | |
| v/s Ratio Perm | 0.20 | | 0.06 | 0.05 | | 0.00 | | | | 0.01 | | | |
| v/c Ratio | 0.34 | 0.54 | 0.10 | 0.10 | 1.31 | 0.00 | 0.51 | 0.32 | | 0.35 | 0.49 | | |
| Uniform Delay, d1 | 34.3 | 17.4 | 12.5 | 14.5 | 32.8 | 14.8 | 55.7 | 49.4 | | 65.4 | 66.2 | | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 2.2 | 1.0 | 0.2 | 0.1 | 142.7 | 0.0 | 0.3 | 0.2 | | 1.0 | 1.3 | | |
| Delay (s) | 36.5 | 18.4 | 12.7 | 14.6 | 175.5 | 14.8 | 56.1 | 49.6 | | 66.4 | 67.5 | | |
| Level of Service | D | B | B | B | F | B | E | D | | E | E | | |
| Approach Delay (s) | | 18.2 | | | 173.6 | | | 54.1 | | | 67.1 | | |
| Approach LOS | | B | | | F | | | D | | | E | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | | | 112.7 | | HCM 2000 Level of Service | | | | | | F | | |
| HCM 2000 Volume to Capacity ratio | | | 1.07 | | | | | | | | | | |
| Actuated Cycle Length (s) | | | 145.0 | | Sum of lost time (s) | | | | | 29.5 | | | |
| Intersection Capacity Utilization | | | 98.1% | | ICU Level of Service | | | | | F | | | |
| Analysis Period (min) | | | 15 | | | | | | | | | | |
| Description: Count Date: 1/21/2014 | | | | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

HCM 6th Signalized Intersection Summary
5: 9th Street & Idaho Street



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|-----|------|-----|------|------|------|-----|-----|-----|------|------|------|
| Lane Configurations | | | | | ↑↑↑ | | | | | | ↑↑↑ | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 290 | 1060 | 0 | 0 | 0 | 0 | 0 | 635 | 45 |
| Future Volume (veh/h) | 0 | 0 | 0 | 290 | 1060 | 0 | 0 | 0 | 0 | 0 | 635 | 45 |
| Initial Q (Qb), veh | | | | 0 | 0 | 0 | | | | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | | | | 1.00 | | 1.00 | | | | 1.00 | | 0.88 |
| Parking Bus, Adj | | | | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | | | No | | | | | | No | | |
| Adj Sat Flow, veh/h/ln | | | | 1626 | 1626 | 0 | | | | 0 | 1639 | 1639 |
| Adj Flow Rate, veh/h | | | | 385 | 1421 | 0 | | | | 0 | 1432 | 109 |
| Peak Hour Factor | | | | 0.95 | 0.94 | 0.88 | | | | 0.88 | 0.86 | 0.80 |
| Percent Heavy Veh, % | | | | 3 | 3 | 0 | | | | 0 | 2 | 2 |
| Cap, veh/h | | | | 468 | 1505 | 0 | | | | 0 | 1613 | 123 |
| Arrive On Green | | | | 0.46 | 0.46 | 0.00 | | | | 0.00 | 0.38 | 0.38 |
| Sat Flow, veh/h | | | | 824 | 3394 | 0 | | | | 0 | 4341 | 319 |
| Grp Volume(v), veh/h | | | | 650 | 1156 | 0 | | | | 0 | 1019 | 522 |
| Grp Sat Flow(s),veh/h/ln | | | | 1392 | 1347 | 0 | | | | 0 | 1492 | 1529 |
| Q Serve(g_s), s | | | | 30.0 | 26.3 | 0.0 | | | | 0.0 | 20.7 | 20.8 |
| Cycle Q Clear(g_c), s | | | | 30.0 | 26.3 | 0.0 | | | | 0.0 | 20.7 | 20.8 |
| Prop In Lane | | | | 0.59 | | 0.00 | | | | 0.00 | | 0.21 |
| Lane Grp Cap(c), veh/h | | | | 730 | 1243 | 0 | | | | 0 | 1147 | 588 |
| V/C Ratio(X) | | | | 0.89 | 0.93 | 0.00 | | | | 0.00 | 0.89 | 0.89 |
| Avail Cap(c_a), veh/h | | | | 730 | 1243 | 0 | | | | 0 | 1147 | 588 |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l) | | | | 1.00 | 1.00 | 0.00 | | | | 0.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | | | | 17.7 | 16.5 | 0.0 | | | | 0.0 | 18.7 | 18.7 |
| Incr Delay (d2), s/veh | | | | 15.3 | 13.4 | 0.0 | | | | 0.0 | 10.3 | 17.9 |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | | | | 11.7 | 9.4 | 0.0 | | | | 0.0 | 8.2 | 9.6 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 33.0 | 29.9 | 0.0 | | | | 0.0 | 29.0 | 36.6 |
| LnGrp LOS | | | | C | C | A | | | | A | C | D |
| Approach Vol, veh/h | | | | | 1806 | | | | | | 1541 | |
| Approach Delay, s/veh | | | | | 31.0 | | | | | | 31.6 | |
| Approach LOS | | | | | C | | | | | | C | |
| Timer - Assigned Phs | | 2 | | 4 | | | | | | | | |
| Phs Duration (G+Y+Rc), s | | 35.0 | | 30.0 | | | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | | | | | | | |
| Max Green Setting (Gmax), s | | 30.0 | | 25.0 | | | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | | 0.0 | | | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 31.3 | | | | | | | | |
| HCM 6th LOS | | | | C | | | | | | | | |

HCM 6th Signalized Intersection Summary
 6: 15th Street & Idaho Street















| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|-----|------|-----|------|------|------|------|------|------|-----|-----|-----|
| Lane Configurations | | | | | ↑↑↑ | | | ↑↑ | | | | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 0 | 780 | 130 | 75 | 755 | 0 | 0 | 0 | 0 |
| Future Volume (veh/h) | 0 | 0 | 0 | 0 | 780 | 130 | 75 | 755 | 0 | 0 | 0 | 0 |
| Initial Q (Qb), veh | | | | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| Ped-Bike Adj(A_pbT) | | | | 1.00 | | 1.00 | 1.00 | | 1.00 | | | |
| Parking Bus, Adj | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Work Zone On Approach | | | | No | | | | No | | | | |
| Adj Sat Flow, veh/h/ln | | | | 0 | 1626 | 1626 | 1639 | 1639 | 0 | | | |
| Adj Flow Rate, veh/h | | | | 0 | 1043 | 174 | 111 | 1116 | 0 | | | |
| Peak Hour Factor | | | | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | | | |
| Percent Heavy Veh, % | | | | 0 | 3 | 3 | 2 | 2 | 0 | | | |
| Cap, veh/h | | | | 0 | 1341 | 223 | 133 | 1405 | 0 | | | |
| Arrive On Green | | | | 0.00 | 0.35 | 0.35 | 0.48 | 0.48 | 0.00 | | | |
| Sat Flow, veh/h | | | | 0 | 3979 | 638 | 275 | 2989 | 0 | | | |
| Grp Volume(v), veh/h | | | | 0 | 805 | 412 | 656 | 571 | 0 | | | |
| Grp Sat Flow(s),veh/h/ln | | | | 0 | 1480 | 1511 | 1625 | 1557 | 0 | | | |
| Q Serve(g_s), s | | | | 0.0 | 14.6 | 14.6 | 21.0 | 18.0 | 0.0 | | | |
| Cycle Q Clear(g_c), s | | | | 0.0 | 14.6 | 14.6 | 21.0 | 18.0 | 0.0 | | | |
| Prop In Lane | | | | 0.00 | | 0.42 | 0.17 | | 0.00 | | | |
| Lane Grp Cap(c), veh/h | | | | 0 | 1036 | 529 | 786 | 753 | 0 | | | |
| V/C Ratio(X) | | | | 0.00 | 0.78 | 0.78 | 0.83 | 0.76 | 0.00 | | | |
| Avail Cap(c_a), veh/h | | | | 0 | 1036 | 529 | 786 | 753 | 0 | | | |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Upstream Filter(l) | | | | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | | | |
| Uniform Delay (d), s/veh | | | | 0.0 | 17.4 | 17.4 | 13.4 | 12.6 | 0.0 | | | |
| Incr Delay (d2), s/veh | | | | 0.0 | 5.7 | 10.8 | 10.2 | 7.1 | 0.0 | | | |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| %ile BackOfQ(50%),veh/ln | | | | 0.0 | 5.3 | 6.2 | 8.5 | 6.6 | 0.0 | | | |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 0.0 | 23.1 | 28.2 | 23.6 | 19.7 | 0.0 | | | |
| LnGrp LOS | | | | A | C | C | C | B | A | | | |
| Approach Vol, veh/h | | | | | 1217 | | | 1227 | | | | |
| Approach Delay, s/veh | | | | | 24.9 | | | 21.8 | | | | |
| Approach LOS | | | | | C | | | C | | | | |
| Timer - Assigned Phs | | 2 | | 4 | | | | | | | | |
| Phs Duration (G+Y+Rc), s | | 26.0 | | 34.0 | | | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | | | | | | | |
| Max Green Setting (Gmax), s | | 21.0 | | 29.0 | | | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | | 0.0 | | | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 23.3 | | | | | | | | |
| HCM 6th LOS | | | | C | | | | | | | | |

HCM 6th Signalized Intersection Summary
7: 9th Street & Main Street

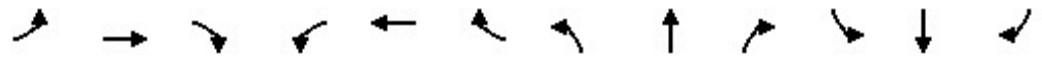


| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|------|------|------|------|-----|-----|-----|-----|-----|------|------|------|
| Lane Configurations | | ↑↑↑ | | | | | | | | | ↑↑↑ | |
| Traffic Volume (veh/h) | 0 | 590 | 270 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 1325 | 0 |
| Future Volume (veh/h) | 0 | 590 | 270 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 1325 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | | | | | | | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | | | | | | | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | | | | | | | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | | | | | | | No | |
| Adj Sat Flow, veh/h/ln | 0 | 1626 | 1626 | | | | | | | 1639 | 1639 | 0 |
| Adj Flow Rate, veh/h | 0 | 1026 | 470 | | | | | | | 151 | 2002 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | | | | | | | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 0 | 3 | 3 | | | | | | | 2 | 2 | 0 |
| Cap, veh/h | 0 | 1063 | 487 | | | | | | | 195 | 2005 | 0 |
| Arrive On Green | 0.00 | 0.12 | 0.12 | | | | | | | 0.50 | 0.50 | 0.00 |
| Sat Flow, veh/h | 0 | 3123 | 1363 | | | | | | | 267 | 4145 | 0 |
| Grp Volume(v), veh/h | 0 | 1020 | 476 | | | | | | | 799 | 1354 | 0 |
| Grp Sat Flow(s),veh/h/ln | 0 | 1480 | 1381 | | | | | | | 1563 | 1357 | 0 |
| Q Serve(g_s), s | 0.0 | 24.0 | 24.0 | | | | | | | 31.8 | 34.8 | 0.0 |
| Cycle Q Clear(g_c), s | 0.0 | 24.0 | 24.0 | | | | | | | 35.0 | 34.8 | 0.0 |
| Prop In Lane | 0.00 | | 0.99 | | | | | | | 0.19 | | 0.00 |
| Lane Grp Cap(c), veh/h | 0 | 1057 | 493 | | | | | | | 843 | 1357 | 0 |
| V/C Ratio(X) | 0.00 | 0.97 | 0.97 | | | | | | | 0.95 | 1.00 | 0.00 |
| Avail Cap(c_a), veh/h | 0 | 1057 | 493 | | | | | | | 843 | 1357 | 0 |
| HCM Platoon Ratio | 1.00 | 0.33 | 0.33 | | | | | | | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | 0.00 | 1.00 | 1.00 | | | | | | | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 0.0 | 30.4 | 30.4 | | | | | | | 17.8 | 17.5 | 0.0 |
| Incr Delay (d2), s/veh | 0.0 | 20.5 | 32.8 | | | | | | | 20.8 | 23.8 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | | | | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.0 | 12.3 | 13.2 | | | | | | | 16.4 | 14.0 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 0.0 | 50.9 | 63.2 | | | | | | | 38.6 | 41.3 | 0.0 |
| LnGrp LOS | A | D | E | | | | | | | D | D | A |
| Approach Vol, veh/h | | 1496 | | | | | | | | | 2153 | |
| Approach Delay, s/veh | | 54.8 | | | | | | | | | 40.3 | |
| Approach LOS | | D | | | | | | | | | D | |
| Timer - Assigned Phs | | 2 | | 4 | | | | | | | | |
| Phs Duration (G+Y+Rc), s | | 30.0 | | 40.0 | | | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | | | | | | | |
| Max Green Setting (Gmax), s | | 25.0 | | 35.0 | | | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | | 0.0 | | | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 46.2 | | | | | | | | | |
| HCM 6th LOS | | | D | | | | | | | | | |

HCM 6th Signalized Intersection Summary
 8: 15th Street & Main Street

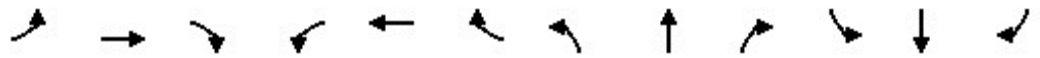
| |  |  |  |  |  |  |  |  |  |  |  |  |
|------------------------------|---|---|---|---|---|---|--|---|---|---|---|---|
| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
| Lane Configurations | | ↑↑↑ | | | | | | ↑↑ | ↑ | | | |
| Traffic Volume (veh/h) | 95 | 500 | 0 | 0 | 0 | 0 | 0 | 700 | 155 | 0 | 0 | 0 |
| Future Volume (veh/h) | 95 | 500 | 0 | 0 | 0 | 0 | 0 | 700 | 155 | 0 | 0 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | | | | 0 | 0 | 0 | | | |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | | | | 1.00 | | 1.00 | | | |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 0.90 | | | |
| Work Zone On Approach | | No | | | | | | No | | | | |
| Adj Sat Flow, veh/h/ln | 1613 | 1613 | 0 | | | | 0 | 1639 | 1639 | | | |
| Adj Flow Rate, veh/h | 179 | 940 | 0 | | | | 0 | 1058 | 234 | | | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | | | | 0.92 | 0.92 | 0.92 | | | |
| Percent Heavy Veh, % | 4 | 4 | 0 | | | | 0 | 2 | 2 | | | |
| Cap, veh/h | 296 | 1221 | 0 | | | | 0 | 1472 | 591 | | | |
| Arrive On Green | 0.35 | 0.35 | 0.00 | | | | 0.00 | 0.47 | 0.47 | | | |
| Sat Flow, veh/h | 585 | 3666 | 0 | | | | 0 | 3196 | 1250 | | | |
| Grp Volume(v), veh/h | 415 | 704 | 0 | | | | 0 | 1058 | 234 | | | |
| Grp Sat Flow(s),veh/h/ln | 1447 | 1336 | 0 | | | | 0 | 1557 | 1250 | | | |
| Q Serve(g_s), s | 13.3 | 12.9 | 0.0 | | | | 0.0 | 14.9 | 6.7 | | | |
| Cycle Q Clear(g_c), s | 14.4 | 12.9 | 0.0 | | | | 0.0 | 14.9 | 6.7 | | | |
| Prop In Lane | 0.43 | | 0.00 | | | | 0.00 | | 1.00 | | | |
| Lane Grp Cap(c), veh/h | 593 | 923 | 0 | | | | 0 | 1472 | 591 | | | |
| V/C Ratio(X) | 0.70 | 0.76 | 0.00 | | | | 0.00 | 0.72 | 0.40 | | | |
| Avail Cap(c_a), veh/h | 593 | 923 | 0 | | | | 0 | 1472 | 591 | | | |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 | | | |
| Upstream Filter(l) | 1.00 | 1.00 | 0.00 | | | | 0.00 | 1.00 | 1.00 | | | |
| Uniform Delay (d), s/veh | 16.4 | 16.0 | 0.0 | | | | 0.0 | 11.6 | 9.4 | | | |
| Incr Delay (d2), s/veh | 6.7 | 6.0 | 0.0 | | | | 0.0 | 3.1 | 2.0 | | | |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 | | | |
| %ile BackOfQ(50%),veh/ln | 5.2 | 4.2 | 0.0 | | | | 0.0 | 4.9 | 1.9 | | | |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 23.1 | 22.0 | 0.0 | | | | 0.0 | 14.6 | 11.4 | | | |
| LnGrp LOS | C | C | A | | | | A | B | B | | | |
| Approach Vol, veh/h | | 1119 | | | | | | 1292 | | | | |
| Approach Delay, s/veh | | 22.4 | | | | | | 14.0 | | | | |
| Approach LOS | | C | | | | | | B | | | | |
| Timer - Assigned Phs | | 2 | | 4 | | | | | | | | |
| Phs Duration (G+Y+Rc), s | | 24.0 | | 31.0 | | | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | | | | | | | |
| Max Green Setting (Gmax), s | | 19.0 | | 26.0 | | | | | | | | |
| Max Q Clear Time (g_c+l1), s | | 0.0 | | 0.0 | | | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 17.9 | | | | | | | | | |
| HCM 6th LOS | | | B | | | | | | | | | |

HCM 6th Signalized Intersection Summary
 9: 27th Street & Main Street



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|-----|------|------|-------|-------|-------|-------|-------|------|------|------|-------|
| Lane Configurations | | | | | ←←← | | ← | ↑ | | | ↑ | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 40 | 1765 | 80 | 455 | 610 | 0 | 0 | 235 | 120 |
| Future Volume (veh/h) | 0 | 0 | 0 | 40 | 1765 | 80 | 455 | 610 | 0 | 0 | 235 | 120 |
| Initial Q (Qb), veh | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | | | | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | | 0.98 |
| Parking Bus, Adj | | | | 0.95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | | | No | | | No | | No | | | No |
| Adj Sat Flow, veh/h/ln | | | | 1850 | 1807 | 1850 | 1821 | 1821 | 0 | 0 | 1821 | 1821 |
| Adj Flow Rate, veh/h | | | | 62 | 2294 | 116 | 685 | 877 | 0 | 0 | 388 | 206 |
| Peak Hour Factor | | | | 0.75 | 0.90 | 0.81 | 0.85 | 0.89 | 0.88 | 0.88 | 0.83 | 0.80 |
| Percent Heavy Veh, % | | | | 0 | 3 | 0 | 2 | 2 | 0 | 0 | 2 | 2 |
| Cap, veh/h | | | | 44 | 1742 | 90 | 453 | 947 | 0 | 0 | 282 | 150 |
| Arrive On Green | | | | 0.37 | 0.37 | 0.37 | 0.23 | 0.52 | 0.00 | 0.00 | 0.25 | 0.25 |
| Sat Flow, veh/h | | | | 121 | 4752 | 246 | 1734 | 1821 | 0 | 0 | 1112 | 590 |
| Grp Volume(v), veh/h | | | | 878 | 765 | 829 | 685 | 877 | 0 | 0 | 0 | 594 |
| Grp Sat Flow(s),veh/h/ln | | | | 1714 | 1644 | 1761 | 1734 | 1821 | 0 | 0 | 0 | 1702 |
| Q Serve(g_s), s | | | | 55.0 | 55.0 | 55.0 | 35.0 | 66.9 | 0.0 | 0.0 | 0.0 | 38.0 |
| Cycle Q Clear(g_c), s | | | | 55.0 | 55.0 | 55.0 | 35.0 | 66.9 | 0.0 | 0.0 | 0.0 | 38.0 |
| Prop In Lane | | | | 0.07 | | 0.14 | 1.00 | | 0.00 | 0.00 | | 0.35 |
| Lane Grp Cap(c), veh/h | | | | 628 | 603 | 646 | 453 | 947 | 0 | 0 | 0 | 431 |
| V/C Ratio(X) | | | | 1.40 | 1.27 | 1.28 | 1.51 | 0.93 | 0.00 | 0.00 | 0.00 | 1.38 |
| Avail Cap(c_a), veh/h | | | | 628 | 603 | 646 | 453 | 947 | 0 | 0 | 0 | 431 |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | | | | 0.85 | 0.85 | 0.85 | 0.39 | 0.39 | 0.00 | 0.00 | 0.00 | 1.00 |
| Uniform Delay (d), s/veh | | | | 47.5 | 47.5 | 47.5 | 55.6 | 33.3 | 0.0 | 0.0 | 0.0 | 56.0 |
| Incr Delay (d2), s/veh | | | | 186.7 | 132.0 | 137.9 | 235.4 | 7.6 | 0.0 | 0.0 | 0.0 | 183.9 |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | | | | 55.7 | 44.3 | 48.5 | 46.1 | 31.3 | 0.0 | 0.0 | 0.0 | 38.5 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 234.2 | 179.5 | 185.4 | 291.0 | 40.9 | 0.0 | 0.0 | 0.0 | 239.9 |
| LnGrp LOS | | | | F | F | F | F | D | A | A | A | F |
| Approach Vol, veh/h | | | | | 2472 | | | 1562 | | | | 594 |
| Approach Delay, s/veh | | | | | 200.9 | | | 150.6 | | | | 239.9 |
| Approach LOS | | | | | F | | | F | | | | F |
| Timer - Assigned Phs | | 2 | 3 | 4 | | | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | | 67.0 | 40.0 | 43.0 | | | | 83.0 | | | | |
| Change Period (Y+Rc), s | | 12.0 | 5.0 | 5.0 | | | | 5.0 | | | | |
| Max Green Setting (Gmax), s | | 55.0 | 35.0 | 38.0 | | | | 78.0 | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | 0.0 | 0.0 | | | | 0.0 | | | | |
| Green Ext Time (p_c), s | | 0.0 | 0.0 | 0.0 | | | | 0.0 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 188.9 | | | | | | | | |
| HCM 6th LOS | | | | F | | | | | | | | |

HCM 6th Signalized Intersection Summary
 11: 27th Street & Fairview Avenue



| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|------------------------------|------|------|------|------|-----|------|------|------|------|------|------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 255 | 680 | 185 | 0 | 0 | 0 | 0 | 705 | 55 | 55 | 225 | 0 |
| Future Volume (veh/h) | 255 | 680 | 185 | 0 | 0 | 0 | 0 | 705 | 55 | 55 | 225 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | | | | | 0 | 0 | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | | | | | 1.00 | 0.99 | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | | | | No | | | No | |
| Adj Sat Flow, veh/h/ln | 1807 | 1807 | 1807 | | | | 0 | 1821 | 1894 | 1821 | 1821 | 0 |
| Adj Flow Rate, veh/h | 431 | 1111 | 391 | | | | 0 | 1049 | 83 | 100 | 411 | 0 |
| Peak Hour Factor | 0.90 | 0.93 | 0.72 | | | | 0.92 | 0.84 | 0.83 | 0.86 | 0.86 | 0.92 |
| Percent Heavy Veh, % | 3 | 3 | 3 | | | | 0 | 2 | 2 | 2 | 2 | 0 |
| Cap, veh/h | 762 | 1591 | 560 | | | | 0 | 989 | 453 | 202 | 754 | 0 |
| Arrive On Green | 0.44 | 0.44 | 0.44 | | | | 0.00 | 0.29 | 0.29 | 0.06 | 0.41 | 0.00 |
| Sat Flow, veh/h | 1721 | 3593 | 1264 | | | | 0 | 3551 | 1585 | 1734 | 1821 | 0 |
| Grp Volume(v), veh/h | 431 | 1017 | 485 | | | | 0 | 1049 | 83 | 100 | 411 | 0 |
| Grp Sat Flow(s),veh/h/ln | 1721 | 1644 | 1569 | | | | 0 | 1730 | 1585 | 1734 | 1821 | 0 |
| Q Serve(g_s), s | 13.0 | 17.5 | 17.5 | | | | 0.0 | 20.0 | 2.8 | 0.0 | 11.9 | 0.0 |
| Cycle Q Clear(g_c), s | 13.0 | 17.5 | 17.5 | | | | 0.0 | 20.0 | 2.8 | 0.0 | 11.9 | 0.0 |
| Prop In Lane | 1.00 | | 0.81 | | | | 0.00 | | 1.00 | 1.00 | | 0.00 |
| Lane Grp Cap(c), veh/h | 762 | 1456 | 695 | | | | 0 | 989 | 453 | 202 | 754 | 0 |
| V/C Ratio(X) | 0.57 | 0.70 | 0.70 | | | | 0.00 | 1.06 | 0.18 | 0.50 | 0.54 | 0.00 |
| Avail Cap(c_a), veh/h | 762 | 1456 | 695 | | | | 0 | 989 | 453 | 202 | 754 | 0 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l) | 0.85 | 0.85 | 0.85 | | | | 0.00 | 1.00 | 1.00 | 0.09 | 0.09 | 0.00 |
| Uniform Delay (d), s/veh | 14.5 | 15.7 | 15.7 | | | | 0.0 | 25.0 | 18.8 | 31.1 | 15.5 | 0.0 |
| Incr Delay (d2), s/veh | 2.6 | 2.4 | 4.9 | | | | 0.0 | 46.3 | 0.9 | 0.2 | 0.3 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 5.1 | 6.3 | 6.5 | | | | 0.0 | 14.1 | 1.1 | 1.6 | 4.7 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 17.1 | 18.1 | 20.6 | | | | 0.0 | 71.3 | 19.7 | 31.3 | 15.8 | 0.0 |
| LnGrp LOS | B | B | C | | | | A | F | B | C | B | A |
| Approach Vol, veh/h | | 1933 | | | | | | 1132 | | | 511 | |
| Approach Delay, s/veh | | 18.5 | | | | | | 67.5 | | | 18.8 | |
| Approach LOS | | B | | | | | | E | | | B | |
| Timer - Assigned Phs | | | | 4 | | 6 | 7 | 8 | | | | |
| Phs Duration (G+Y+Rc), s | | | | 34.0 | | 36.0 | 9.0 | 25.0 | | | | |
| Change Period (Y+Rc), s | | | | 5.0 | | 5.0 | 5.0 | 5.0 | | | | |
| Max Green Setting (Gmax), s | | | | 29.0 | | 31.0 | 4.0 | 20.0 | | | | |
| Max Q Clear Time (g_c+I1), s | | | | 0.0 | | 0.0 | 0.0 | 0.0 | | | | |
| Green Ext Time (p_c), s | | | | 0.0 | | 0.0 | 0.0 | 0.0 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 34.1 | | | | | | | | | |
| HCM 6th LOS | | | C | | | | | | | | | |

HCM 6th Signalized Intersection Summary
 1: 9th Street & State Street



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|------|------|------|------|------|------|-----|-----|-----|------|------|------|
| Lane Configurations | | ↑↑ | | | ↑↑ | | | | | | ↑↑ | ↑ |
| Traffic Volume (veh/h) | 0 | 430 | 130 | 35 | 740 | 0 | 0 | 0 | 0 | 20 | 570 | 130 |
| Future Volume (veh/h) | 0 | 430 | 130 | 35 | 740 | 0 | 0 | 0 | 0 | 20 | 570 | 130 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | | | | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | 1.00 | | 1.00 | | | | 1.00 | | 0.99 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | | | | No | |
| Adj Sat Flow, veh/h/ln | 0 | 1613 | 1613 | 1613 | 1613 | 0 | | | | 1639 | 1639 | 1639 |
| Adj Flow Rate, veh/h | 0 | 682 | 206 | 52 | 915 | 0 | | | | 41 | 833 | 201 |
| Peak Hour Factor | 0.93 | 0.87 | 0.87 | 0.77 | 0.93 | 0.93 | | | | 0.63 | 0.89 | 0.84 |
| Percent Heavy Veh, % | 0 | 4 | 4 | 4 | 4 | 0 | | | | 2 | 2 | 2 |
| Cap, veh/h | 0 | 1188 | 359 | 104 | 1410 | 0 | | | | 49 | 1044 | 472 |
| Arrive On Green | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | | | | 0.11 | 0.11 | 0.11 |
| Sat Flow, veh/h | 0 | 2391 | 698 | 91 | 2815 | 0 | | | | 143 | 3046 | 1376 |
| Grp Volume(v), veh/h | 0 | 452 | 436 | 493 | 474 | 0 | | | | 468 | 406 | 201 |
| Grp Sat Flow(s),veh/h/ln | 0 | 1532 | 1476 | 1438 | 1394 | 0 | | | | 1632 | 1557 | 1376 |
| Q Serve(g_s), s | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | 19.7 | 17.7 | 9.5 |
| Cycle Q Clear(g_c), s | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | 19.7 | 17.7 | 9.5 |
| Prop In Lane | 0.00 | | 0.47 | 0.11 | | 0.00 | | | | 0.09 | | 1.00 |
| Lane Grp Cap(c), veh/h | 0 | 788 | 759 | 796 | 717 | 0 | | | | 560 | 534 | 472 |
| V/C Ratio(X) | 0.00 | 0.57 | 0.57 | 0.62 | 0.66 | 0.00 | | | | 0.84 | 0.76 | 0.43 |
| Avail Cap(c_a), veh/h | 0 | 788 | 759 | 796 | 717 | 0 | | | | 560 | 534 | 472 |
| HCM Platoon Ratio | 1.00 | 2.00 | 2.00 | 2.00 | 2.00 | 1.00 | | | | 0.33 | 0.33 | 0.33 |
| Upstream Filter(I) | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | | | | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | 29.1 | 28.3 | 24.6 |
| Incr Delay (d2), s/veh | 0.0 | 3.0 | 3.1 | 3.6 | 4.7 | 0.0 | | | | 13.8 | 9.8 | 2.8 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.0 | 0.7 | 0.7 | 0.8 | 0.9 | 0.0 | | | | 10.6 | 8.7 | 3.8 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 0.0 | 3.0 | 3.1 | 3.6 | 4.7 | 0.0 | | | | 42.9 | 38.1 | 27.4 |
| LnGrp LOS | A | A | A | A | A | A | | | | D | D | C |
| Approach Vol, veh/h | | 888 | | | 967 | | | | | | 1075 | |
| Approach Delay, s/veh | | 3.1 | | | 4.2 | | | | | | 38.2 | |
| Approach LOS | | A | | | A | | | | | | D | |
| Timer - Assigned Phs | | 2 | | 4 | | 6 | | | | | | |
| Phs Duration (G+Y+Rc), s | | 41.0 | | 29.0 | | 41.0 | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | 5.0 | | | | | | |
| Max Green Setting (Gmax), s | | 36.0 | | 24.0 | | 36.0 | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | | 0.0 | | 0.0 | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | 0.0 | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 16.3 | | | | | | | | |
| HCM 6th LOS | | | | B | | | | | | | | |

HCM 6th Signalized Intersection Summary
 2: 15th Street & State Street



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|------|------|------|------|------|------|------|------|------|-----|-----|-----|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (veh/h) | 95 | 580 | 0 | 0 | 1115 | 80 | 250 | 715 | 35 | 0 | 0 | 0 |
| Future Volume (veh/h) | 95 | 580 | 0 | 0 | 1115 | 80 | 250 | 715 | 35 | 0 | 0 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 0.99 | 1.00 | | 0.99 | | | |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Work Zone On Approach | | No | | | No | | | No | | | | |
| Adj Sat Flow, veh/h/ln | 1792 | 1864 | 0 | 0 | 1879 | 1807 | 1821 | 1821 | 1821 | | | |
| Adj Flow Rate, veh/h | 149 | 857 | 0 | 0 | 1345 | 112 | 288 | 833 | 44 | | | |
| Peak Hour Factor | 0.83 | 0.88 | 0.95 | 0.95 | 0.92 | 0.79 | 0.92 | 0.91 | 0.84 | | | |
| Percent Heavy Veh, % | 4 | 4 | 0 | 0 | 3 | 3 | 2 | 2 | 2 | | | |
| Cap, veh/h | 230 | 2159 | 0 | 0 | 1652 | 137 | 512 | 986 | 52 | | | |
| Arrive On Green | 0.13 | 1.00 | 0.00 | 0.00 | 0.50 | 0.50 | 0.30 | 0.30 | 0.30 | | | |
| Sat Flow, veh/h | 1707 | 3635 | 0 | 0 | 3429 | 277 | 1734 | 3341 | 176 | | | |
| Grp Volume(v), veh/h | 149 | 857 | 0 | 0 | 718 | 739 | 288 | 431 | 446 | | | |
| Grp Sat Flow(s),veh/h/ln | 1707 | 1771 | 0 | 0 | 1785 | 1827 | 1734 | 1730 | 1787 | | | |
| Q Serve(g_s), s | 1.0 | 0.0 | 0.0 | 0.0 | 35.6 | 36.0 | 14.7 | 24.6 | 24.6 | | | |
| Cycle Q Clear(g_c), s | 1.0 | 0.0 | 0.0 | 0.0 | 35.6 | 36.0 | 14.7 | 24.6 | 24.6 | | | |
| Prop In Lane | 1.00 | | 0.00 | 0.00 | | 0.15 | 1.00 | | 0.10 | | | |
| Lane Grp Cap(c), veh/h | 230 | 2159 | 0 | 0 | 884 | 905 | 512 | 511 | 528 | | | |
| V/C Ratio(X) | 0.65 | 0.40 | 0.00 | 0.00 | 0.81 | 0.82 | 0.56 | 0.84 | 0.84 | | | |
| Avail Cap(c_a), veh/h | 230 | 2159 | 0 | 0 | 884 | 905 | 512 | 511 | 528 | | | |
| HCM Platoon Ratio | 2.00 | 2.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Upstream Filter(l) | 0.82 | 0.82 | 0.00 | 0.00 | 1.00 | 1.00 | 0.73 | 0.73 | 0.73 | | | |
| Uniform Delay (d), s/veh | 40.3 | 0.0 | 0.0 | 0.0 | 22.4 | 22.5 | 31.3 | 34.7 | 34.7 | | | |
| Incr Delay (d2), s/veh | 4.0 | 0.4 | 0.0 | 0.0 | 8.0 | 8.1 | 3.2 | 11.9 | 11.6 | | | |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| %ile BackOfQ(50%),veh/ln | 3.7 | 0.1 | 0.0 | 0.0 | 16.4 | 17.0 | 6.6 | 12.0 | 12.3 | | | |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 44.3 | 0.4 | 0.0 | 0.0 | 30.4 | 30.6 | 34.5 | 46.7 | 46.3 | | | |
| LnGrp LOS | D | A | A | A | C | C | C | D | D | | | |
| Approach Vol, veh/h | | 1006 | | | 1457 | | | 1165 | | | | |
| Approach Delay, s/veh | | 6.9 | | | 30.5 | | | 43.5 | | | | |
| Approach LOS | | A | | | C | | | D | | | | |
| Timer - Assigned Phs | 1 | 2 | | | | 6 | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 12.0 | 57.0 | | | | 69.0 | | 36.0 | | | | |
| Change Period (Y+Rc), s | 5.0 | 5.0 | | | | 5.0 | | 5.0 | | | | |
| Max Green Setting (Gmax), s | 7.0 | 52.0 | | | | 64.0 | | 31.0 | | | | |
| Max Q Clear Time (g_c+I1), s | 0.0 | 0.0 | | | | 0.0 | | 0.0 | | | | |
| Green Ext Time (p_c), s | 0.0 | 0.0 | | | | 0.0 | | 0.0 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | | 28.1 | | | | | | | |
| HCM 6th LOS | | | | | C | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 3: 27th Street/26th Street & State Street



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------|-------|------|------|-------|-------|------|-------|-------|------|-------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 25 | 695 | 170 | 45 | 1495 | 45 | 305 | 135 | 45 | 20 | 50 | 15 |
| Future Volume (vph) | 25 | 695 | 170 | 45 | 1495 | 45 | 305 | 135 | 45 | 20 | 50 | 15 |
| Ideal Flow (vphpl) | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 |
| Lane Width | 11 | 12 | 12 | 11 | 12 | 12 | 11 | 11 | 12 | 11 | 11 | 12 |
| Total Lost time (s) | 6.0 | 5.0 | 5.0 | 6.0 | 5.0 | | 6.0 | 6.0 | | 6.0 | 6.0 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.91 | | 0.95 | 0.95 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.97 | | 1.00 | 0.96 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 0.99 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1649 | 3413 | 1527 | 1649 | 4879 | | 1582 | 1598 | | 1666 | 1678 | |
| Flt Permitted | 0.08 | 1.00 | 1.00 | 0.09 | 1.00 | | 0.95 | 0.99 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 136 | 3413 | 1527 | 162 | 4879 | | 1582 | 1598 | | 1666 | 1678 | |
| Peak-hour factor, PHF | 0.82 | 0.90 | 0.84 | 0.67 | 0.94 | 0.83 | 0.86 | 0.77 | 0.73 | 0.68 | 0.89 | 0.67 |
| Growth Factor (vph) | 126% | 126% | 126% | 114% | 114% | 114% | 226% | 226% | 226% | 255% | 255% | 255% |
| Adj. Flow (vph) | 38 | 973 | 255 | 77 | 1813 | 62 | 802 | 396 | 139 | 75 | 143 | 57 |
| RTOR Reduction (vph) | 0 | 0 | 131 | 0 | 3 | 0 | 0 | 6 | 0 | 0 | 9 | 0 |
| Lane Group Flow (vph) | 38 | 973 | 124 | 77 | 1872 | 0 | 666 | 665 | 0 | 75 | 191 | 0 |
| Heavy Vehicles (%) | 3% | 3% | 3% | 3% | 3% | 3% | 2% | 2% | 2% | 2% | 2% | 2% |
| Turn Type | pm+pt | NA | Perm | pm+pt | NA | | Split | NA | | Split | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | 8 | 8 | | 4 | 4 | |
| Permitted Phases | 6 | | 6 | 2 | | | | | | | | |
| Actuated Green, G (s) | 57.4 | 51.0 | 51.0 | 60.6 | 52.6 | | 55.0 | 55.0 | | 13.0 | 13.0 | |
| Effective Green, g (s) | 57.4 | 51.0 | 51.0 | 60.6 | 52.6 | | 55.0 | 55.0 | | 13.0 | 13.0 | |
| Actuated g/C Ratio | 0.38 | 0.34 | 0.34 | 0.40 | 0.35 | | 0.37 | 0.37 | | 0.09 | 0.09 | |
| Clearance Time (s) | 6.0 | 5.0 | 5.0 | 6.0 | 5.0 | | 6.0 | 6.0 | | 6.0 | 6.0 | |
| Vehicle Extension (s) | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | | 2.0 | 2.0 | | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | 116 | 1160 | 519 | 144 | 1710 | | 580 | 585 | | 144 | 145 | |
| v/s Ratio Prot | 0.01 | 0.29 | | c0.03 | c0.38 | | c0.42 | 0.42 | | 0.05 | c0.11 | |
| v/s Ratio Perm | 0.11 | | 0.08 | 0.19 | | | | | | | | |
| v/c Ratio | 0.33 | 0.84 | 0.24 | 0.53 | 1.09 | | 1.15 | 1.14 | | 0.52 | 1.32 | |
| Uniform Delay, d1 | 36.8 | 45.7 | 35.5 | 33.0 | 48.7 | | 47.5 | 47.5 | | 65.5 | 68.5 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 0.6 | 7.3 | 1.1 | 1.9 | 52.6 | | 85.5 | 80.8 | | 1.6 | 182.6 | |
| Delay (s) | 37.4 | 53.0 | 36.6 | 34.9 | 101.3 | | 133.0 | 128.3 | | 67.1 | 251.1 | |
| Level of Service | D | D | D | C | F | | F | F | | E | F | |
| Approach Delay (s) | | 49.3 | | | 98.7 | | | 130.6 | | | 200.9 | |
| Approach LOS | | D | | | F | | | F | | | F | |

| Intersection Summary | | | |
|------------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 100.4 | HCM 2000 Level of Service | F |
| HCM 2000 Volume to Capacity ratio | 1.12 | | |
| Actuated Cycle Length (s) | 150.0 | Sum of lost time (s) | 23.0 |
| Intersection Capacity Utilization | 98.2% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |
| Description: Count Date: 1/22/2015 | | | |
| c Critical Lane Group | | | |

HCM Signalized Intersection Capacity Analysis
 4: Whitewater Park Blvd./31st Street & State Street

ACHD Countywide Model
 03/11/2021



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR | |
|------------------------------------|-------|------|---------------------------|-------|-------|------|-------|-------|------|-------|-------|------|--|
| Lane Configurations | | | | | | | | | | | | | |
| Traffic Volume (vph) | 22 | 820 | 106 | 16 | 1684 | 4 | 218 | 64 | 36 | 18 | 30 | 4 | |
| Future Volume (vph) | 22 | 820 | 106 | 16 | 1684 | 4 | 218 | 64 | 36 | 18 | 30 | 4 | |
| Ideal Flow (vphpl) | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | |
| Lane Width | 10 | 13 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 11 | 12 | 12 | |
| Total Lost time (s) | 6.0 | 5.5 | 5.5 | 6.0 | 5.5 | 5.5 | 6.0 | 5.5 | | 6.0 | 6.0 | | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.97 | 1.00 | | 1.00 | 1.00 | | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.95 | | 1.00 | 0.98 | | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | | |
| Satd. Flow (prot) | 1516 | 3526 | 1527 | 1706 | 3413 | 1527 | 3343 | 1716 | | 1666 | 1784 | | |
| Flt Permitted | 0.05 | 1.00 | 1.00 | 0.18 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.73 | 1.00 | | |
| Satd. Flow (perm) | 74 | 3526 | 1527 | 332 | 3413 | 1527 | 3343 | 1716 | | 1275 | 1784 | | |
| Peak-hour factor, PHF | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | |
| Growth Factor (vph) | 134% | 134% | 134% | 142% | 142% | 142% | 122% | 122% | 122% | 157% | 157% | 157% | |
| Adj. Flow (vph) | 30 | 1133 | 146 | 23 | 2465 | 6 | 274 | 80 | 45 | 29 | 49 | 6 | |
| RTOR Reduction (vph) | 0 | 0 | 59 | 0 | 0 | 2 | 0 | 14 | 0 | 0 | 4 | 0 | |
| Lane Group Flow (vph) | 30 | 1133 | 87 | 23 | 2465 | 4 | 274 | 111 | 0 | 29 | 51 | 0 | |
| Heavy Vehicles (%) | 3% | 3% | 3% | 3% | 3% | 3% | 2% | 2% | 2% | 2% | 2% | 2% | |
| Bus Blockages (#/hr) | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Turn Type | pm+pt | NA | Perm | pm+pt | NA | Perm | Prot | NA | | pm+pt | NA | | |
| Protected Phases | 1 | 6 | | 5 | 2 | | 3 | 8 | | 7 | 4 | | |
| Permitted Phases | 6 | | 6 | 2 | | 2 | | | | 4 | 4 | | |
| Actuated Green, G (s) | 90.7 | 86.5 | 86.5 | 88.9 | 85.6 | 85.6 | 23.2 | 29.2 | | 8.5 | 8.5 | | |
| Effective Green, g (s) | 90.7 | 86.5 | 86.5 | 88.9 | 85.6 | 85.6 | 23.2 | 29.2 | | 8.5 | 8.5 | | |
| Actuated g/C Ratio | 0.63 | 0.60 | 0.60 | 0.61 | 0.59 | 0.59 | 0.16 | 0.20 | | 0.06 | 0.06 | | |
| Clearance Time (s) | 6.0 | 5.5 | 5.5 | 6.0 | 5.5 | 5.5 | 6.0 | 5.5 | | 6.0 | 6.0 | | |
| Vehicle Extension (s) | 3.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | | 2.0 | 2.0 | | |
| Lane Grp Cap (vph) | 88 | 2103 | 910 | 234 | 2014 | 901 | 534 | 345 | | 82 | 104 | | |
| v/s Ratio Prot | c0.01 | 0.32 | | 0.00 | c0.72 | | c0.08 | c0.06 | | 0.01 | c0.03 | | |
| v/s Ratio Perm | 0.20 | | 0.06 | 0.06 | | 0.00 | | | | 0.01 | | | |
| v/c Ratio | 0.34 | 0.54 | 0.10 | 0.10 | 1.22 | 0.00 | 0.51 | 0.32 | | 0.35 | 0.49 | | |
| Uniform Delay, d1 | 34.3 | 17.4 | 12.5 | 12.9 | 29.7 | 12.2 | 55.7 | 49.4 | | 65.4 | 66.2 | | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | |
| Incremental Delay, d2 | 2.3 | 1.0 | 0.2 | 0.1 | 105.4 | 0.0 | 0.3 | 0.2 | | 1.0 | 1.3 | | |
| Delay (s) | 36.6 | 18.4 | 12.7 | 12.9 | 135.1 | 12.2 | 56.1 | 49.6 | | 66.4 | 67.5 | | |
| Level of Service | D | B | B | B | F | B | E | D | | E | E | | |
| Approach Delay (s) | | 18.2 | | | 133.7 | | | 54.1 | | | 67.1 | | |
| Approach LOS | | B | | | F | | | D | | | E | | |
| Intersection Summary | | | | | | | | | | | | | |
| HCM 2000 Control Delay | 89.7 | | HCM 2000 Level of Service | | | | | F | | | | | |
| HCM 2000 Volume to Capacity ratio | 1.01 | | | | | | | | | | | | |
| Actuated Cycle Length (s) | 145.0 | | Sum of lost time (s) | | | | | 23.5 | | | | | |
| Intersection Capacity Utilization | 98.6% | | ICU Level of Service | | | | | F | | | | | |
| Analysis Period (min) | 15 | | | | | | | | | | | | |
| Description: Count Date: 1/21/2014 | | | | | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | | |

HCM 6th Signalized Intersection Summary
5: 9th Street & Idaho Street



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|-----|------|-----|------|------|------|-----|-----|-----|------|------|------|
| Lane Configurations | | | | | ↑↑↑ | | | | | | ↑↑↑ | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 290 | 1060 | 0 | 0 | 0 | 0 | 0 | 635 | 45 |
| Future Volume (veh/h) | 0 | 0 | 0 | 290 | 1060 | 0 | 0 | 0 | 0 | 0 | 635 | 45 |
| Initial Q (Qb), veh | | | | 0 | 0 | 0 | | | | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | | | | 1.00 | | 1.00 | | | | 1.00 | | 0.88 |
| Parking Bus, Adj | | | | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | | | No | | | | | | No | | |
| Adj Sat Flow, veh/h/ln | | | | 1639 | 1639 | 0 | | | | 0 | 1613 | 1613 |
| Adj Flow Rate, veh/h | | | | 388 | 1432 | 0 | | | | 0 | 1440 | 110 |
| Peak Hour Factor | | | | 0.95 | 0.94 | 0.88 | | | | 0.88 | 0.86 | 0.80 |
| Percent Heavy Veh, % | | | | 2 | 2 | 0 | | | | 0 | 4 | 4 |
| Cap, veh/h | | | | 471 | 1517 | 0 | | | | 0 | 1587 | 121 |
| Arrive On Green | | | | 0.46 | 0.46 | 0.00 | | | | 0.00 | 0.38 | 0.38 |
| Sat Flow, veh/h | | | | 830 | 3421 | 0 | | | | 0 | 4270 | 315 |
| Grp Volume(v), veh/h | | | | 656 | 1164 | 0 | | | | 0 | 1025 | 525 |
| Grp Sat Flow(s),veh/h/ln | | | | 1403 | 1357 | 0 | | | | 0 | 1468 | 1505 |
| Q Serve(g_s), s | | | | 30.0 | 26.3 | 0.0 | | | | 0.0 | 21.4 | 21.5 |
| Cycle Q Clear(g_c), s | | | | 30.0 | 26.3 | 0.0 | | | | 0.0 | 21.4 | 21.5 |
| Prop In Lane | | | | 0.59 | | 0.00 | | | | 0.00 | | 0.21 |
| Lane Grp Cap(c), veh/h | | | | 736 | 1253 | 0 | | | | 0 | 1129 | 579 |
| V/C Ratio(X) | | | | 0.89 | 0.93 | 0.00 | | | | 0.00 | 0.91 | 0.91 |
| Avail Cap(c_a), veh/h | | | | 736 | 1253 | 0 | | | | 0 | 1129 | 579 |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | | | | 1.00 | 1.00 | 0.00 | | | | 0.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | | | | 17.7 | 16.5 | 0.0 | | | | 0.0 | 18.9 | 18.9 |
| Incr Delay (d2), s/veh | | | | 15.3 | 13.3 | 0.0 | | | | 0.0 | 12.1 | 20.5 |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | | | | 11.8 | 9.5 | 0.0 | | | | 0.0 | 8.5 | 10.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 33.0 | 29.8 | 0.0 | | | | 0.0 | 31.0 | 39.4 |
| LnGrp LOS | | | | C | C | A | | | | A | C | D |
| Approach Vol, veh/h | | | | | 1820 | | | | | | 1550 | |
| Approach Delay, s/veh | | | | | 31.0 | | | | | | 33.9 | |
| Approach LOS | | | | | C | | | | | | C | |
| Timer - Assigned Phs | | 2 | | 4 | | | | | | | | |
| Phs Duration (G+Y+Rc), s | | 35.0 | | 30.0 | | | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | | | | | | | |
| Max Green Setting (Gmax), s | | 30.0 | | 25.0 | | | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | | 0.0 | | | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 32.3 | | | | | | | | |
| HCM 6th LOS | | | | C | | | | | | | | |

HCM 6th Signalized Intersection Summary
 7: 9th Street & Main Street



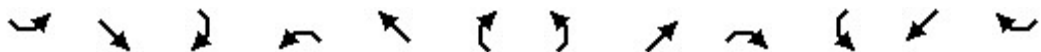
| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|------|------|------|------|-----|-----|-----|-----|-----|------|------|------|
| Lane Configurations | | ↑↑↑ | | | | | | | | | ↑↑↑ | |
| Traffic Volume (veh/h) | 0 | 590 | 270 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 1325 | 0 |
| Future Volume (veh/h) | 0 | 590 | 270 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 1325 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | | | | | | | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | | | | | | | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | | | | | | | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | | | | | | | No | |
| Adj Sat Flow, veh/h/ln | 0 | 1639 | 1639 | | | | | | | 1626 | 1626 | 0 |
| Adj Flow Rate, veh/h | 0 | 1026 | 470 | | | | | | | 152 | 2016 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | | | | | | | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 0 | 2 | 2 | | | | | | | 3 | 3 | 0 |
| Cap, veh/h | 0 | 1072 | 491 | | | | | | | 194 | 1989 | 0 |
| Arrive On Green | 0.00 | 0.12 | 0.12 | | | | | | | 0.50 | 0.50 | 0.00 |
| Sat Flow, veh/h | 0 | 3148 | 1374 | | | | | | | 265 | 4112 | 0 |
| Grp Volume(v), veh/h | 0 | 1020 | 476 | | | | | | | 805 | 1363 | 0 |
| Grp Sat Flow(s),veh/h/ln | 0 | 1492 | 1392 | | | | | | | 1551 | 1347 | 0 |
| Q Serve(g_s), s | 0.0 | 23.8 | 23.8 | | | | | | | 31.9 | 35.0 | 0.0 |
| Cycle Q Clear(g_c), s | 0.0 | 23.8 | 23.8 | | | | | | | 35.0 | 35.0 | 0.0 |
| Prop In Lane | 0.00 | | 0.99 | | | | | | | 0.19 | | 0.00 |
| Lane Grp Cap(c), veh/h | 0 | 1065 | 497 | | | | | | | 836 | 1347 | 0 |
| V/C Ratio(X) | 0.00 | 0.96 | 0.96 | | | | | | | 0.96 | 1.01 | 0.00 |
| Avail Cap(c_a), veh/h | 0 | 1065 | 497 | | | | | | | 836 | 1347 | 0 |
| HCM Platoon Ratio | 1.00 | 0.33 | 0.33 | | | | | | | 1.00 | 1.00 | 1.00 |
| Upstream Filter(l) | 0.00 | 1.00 | 1.00 | | | | | | | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 0.0 | 30.3 | 30.3 | | | | | | | 18.1 | 17.5 | 0.0 |
| Incr Delay (d2), s/veh | 0.0 | 19.1 | 31.1 | | | | | | | 23.2 | 27.6 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | | | | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.0 | 12.1 | 13.0 | | | | | | | 17.2 | 14.7 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 0.0 | 49.4 | 61.4 | | | | | | | 41.3 | 45.1 | 0.0 |
| LnGrp LOS | A | D | E | | | | | | | D | F | A |
| Approach Vol, veh/h | | 1496 | | | | | | | | | 2168 | |
| Approach Delay, s/veh | | 53.2 | | | | | | | | | 43.7 | |
| Approach LOS | | D | | | | | | | | | D | |
| Timer - Assigned Phs | | 2 | | 4 | | | | | | | | |
| Phs Duration (G+Y+Rc), s | | 30.0 | | 40.0 | | | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | | | | | | | |
| Max Green Setting (Gmax), s | | 25.0 | | 35.0 | | | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | | 0.0 | | | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 47.6 | | | | | | | | | |
| HCM 6th LOS | | | D | | | | | | | | | |

HCM 6th Signalized Intersection Summary
 1: 9th Street & State Street



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|------|------|------|------|------|------|-----|-----|-----|------|------|------|
| Lane Configurations | | ↑↑ | | | ↑↑ | | | | | | ↑↑ | ↑ |
| Traffic Volume (veh/h) | 0 | 430 | 130 | 35 | 740 | 0 | 0 | 0 | 0 | 20 | 570 | 130 |
| Future Volume (veh/h) | 0 | 430 | 130 | 35 | 740 | 0 | 0 | 0 | 0 | 20 | 570 | 130 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | | | | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 0.99 | 1.00 | | 1.00 | | | | 1.00 | | 0.99 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | No | | | | | | No | |
| Adj Sat Flow, veh/h/ln | 0 | 1613 | 1613 | 1613 | 1613 | 0 | | | | 1639 | 1639 | 1639 |
| Adj Flow Rate, veh/h | 0 | 682 | 206 | 52 | 915 | 0 | | | | 41 | 833 | 201 |
| Peak Hour Factor | 0.93 | 0.87 | 0.87 | 0.77 | 0.93 | 0.93 | | | | 0.63 | 0.89 | 0.84 |
| Percent Heavy Veh, % | 0 | 4 | 4 | 4 | 4 | 0 | | | | 2 | 2 | 2 |
| Cap, veh/h | 0 | 1188 | 359 | 104 | 1410 | 0 | | | | 49 | 1044 | 472 |
| Arrive On Green | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | | | | 0.11 | 0.11 | 0.11 |
| Sat Flow, veh/h | 0 | 2391 | 698 | 91 | 2815 | 0 | | | | 143 | 3046 | 1376 |
| Grp Volume(v), veh/h | 0 | 452 | 436 | 493 | 474 | 0 | | | | 468 | 406 | 201 |
| Grp Sat Flow(s),veh/h/ln | 0 | 1532 | 1476 | 1438 | 1394 | 0 | | | | 1632 | 1557 | 1376 |
| Q Serve(g_s), s | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | 19.7 | 17.7 | 9.5 |
| Cycle Q Clear(g_c), s | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | 19.7 | 17.7 | 9.5 |
| Prop In Lane | 0.00 | | 0.47 | 0.11 | | 0.00 | | | | 0.09 | | 1.00 |
| Lane Grp Cap(c), veh/h | 0 | 788 | 759 | 796 | 717 | 0 | | | | 560 | 534 | 472 |
| V/C Ratio(X) | 0.00 | 0.57 | 0.57 | 0.62 | 0.66 | 0.00 | | | | 0.84 | 0.76 | 0.43 |
| Avail Cap(c_a), veh/h | 0 | 788 | 759 | 796 | 717 | 0 | | | | 560 | 534 | 472 |
| HCM Platoon Ratio | 1.00 | 2.00 | 2.00 | 2.00 | 2.00 | 1.00 | | | | 0.33 | 0.33 | 0.33 |
| Upstream Filter(l) | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | | | | 1.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | 29.1 | 28.3 | 24.6 |
| Incr Delay (d2), s/veh | 0.0 | 3.0 | 3.1 | 3.6 | 4.7 | 0.0 | | | | 13.8 | 9.8 | 2.8 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.0 | 0.7 | 0.7 | 0.8 | 0.9 | 0.0 | | | | 10.6 | 8.7 | 3.8 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 0.0 | 3.0 | 3.1 | 3.6 | 4.7 | 0.0 | | | | 42.9 | 38.1 | 27.4 |
| LnGrp LOS | A | A | A | A | A | A | | | | D | D | C |
| Approach Vol, veh/h | | 888 | | | 967 | | | | | | 1075 | |
| Approach Delay, s/veh | | 3.1 | | | 4.2 | | | | | | 38.2 | |
| Approach LOS | | A | | | A | | | | | | D | |
| Timer - Assigned Phs | | 2 | | 4 | | 6 | | | | | | |
| Phs Duration (G+Y+Rc), s | | 41.0 | | 29.0 | | 41.0 | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | 5.0 | | | | | | |
| Max Green Setting (Gmax), s | | 36.0 | | 24.0 | | 36.0 | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | | 0.0 | | 0.0 | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | 0.0 | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 16.3 | | | | | | | | |
| HCM 6th LOS | | | | B | | | | | | | | |

HCM 6th Signalized Intersection Summary
 2: 15th Street & State Street



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|------|------|------|------|------|------|------|------|------|-----|-----|-----|
| Lane Configurations | ↖ | ↗ | | | ↖ | | ↖ | ↗ | | | | |
| Traffic Volume (veh/h) | 95 | 580 | 0 | 0 | 1115 | 80 | 250 | 715 | 35 | 0 | 0 | 0 |
| Future Volume (veh/h) | 95 | 580 | 0 | 0 | 1115 | 80 | 250 | 715 | 35 | 0 | 0 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | 1.00 | | 0.99 | 1.00 | | 0.99 | | | |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Work Zone On Approach | | No | | | No | | | No | | | | |
| Adj Sat Flow, veh/h/ln | 1792 | 1864 | 0 | 0 | 1879 | 1807 | 1821 | 1821 | 1821 | | | |
| Adj Flow Rate, veh/h | 149 | 857 | 0 | 0 | 1345 | 112 | 288 | 833 | 44 | | | |
| Peak Hour Factor | 0.83 | 0.88 | 0.95 | 0.95 | 0.92 | 0.79 | 0.92 | 0.91 | 0.84 | | | |
| Percent Heavy Veh, % | 4 | 4 | 0 | 0 | 3 | 3 | 2 | 2 | 2 | | | |
| Cap, veh/h | 230 | 2159 | 0 | 0 | 1652 | 137 | 512 | 986 | 52 | | | |
| Arrive On Green | 0.13 | 1.00 | 0.00 | 0.00 | 0.50 | 0.50 | 0.30 | 0.30 | 0.30 | | | |
| Sat Flow, veh/h | 1707 | 3635 | 0 | 0 | 3429 | 277 | 1734 | 3341 | 176 | | | |
| Grp Volume(v), veh/h | 149 | 857 | 0 | 0 | 718 | 739 | 288 | 431 | 446 | | | |
| Grp Sat Flow(s),veh/h/ln | 1707 | 1771 | 0 | 0 | 1785 | 1827 | 1734 | 1730 | 1787 | | | |
| Q Serve(g_s), s | 1.0 | 0.0 | 0.0 | 0.0 | 35.6 | 36.0 | 14.7 | 24.6 | 24.6 | | | |
| Cycle Q Clear(g_c), s | 1.0 | 0.0 | 0.0 | 0.0 | 35.6 | 36.0 | 14.7 | 24.6 | 24.6 | | | |
| Prop In Lane | 1.00 | | 0.00 | 0.00 | | 0.15 | 1.00 | | 0.10 | | | |
| Lane Grp Cap(c), veh/h | 230 | 2159 | 0 | 0 | 884 | 905 | 512 | 511 | 528 | | | |
| V/C Ratio(X) | 0.65 | 0.40 | 0.00 | 0.00 | 0.81 | 0.82 | 0.56 | 0.84 | 0.84 | | | |
| Avail Cap(c_a), veh/h | 230 | 2159 | 0 | 0 | 884 | 905 | 512 | 511 | 528 | | | |
| HCM Platoon Ratio | 2.00 | 2.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | | |
| Upstream Filter(l) | 0.82 | 0.82 | 0.00 | 0.00 | 1.00 | 1.00 | 0.73 | 0.73 | 0.73 | | | |
| Uniform Delay (d), s/veh | 40.3 | 0.0 | 0.0 | 0.0 | 22.4 | 22.5 | 31.3 | 34.7 | 34.7 | | | |
| Incr Delay (d2), s/veh | 4.0 | 0.4 | 0.0 | 0.0 | 8.0 | 8.1 | 3.2 | 11.9 | 11.6 | | | |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| %ile BackOfQ(50%),veh/ln | 3.7 | 0.1 | 0.0 | 0.0 | 16.4 | 17.0 | 6.6 | 12.0 | 12.3 | | | |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 44.3 | 0.4 | 0.0 | 0.0 | 30.4 | 30.6 | 34.5 | 46.7 | 46.3 | | | |
| LnGrp LOS | D | A | A | A | C | C | C | D | D | | | |
| Approach Vol, veh/h | | 1006 | | | 1457 | | | 1165 | | | | |
| Approach Delay, s/veh | | 6.9 | | | 30.5 | | | 43.5 | | | | |
| Approach LOS | | A | | | C | | | D | | | | |
| Timer - Assigned Phs | 1 | 2 | | | | 6 | | 8 | | | | |
| Phs Duration (G+Y+Rc), s | 12.0 | 57.0 | | | | 69.0 | | 36.0 | | | | |
| Change Period (Y+Rc), s | 5.0 | 5.0 | | | | 5.0 | | 5.0 | | | | |
| Max Green Setting (Gmax), s | 7.0 | 52.0 | | | | 64.0 | | 31.0 | | | | |
| Max Q Clear Time (g_c+l1), s | 0.0 | 0.0 | | | | 0.0 | | 0.0 | | | | |
| Green Ext Time (p_c), s | 0.0 | 0.0 | | | | 0.0 | | 0.0 | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | | 28.1 | | | | | | | |
| HCM 6th LOS | | | | | C | | | | | | | |

HCM Signalized Intersection Capacity Analysis
 3: 27th Street/26th Street & State Street



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------|-------|-------|------|-------|-------|------|-------|-------|------|-------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 25 | 695 | 170 | 45 | 1495 | 45 | 305 | 135 | 45 | 20 | 50 | 15 |
| Future Volume (vph) | 25 | 695 | 170 | 45 | 1495 | 45 | 305 | 135 | 45 | 20 | 50 | 15 |
| Ideal Flow (vphpl) | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 |
| Lane Width | 11 | 12 | 12 | 11 | 12 | 12 | 11 | 11 | 12 | 11 | 11 | 12 |
| Total Lost time (s) | 12.0 | 5.0 | 5.0 | 6.0 | 5.0 | | 6.0 | 6.0 | | 6.0 | 6.0 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.91 | | 0.95 | 0.95 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | | 1.00 | 0.97 | | 1.00 | 0.96 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 0.99 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1649 | 3413 | 1527 | 1649 | 4879 | | 1582 | 1598 | | 1666 | 1678 | |
| Flt Permitted | 0.08 | 1.00 | 1.00 | 0.12 | 1.00 | | 0.95 | 0.99 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | 134 | 3413 | 1527 | 215 | 4879 | | 1582 | 1598 | | 1666 | 1678 | |
| Peak-hour factor, PHF | 0.82 | 0.90 | 0.84 | 0.67 | 0.94 | 0.83 | 0.86 | 0.77 | 0.73 | 0.68 | 0.89 | 0.67 |
| Growth Factor (vph) | 126% | 126% | 126% | 114% | 114% | 114% | 226% | 226% | 226% | 255% | 255% | 255% |
| Adj. Flow (vph) | 38 | 973 | 255 | 77 | 1813 | 62 | 802 | 396 | 139 | 75 | 143 | 57 |
| RTOR Reduction (vph) | 0 | 0 | 136 | 0 | 3 | 0 | 0 | 7 | 0 | 0 | 10 | 0 |
| Lane Group Flow (vph) | 38 | 973 | 119 | 77 | 1872 | 0 | 666 | 664 | 0 | 75 | 190 | 0 |
| Heavy Vehicles (%) | 3% | 3% | 3% | 3% | 3% | 3% | 2% | 2% | 2% | 2% | 2% | 2% |
| Turn Type | pm+pt | NA | Perm | pm+pt | NA | | Split | NA | | Split | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | 8 | 8 | | 4 | 4 | |
| Permitted Phases | 6 | | 6 | 2 | | | | | | | | |
| Actuated Green, G (s) | 58.4 | 52.0 | 52.0 | 55.6 | 47.6 | | 50.0 | 50.0 | | 12.0 | 12.0 | |
| Effective Green, g (s) | 58.4 | 52.0 | 52.0 | 55.6 | 47.6 | | 50.0 | 50.0 | | 12.0 | 12.0 | |
| Actuated g/C Ratio | 0.40 | 0.36 | 0.36 | 0.38 | 0.33 | | 0.34 | 0.34 | | 0.08 | 0.08 | |
| Clearance Time (s) | 12.0 | 5.0 | 5.0 | 6.0 | 5.0 | | 6.0 | 6.0 | | 6.0 | 6.0 | |
| Vehicle Extension (s) | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | | 2.0 | 2.0 | | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | 120 | 1223 | 547 | 161 | 1601 | | 545 | 551 | | 137 | 138 | |
| v/s Ratio Prot | 0.01 | c0.29 | | c0.03 | c0.38 | | c0.42 | 0.42 | | 0.05 | c0.11 | |
| v/s Ratio Perm | 0.11 | | 0.08 | 0.16 | | | | | | | | |
| v/c Ratio | 0.32 | 0.80 | 0.22 | 0.48 | 1.17 | | 1.22 | 1.21 | | 0.55 | 1.38 | |
| Uniform Delay, d1 | 34.6 | 41.7 | 32.3 | 32.0 | 48.7 | | 47.5 | 47.5 | | 63.9 | 66.5 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 0.6 | 5.4 | 0.9 | 0.8 | 83.4 | | 115.6 | 108.9 | | 2.4 | 208.1 | |
| Delay (s) | 35.1 | 47.1 | 33.3 | 32.8 | 132.1 | | 163.1 | 156.4 | | 66.3 | 274.6 | |
| Level of Service | D | D | C | C | F | | F | F | | E | F | |
| Approach Delay (s) | | 44.0 | | | 128.1 | | | 159.8 | | | 217.8 | |
| Approach LOS | | D | | | F | | | F | | | F | |

Intersection Summary

| | | | |
|-----------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 119.9 | HCM 2000 Level of Service | F |
| HCM 2000 Volume to Capacity ratio | 1.19 | | |
| Actuated Cycle Length (s) | 145.0 | Sum of lost time (s) | 29.0 |
| Intersection Capacity Utilization | 98.2% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |

Description: Count Date: 1/22/2015

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
4: Whitewater Park Blvd./31st Street & State Street

ACHD Countywide Model
03/11/2021



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------|-------|-------|------|-------|-------|------|-------|-------|------|-------|-------|------|
| Lane Configurations | | | | | | | | | | | | |
| Traffic Volume (vph) | 22 | 820 | 106 | 16 | 1684 | 4 | 218 | 64 | 36 | 18 | 30 | 4 |
| Future Volume (vph) | 22 | 820 | 106 | 16 | 1684 | 4 | 218 | 64 | 36 | 18 | 30 | 4 |
| Ideal Flow (vphpl) | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 | 1850 |
| Lane Width | 10 | 13 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 11 | 12 | 12 |
| Total Lost time (s) | 10.0 | 5.5 | 5.5 | 6.0 | 5.5 | 5.5 | 6.0 | 5.5 | | 6.0 | 6.0 | |
| Lane Util. Factor | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 0.97 | 1.00 | | 1.00 | 1.00 | |
| Frt | 1.00 | 1.00 | 0.85 | 1.00 | 1.00 | 0.85 | 1.00 | 0.95 | | 1.00 | 0.98 | |
| Flt Protected | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | 1516 | 3526 | 1527 | 1706 | 3413 | 1527 | 3343 | 1716 | | 1666 | 1784 | |
| Flt Permitted | 0.05 | 1.00 | 1.00 | 0.19 | 1.00 | 1.00 | 0.95 | 1.00 | | 0.73 | 1.00 | |
| Satd. Flow (perm) | 74 | 3526 | 1527 | 349 | 3413 | 1527 | 3343 | 1716 | | 1275 | 1784 | |
| Peak-hour factor, PHF | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 | 0.97 |
| Growth Factor (vph) | 134% | 134% | 134% | 142% | 142% | 142% | 122% | 122% | 122% | 157% | 157% | 157% |
| Adj. Flow (vph) | 30 | 1133 | 146 | 23 | 2465 | 6 | 274 | 80 | 45 | 29 | 49 | 6 |
| RTOR Reduction (vph) | 0 | 0 | 59 | 0 | 0 | 3 | 0 | 14 | 0 | 0 | 4 | 0 |
| Lane Group Flow (vph) | 30 | 1133 | 87 | 23 | 2465 | 3 | 274 | 111 | 0 | 29 | 51 | 0 |
| Heavy Vehicles (%) | 3% | 3% | 3% | 3% | 3% | 3% | 2% | 2% | 2% | 2% | 2% | 2% |
| Bus Blockages (#/hr) | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Turn Type | pm+pt | NA | Perm | pm+pt | NA | Perm | Prot | NA | | pm+pt | NA | |
| Protected Phases | 1 | 6 | | 5 | 2 | | 3 | 8 | | 7 | 4 | |
| Permitted Phases | 6 | | 6 | 2 | | 2 | | | | 4 | 4 | |
| Actuated Green, G (s) | 90.8 | 86.5 | 86.5 | 84.8 | 81.5 | 81.5 | 23.2 | 29.2 | | 8.5 | 8.5 | |
| Effective Green, g (s) | 90.8 | 86.5 | 86.5 | 84.8 | 81.5 | 81.5 | 23.2 | 29.2 | | 8.5 | 8.5 | |
| Actuated g/C Ratio | 0.63 | 0.60 | 0.60 | 0.58 | 0.56 | 0.56 | 0.16 | 0.20 | | 0.06 | 0.06 | |
| Clearance Time (s) | 10.0 | 5.5 | 5.5 | 6.0 | 5.5 | 5.5 | 6.0 | 5.5 | | 6.0 | 6.0 | |
| Vehicle Extension (s) | 3.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | | 2.0 | 2.0 | |
| Lane Grp Cap (vph) | 89 | 2103 | 910 | 234 | 1918 | 858 | 534 | 345 | | 82 | 104 | |
| v/s Ratio Prot | c0.01 | c0.32 | | 0.00 | c0.72 | | c0.08 | c0.06 | | 0.01 | c0.03 | |
| v/s Ratio Perm | 0.20 | | 0.06 | 0.06 | | 0.00 | | | | 0.01 | | |
| v/c Ratio | 0.34 | 0.54 | 0.10 | 0.10 | 1.29 | 0.00 | 0.51 | 0.32 | | 0.35 | 0.49 | |
| Uniform Delay, d1 | 34.3 | 17.4 | 12.5 | 13.9 | 31.8 | 13.9 | 55.7 | 49.4 | | 65.4 | 66.2 | |
| Progression Factor | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | 2.2 | 1.0 | 0.2 | 0.1 | 132.4 | 0.0 | 0.3 | 0.2 | | 1.0 | 1.3 | |
| Delay (s) | 36.5 | 18.4 | 12.7 | 14.0 | 164.2 | 13.9 | 56.1 | 49.6 | | 66.4 | 67.5 | |
| Level of Service | D | B | B | B | F | B | E | D | | E | E | |
| Approach Delay (s) | | 18.2 | | | 162.4 | | | 54.1 | | | 67.1 | |
| Approach LOS | | B | | | F | | | D | | | E | |

Intersection Summary

| | | | |
|------------------------------------|-------|---------------------------|------|
| HCM 2000 Control Delay | 106.4 | HCM 2000 Level of Service | F |
| HCM 2000 Volume to Capacity ratio | 1.05 | | |
| Actuated Cycle Length (s) | 145.0 | Sum of lost time (s) | 27.5 |
| Intersection Capacity Utilization | 98.6% | ICU Level of Service | F |
| Analysis Period (min) | 15 | | |
| Description: Count Date: 1/21/2014 | | | |
| c Critical Lane Group | | | |

HCM 6th Signalized Intersection Summary
 5: 9th Street & Idaho Street



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|-----|------|-----|------|------|------|-----|-----|-----|------|------|------|
| Lane Configurations | | | | | ↑↑↑ | | | | | | ↑↑↑ | |
| Traffic Volume (veh/h) | 0 | 0 | 0 | 290 | 1060 | 0 | 0 | 0 | 0 | 0 | 635 | 45 |
| Future Volume (veh/h) | 0 | 0 | 0 | 290 | 1060 | 0 | 0 | 0 | 0 | 0 | 635 | 45 |
| Initial Q (Qb), veh | | | | 0 | 0 | 0 | | | | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | | | | 1.00 | | 1.00 | | | | 1.00 | | 0.88 |
| Parking Bus, Adj | | | | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | | | No | | | | | | No | | |
| Adj Sat Flow, veh/h/ln | | | | 1639 | 1639 | 0 | | | | 0 | 1613 | 1613 |
| Adj Flow Rate, veh/h | | | | 388 | 1432 | 0 | | | | 0 | 1440 | 110 |
| Peak Hour Factor | | | | 0.95 | 0.94 | 0.88 | | | | 0.88 | 0.86 | 0.80 |
| Percent Heavy Veh, % | | | | 2 | 2 | 0 | | | | 0 | 4 | 4 |
| Cap, veh/h | | | | 471 | 1517 | 0 | | | | 0 | 1587 | 121 |
| Arrive On Green | | | | 0.46 | 0.46 | 0.00 | | | | 0.00 | 0.38 | 0.38 |
| Sat Flow, veh/h | | | | 830 | 3421 | 0 | | | | 0 | 4270 | 315 |
| Grp Volume(v), veh/h | | | | 656 | 1164 | 0 | | | | 0 | 1025 | 525 |
| Grp Sat Flow(s),veh/h/ln | | | | 1403 | 1357 | 0 | | | | 0 | 1468 | 1505 |
| Q Serve(g_s), s | | | | 30.0 | 26.3 | 0.0 | | | | 0.0 | 21.4 | 21.5 |
| Cycle Q Clear(g_c), s | | | | 30.0 | 26.3 | 0.0 | | | | 0.0 | 21.4 | 21.5 |
| Prop In Lane | | | | 0.59 | | 0.00 | | | | 0.00 | | 0.21 |
| Lane Grp Cap(c), veh/h | | | | 736 | 1253 | 0 | | | | 0 | 1129 | 579 |
| V/C Ratio(X) | | | | 0.89 | 0.93 | 0.00 | | | | 0.00 | 0.91 | 0.91 |
| Avail Cap(c_a), veh/h | | | | 736 | 1253 | 0 | | | | 0 | 1129 | 579 |
| HCM Platoon Ratio | | | | 1.00 | 1.00 | 1.00 | | | | 1.00 | 1.00 | 1.00 |
| Upstream Filter(I) | | | | 1.00 | 1.00 | 0.00 | | | | 0.00 | 1.00 | 1.00 |
| Uniform Delay (d), s/veh | | | | 17.7 | 16.5 | 0.0 | | | | 0.0 | 18.9 | 18.9 |
| Incr Delay (d2), s/veh | | | | 15.3 | 13.3 | 0.0 | | | | 0.0 | 12.1 | 20.5 |
| Initial Q Delay(d3),s/veh | | | | 0.0 | 0.0 | 0.0 | | | | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | | | | 11.8 | 9.5 | 0.0 | | | | 0.0 | 8.5 | 10.1 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | | | | 33.0 | 29.8 | 0.0 | | | | 0.0 | 31.0 | 39.4 |
| LnGrp LOS | | | | C | C | A | | | | A | C | D |
| Approach Vol, veh/h | | | | | 1820 | | | | | | 1550 | |
| Approach Delay, s/veh | | | | | 31.0 | | | | | | 33.9 | |
| Approach LOS | | | | | C | | | | | | C | |
| Timer - Assigned Phs | | 2 | | 4 | | | | | | | | |
| Phs Duration (G+Y+Rc), s | | 35.0 | | 30.0 | | | | | | | | |
| Change Period (Y+Rc), s | | 5.0 | | 5.0 | | | | | | | | |
| Max Green Setting (Gmax), s | | 30.0 | | 25.0 | | | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | | 0.0 | | | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | | 32.3 | | | | | | | | |
| HCM 6th LOS | | | | C | | | | | | | | |

HCM 6th Signalized Intersection Summary
 7: 9th Street & Main Street



| Movement | SEL | SET | SER | NWL | NWT | NWR | NEL | NET | NER | SWL | SWT | SWR |
|------------------------------|------|------|------|------|-----|-----|-----|-----|-----|------|------|------|
| Lane Configurations | | ↑↑↑ | | | | | | | | | ↑↑↑ | |
| Traffic Volume (veh/h) | 0 | 590 | 270 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 1325 | 0 |
| Future Volume (veh/h) | 0 | 590 | 270 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 1325 | 0 |
| Initial Q (Qb), veh | 0 | 0 | 0 | | | | | | | 0 | 0 | 0 |
| Ped-Bike Adj(A_pbT) | 1.00 | | 1.00 | | | | | | | 1.00 | | 1.00 |
| Parking Bus, Adj | 1.00 | 1.00 | 1.00 | | | | | | | 1.00 | 1.00 | 1.00 |
| Work Zone On Approach | | No | | | | | | | | | No | |
| Adj Sat Flow, veh/h/ln | 0 | 1639 | 1639 | | | | | | | 1626 | 1626 | 0 |
| Adj Flow Rate, veh/h | 0 | 1026 | 470 | | | | | | | 152 | 2016 | 0 |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | | | | | | | 0.92 | 0.92 | 0.92 |
| Percent Heavy Veh, % | 0 | 2 | 2 | | | | | | | 3 | 3 | 0 |
| Cap, veh/h | 0 | 1154 | 529 | | | | | | | 174 | 1945 | 0 |
| Arrive On Green | 0.00 | 0.38 | 0.38 | | | | | | | 0.16 | 0.16 | 0.00 |
| Sat Flow, veh/h | 0 | 3148 | 1374 | | | | | | | 287 | 4083 | 0 |
| Grp Volume(v), veh/h | 0 | 1020 | 476 | | | | | | | 800 | 1368 | 0 |
| Grp Sat Flow(s),veh/h/ln | 0 | 1492 | 1392 | | | | | | | 1544 | 1347 | 0 |
| Q Serve(g_s), s | 0.0 | 41.6 | 41.6 | | | | | | | 62.8 | 64.0 | 0.0 |
| Cycle Q Clear(g_c), s | 0.0 | 41.6 | 41.6 | | | | | | | 64.0 | 64.0 | 0.0 |
| Prop In Lane | 0.00 | | 0.99 | | | | | | | 0.19 | | 0.00 |
| Lane Grp Cap(c), veh/h | 0 | 1147 | 535 | | | | | | | 793 | 1326 | 0 |
| V/C Ratio(X) | 0.00 | 0.89 | 0.89 | | | | | | | 1.01 | 1.03 | 0.00 |
| Avail Cap(c_a), veh/h | 0 | 1147 | 535 | | | | | | | 793 | 1326 | 0 |
| HCM Platoon Ratio | 1.00 | 1.00 | 1.00 | | | | | | | 0.33 | 0.33 | 1.00 |
| Upstream Filter(l) | 0.00 | 1.00 | 1.00 | | | | | | | 1.00 | 1.00 | 0.00 |
| Uniform Delay (d), s/veh | 0.0 | 37.4 | 37.4 | | | | | | | 55.7 | 54.4 | 0.0 |
| Incr Delay (d2), s/veh | 0.0 | 10.4 | 19.4 | | | | | | | 34.1 | 33.2 | 0.0 |
| Initial Q Delay(d3),s/veh | 0.0 | 0.0 | 0.0 | | | | | | | 0.0 | 0.0 | 0.0 |
| %ile BackOfQ(50%),veh/ln | 0.0 | 16.6 | 16.9 | | | | | | | 35.5 | 29.4 | 0.0 |
| Unsig. Movement Delay, s/veh | | | | | | | | | | | | |
| LnGrp Delay(d),s/veh | 0.0 | 47.8 | 56.8 | | | | | | | 89.9 | 87.7 | 0.0 |
| LnGrp LOS | A | D | E | | | | | | | F | F | A |
| Approach Vol, veh/h | | 1496 | | | | | | | | | 2168 | |
| Approach Delay, s/veh | | 50.7 | | | | | | | | | 88.5 | |
| Approach LOS | | D | | | | | | | | | F | |
| Timer - Assigned Phs | | 2 | | 4 | | | | | | | | |
| Phs Duration (G+Y+Rc), s | | 61.0 | | 69.0 | | | | | | | | |
| Change Period (Y+Rc), s | | 11.0 | | 5.0 | | | | | | | | |
| Max Green Setting (Gmax), s | | 50.0 | | 64.0 | | | | | | | | |
| Max Q Clear Time (g_c+I1), s | | 0.0 | | 0.0 | | | | | | | | |
| Green Ext Time (p_c), s | | 0.0 | | 0.0 | | | | | | | | |
| Intersection Summary | | | | | | | | | | | | |
| HCM 6th Ctrl Delay | | | 73.1 | | | | | | | | | |
| HCM 6th LOS | | | E | | | | | | | | | |

B. ROUTE DESCRIPTIONS TECHNICAL MEMORANDUM



BUILDING A BETTER
State Street

MEMORANDUM

Date: February 23, 2021
To: Stephen Hunt, Valley Regional Transit
From: Mary Sizemore, Fehr & Peers
Maria Vyas, Fehr & Peers
Subject: State Street Transit Alternatives Analysis: Potential Stop Locations

UT20-2200

The State Street bus route alternative analysis includes three different alignments, each with its own set of bus stops. This document outlines the route of each alignment and its stops including any landmarks along the way as well as a list of modified or eliminated stops. Stops along the route were chosen based on conversations with VRT and the factors outlined in VRT's Bus Stop Location and Transit Amenities Development Guidelines. Some important ones include:

- Spacing: 0.25mi to 0.5mi for dense areas.
- Trip Generators: proximity to large job, commercial, or residential centers.
- Relation to intersection: far-side stops are preferred over near-side stops for pedestrian safety and efficiency of all vehicles through the intersection.
- Right-of-Way (ROW): ample ROW is available for passenger boarding and alighting in compliance with the Americans with Disabilities Act (ADA).

These factors influence the use of existing stops, modifications to existing stops, and the addition of new stops. Some stops are marked as "potential" to indicate locations that meet most but not all of the above factors. These stops will require further discussion with VRT to determine their final eligibility.

Whitewater Park Boulevard Alignment

Inbound buses will travel southeast on State Street and stop at the Idaho Transportation Department building before turning right onto southbound Whitewater Park Boulevard. Buses will then travel along Whitewater Park Boulevard with stops at Pleasanton Avenue and Main Street, passing Esther Simplot Park. Buses will then turn left at Fairview Avenue to travel east through the new and planned high-density development towards downtown, stopping at 27th Street, 24th Street, and 18th Street. Buses will then continue southeast onto Main Street, stopping at 15th Street and 11th Street. Buses will continue down Main Street, turn right onto southwest

Capitol Boulevard, then turn right to enter the underground Main Street station (Main Street & Capitol Boulevard).

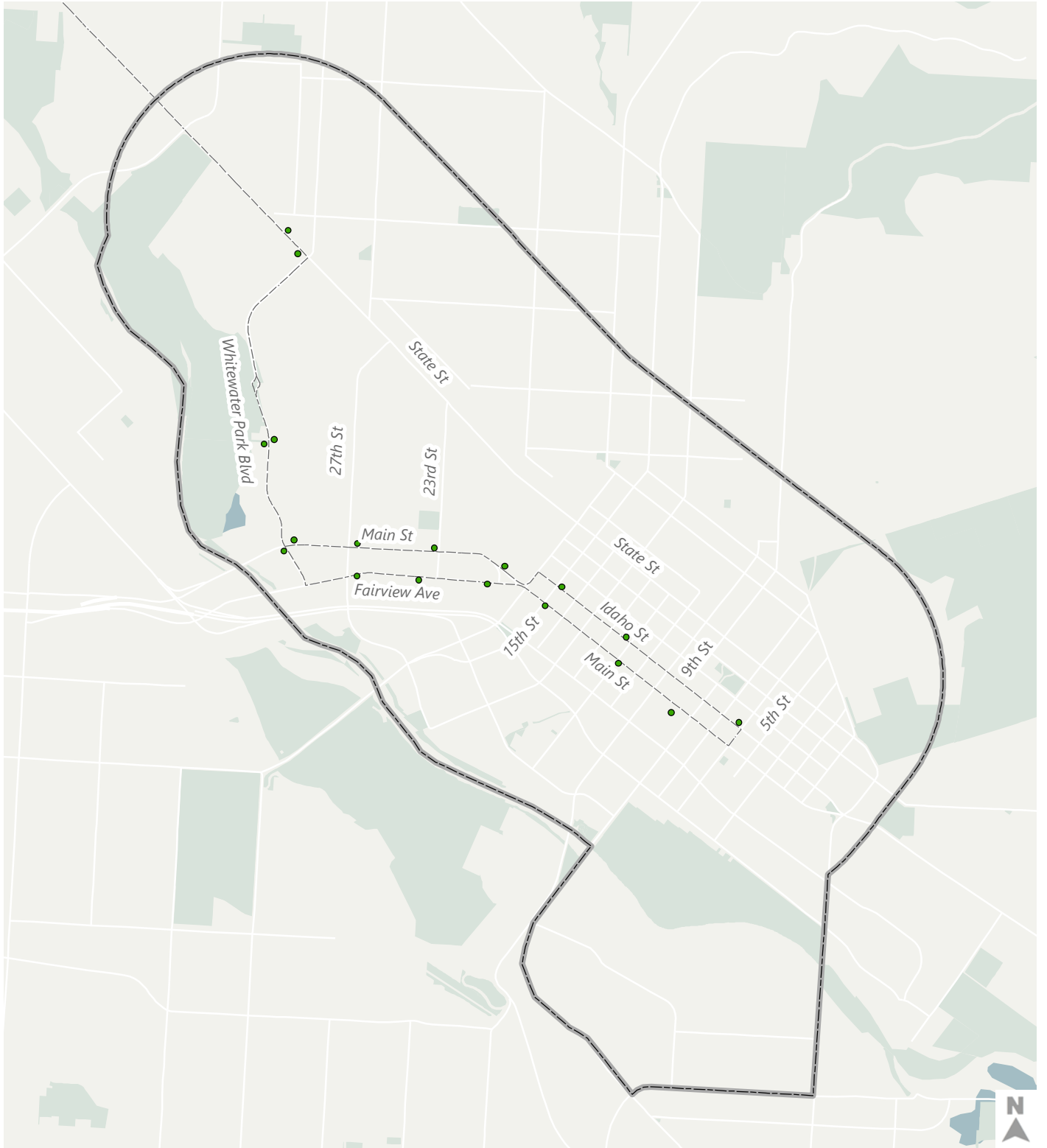
Outbound buses will depart Main Street Station by heading southeast on Main Street before turning left onto northbound 5th Street. Buses will make another left turn onto Idaho Street and stop near 5th Street & Idaho Street. Buses will continue northwest on Idaho Street, stopping at 11th Street and 15th Street to provide service to the commercial heart of downtown. At 16th Street, buses will make a left turn and then a right turn onto westbound Main Street. Buses will continue on Main Street with stops at 17th Street, 23rd Street, 27th Street, and Whitewater Park Boulevard before turning right onto northbound Whitewater Park Boulevard. Buses will stop at Pleasanton Avenue, continue past Esther Simplot Park, and turn left onto State Street with a stop at 32nd Street before continuing northwest.

Table 1. Whitewater Alignment Stops - Existing, New, and Modified

| Stop Name | Corner | Action | Comment |
|--|--------|------------|---|
| State & Whitewater | SE→SW | Modify | Move to near side of intersection for ITD building |
| Whitewater & Pleasanton | SW | Add | Near park, apartments, and active transportation infrastructure |
| Main & Whitewater | SW | Add | Near planned high-density development |
| Fairview & 27 th | SW→SE | Modify | Move to far side of intersection |
| Fairview & 24 th | SE | Modify | Move stop to far side of 24 th near new high-density development. |
| Fairview & 18 th | SE | No Changes | |
| Main & 15 th | SW→SE | Modify | Move to far side of intersection |
| Main & 13 th | SE | Skip | Stop spacing too close. 790' to next stop |
| Main & 11 th | SW→SE | Modify | Move to far side of intersection |
| Main Street Station | - | No Changes | |
| Idaho & 5 th | NE→NW | Modify | Move across 5 th Street for far-side transfers |
| Idaho & 9 th | NW | Skip | Stop spacing too close. 42 existing on/off; 400' to next stop. |
| Idaho & 11 th | NW | No Changes | Stop will serve new development. |
| Idaho & 13 th | NW | Skip | Stop spacing too close. 580' to next stop. |
| Idaho & 15 th | NE | No Changes | |
| Main & 18 th → 17 th | NE | Modify | Move from 18 th to 17 th for sight line safety, ROW, bike lane access |
| Main & 24 th → 23 rd | NW | Modify | Provides a pair for the stop at 24 th on Fairview |
| Main & 27 th | NW | Modify | Keep near-side. Move east for right-turn movement. |
| Main & Whitewater | NE | Add | Near high-density development |
| Whitewater & Pleasanton | NE | Add | Near park, apartments, and active transportation infrastructure |
| State & 32 nd | NE | Add | Maintain even stop spacing |

Source: Fehr & Peers.

Below are a map of the stops and sample cross-sections along the alignment:



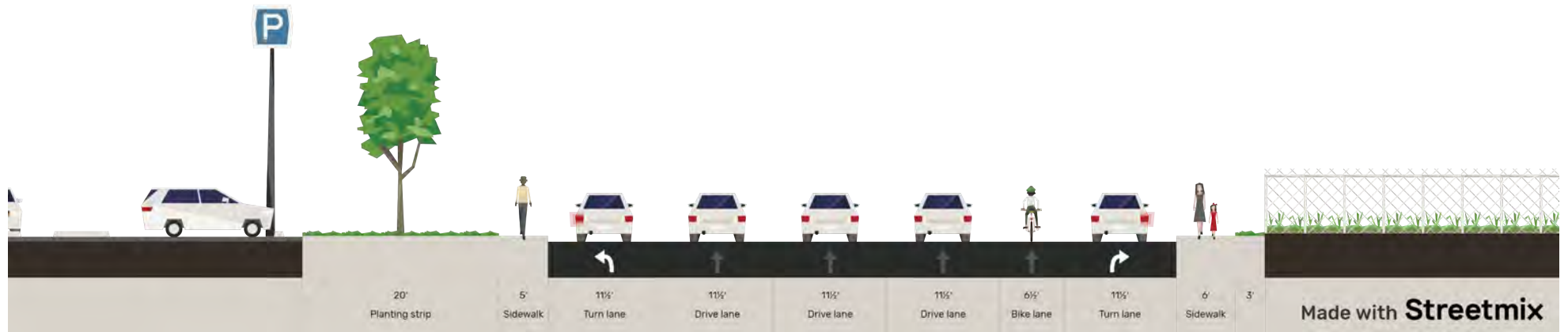
LEGEND

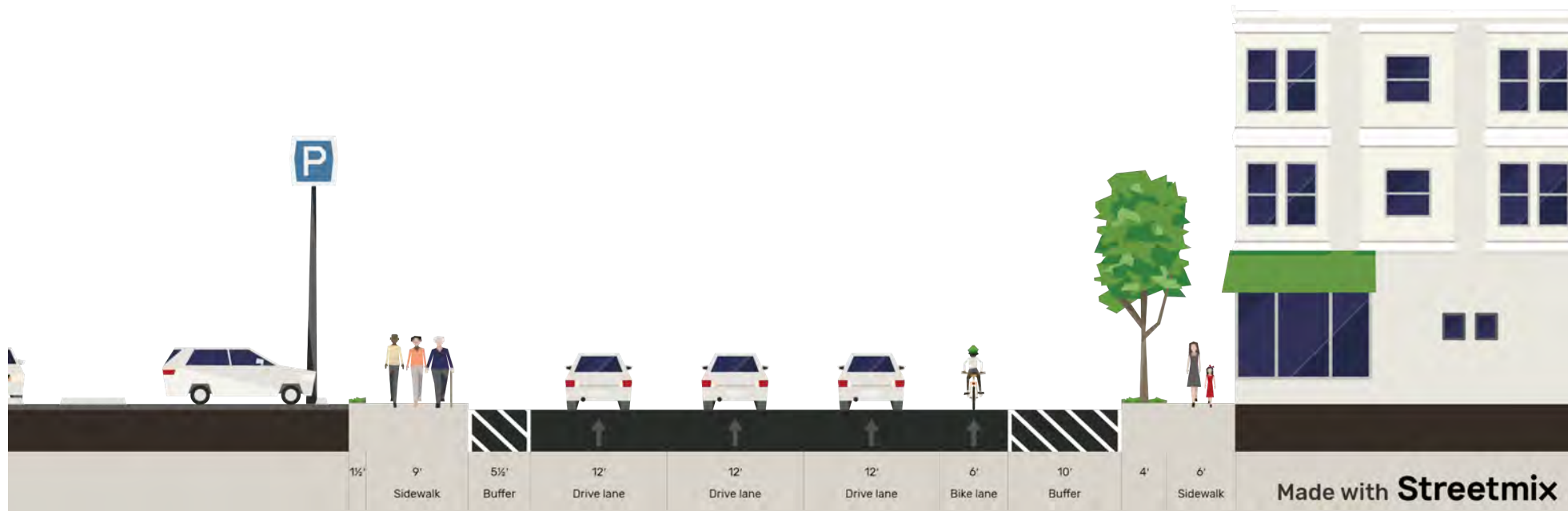
- Recommended
- Potential
- Alignment

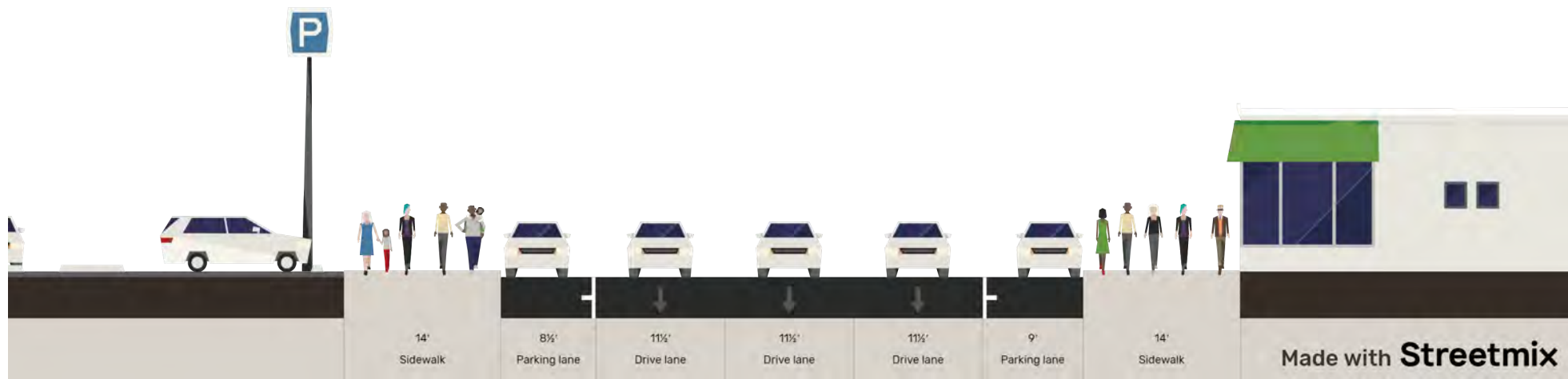
Transit

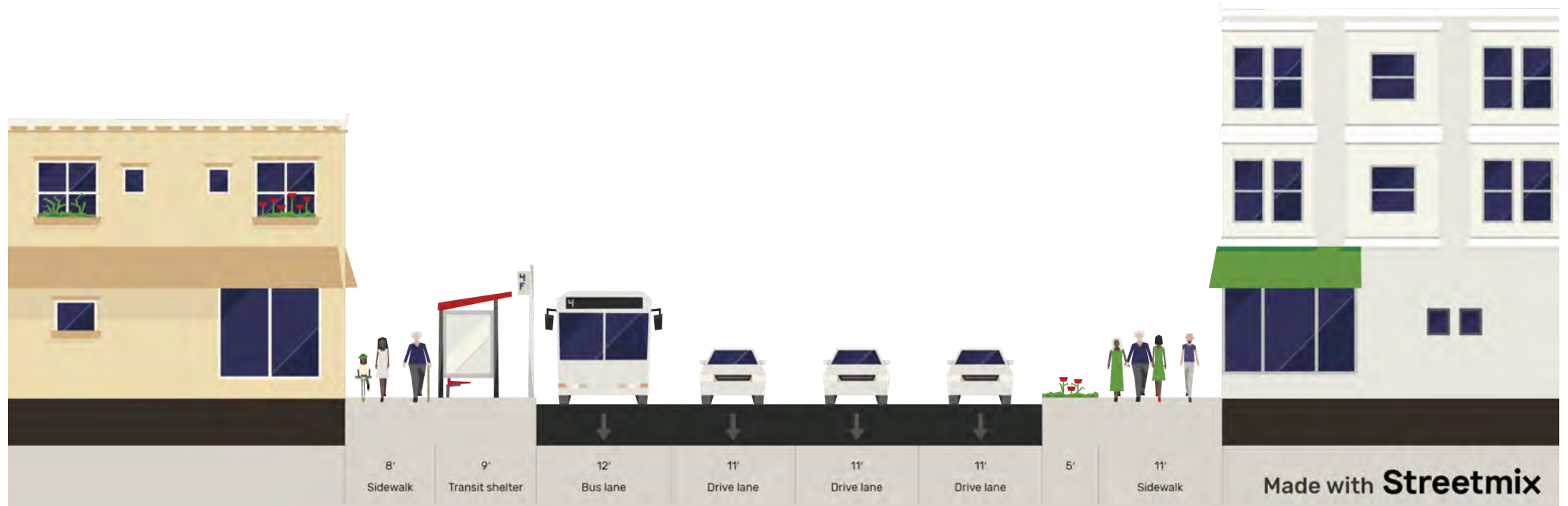
Potential Stop Locations - Whitewater Park Boulevard

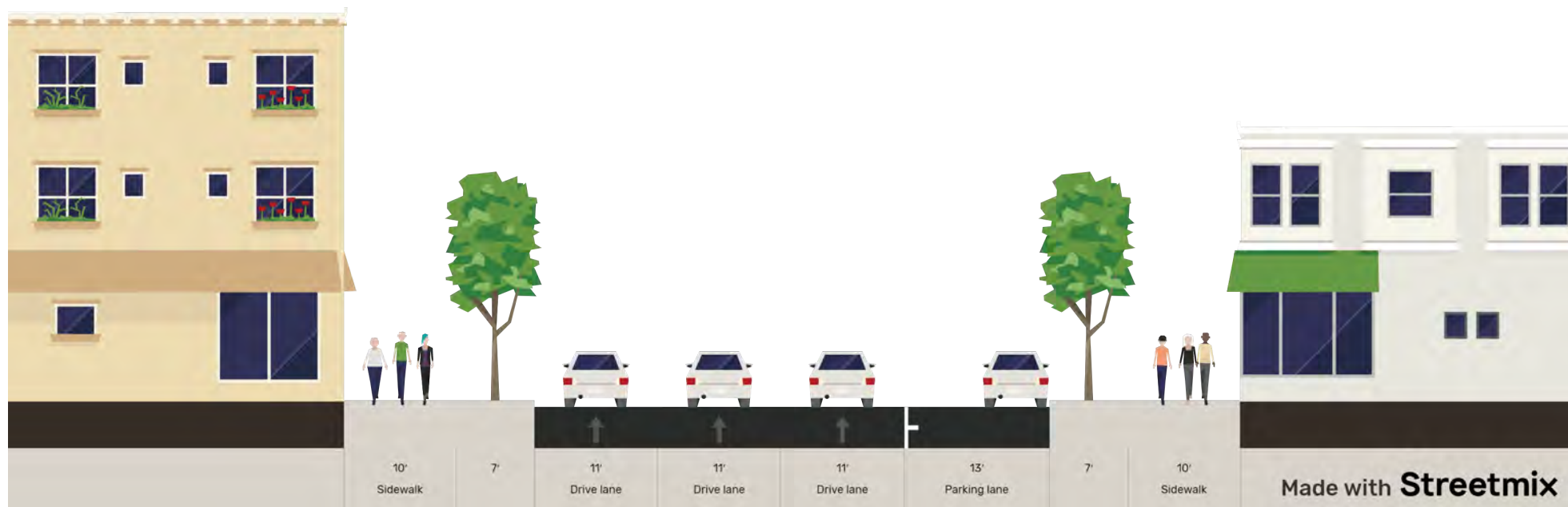


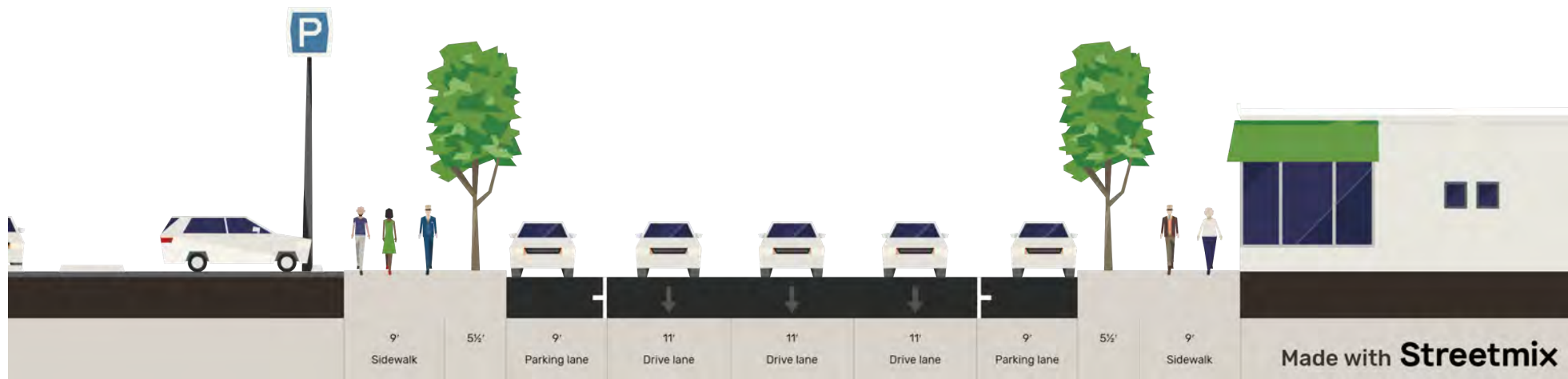


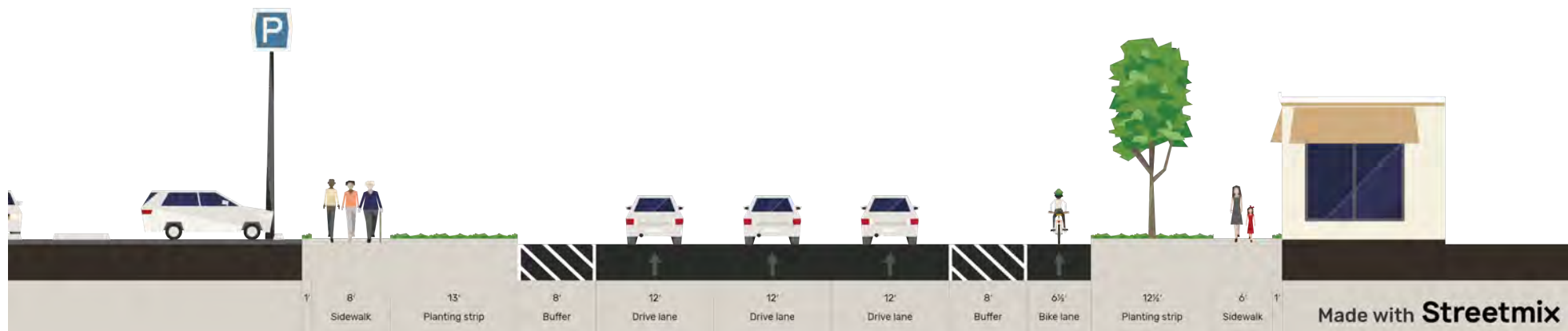












27th Street Alignment

Inbound buses will travel southeast on State Street, stopping at the Idaho Transportation Department building before turning right onto 27th Street. Buses will stop on 27th Street at State Street with a potential stop at Pleasanton Avenue. Buses will then turn left at Fairview Avenue to travel east through the new and planned high-density development towards downtown, stopping at 27th Street, 24th Street, and 18th Street. Buses will then continue southeast onto Main Street, stopping at 15th Street and 11th Street. Buses will continue down Main Street, turn right onto southwest Capitol Boulevard, then turn right to enter the underground Main Street station (Main Street & Capitol Boulevard).

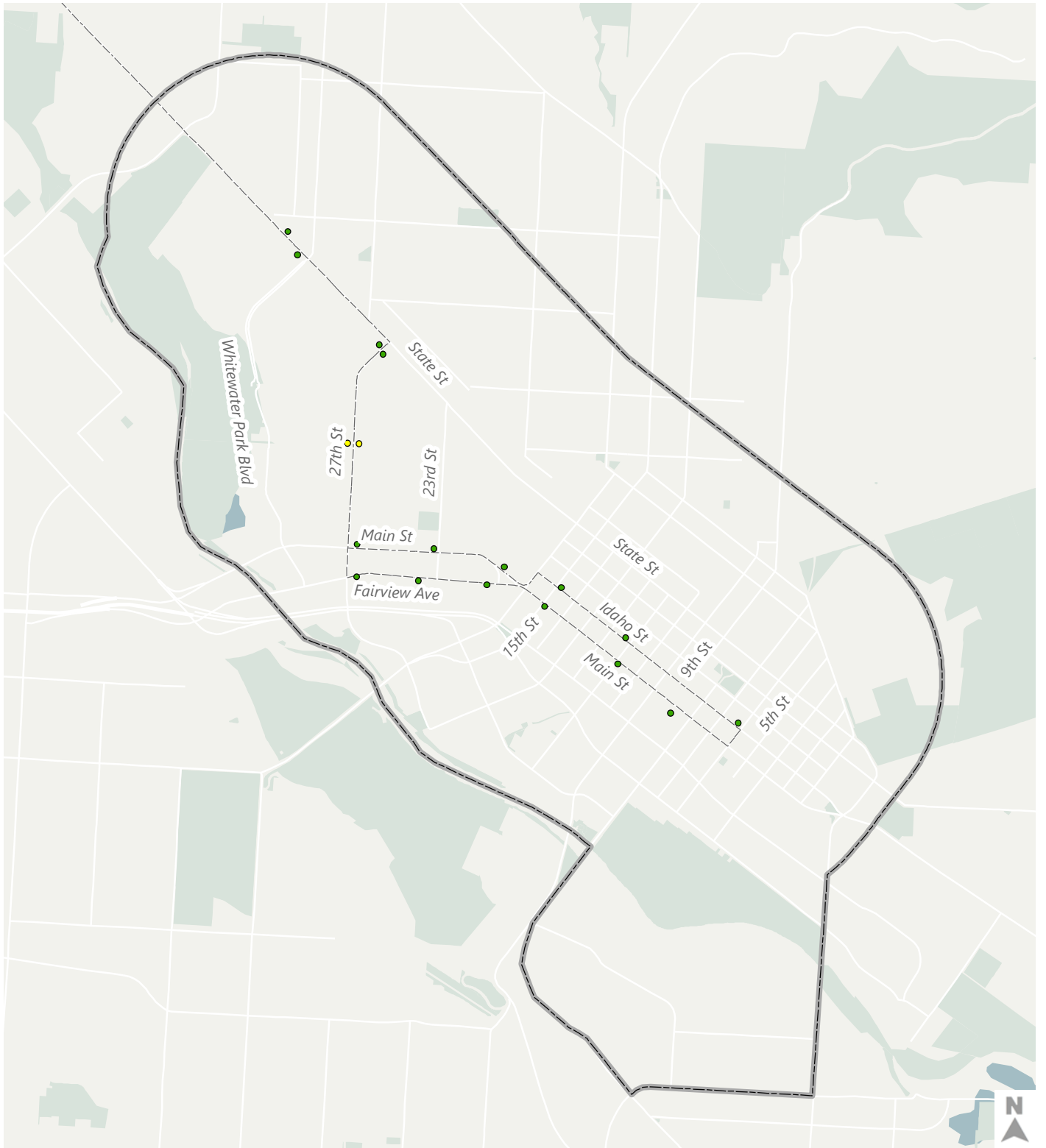
Outbound buses will depart Main Street Station by heading southeast on Main Street before turning left onto northbound 5th Street. Buses will make another left turn onto Idaho Street and stop near 5th Street & Idaho Street. Buses will continue northwest on Idaho Street, stopping at 11th Street and 15th Street to provide service to the commercial heart of downtown. At 16th Street, buses will make a left turn and then a right turn onto westbound Main Street. Buses will continue on Main Street with stops at 17th Street, 23rd Street, 27th Street before turning right onto northbound 27th Street. Buses will stop at Pleasanton Avenue (potential) and just south of State Street before making a left turn to head northwest-bound on State Street. Buses will stop at 32nd St before continuing northwest.

Table 2. 27th Street Alignment Stops - Existing, New, and Modified

| Stop Name | Corner | Action | Comment |
|---|--------|-----------------|---|
| State & Whitewater | SE | Modify | Move to near side of intersection for ITD building (SW corner) |
| State & 27 th → 27 th & State | SW→NW | Modify | Move to 27 th Street for far-side placement |
| 27 th & Pleasanton | SW | Add (Potential) | Near bicycle infrastructure to Esther Simplot Park |
| Fairview & 27 th | SW→SE | Modify | Move to far side of intersection |
| Fairview & 24 th | SE | Modify | Move stop to far side of 24 th near new high-density development. |
| Fairview & 18 th | SW | No Changes | |
| Main & 15 th | SW→SE | Modify | Move to far side of intersection |
| Main & 13 th | SE | Skip | Stop spacing too close. 790' to next stop |
| Main & 11 th | SW→SE | Modify | Move to far side of intersection |
| Main Street Station | - | No Changes | |
| Idaho & 5 th | NE→NW | Modify | Move across 5 th Street for far-side transfers |
| Idaho & 9 th | NW | Skip | Stop spacing too close. 42 existing on/off; 400' to next stop. |
| Idaho & 11 th | NW | No Changes | Stop will serve new development. |
| Idaho & 13 th | NW | Skip | Stop spacing too close. 580' to next stop. |
| Idaho & 15 th | NE | No Changes | |
| Main & 18 th → 17 th | NE | Modify | Move from 18 th to 17 th for sight line safety, ROW, bike lane access |
| Main & 24 th → 23 rd | NW | Modify | Provides a pair for the stop at 24 th on Fairview |
| Main & 27 th | NW | Modify | Keep near-side. Move east for right-turn movement. |
| 27 th & Pleasanton | NE | Add (Potential) | Near bicycle infrastructure to Esther Simplot Park |
| State & 27 th → 27 th & State | NE | Modify | Move stop off of State Street & before left-turn movement |
| State and 32 nd | NE | Add | Maintain even stop spacing |

Source: Fehr & Peers.

Below are a map of the stops and sample cross-sections along the alignment:

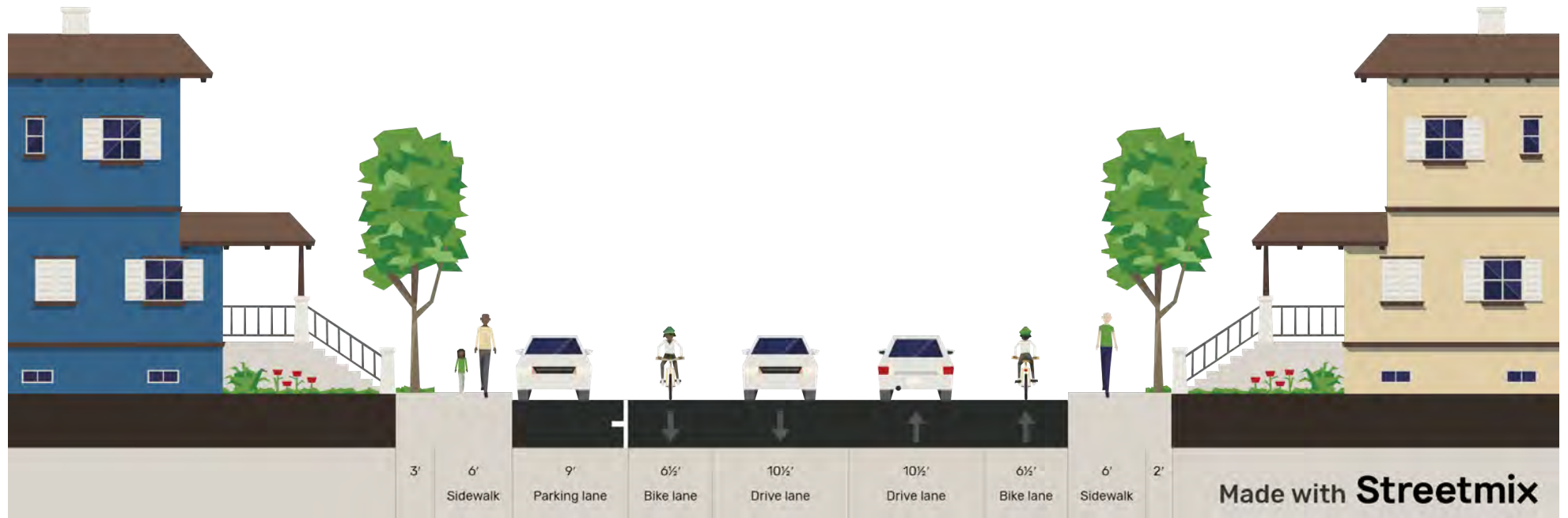


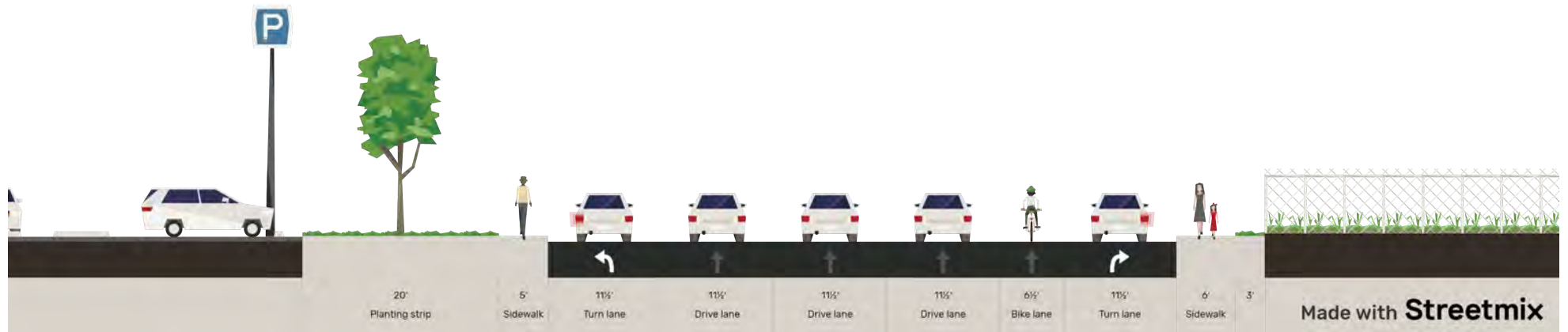
LEGEND

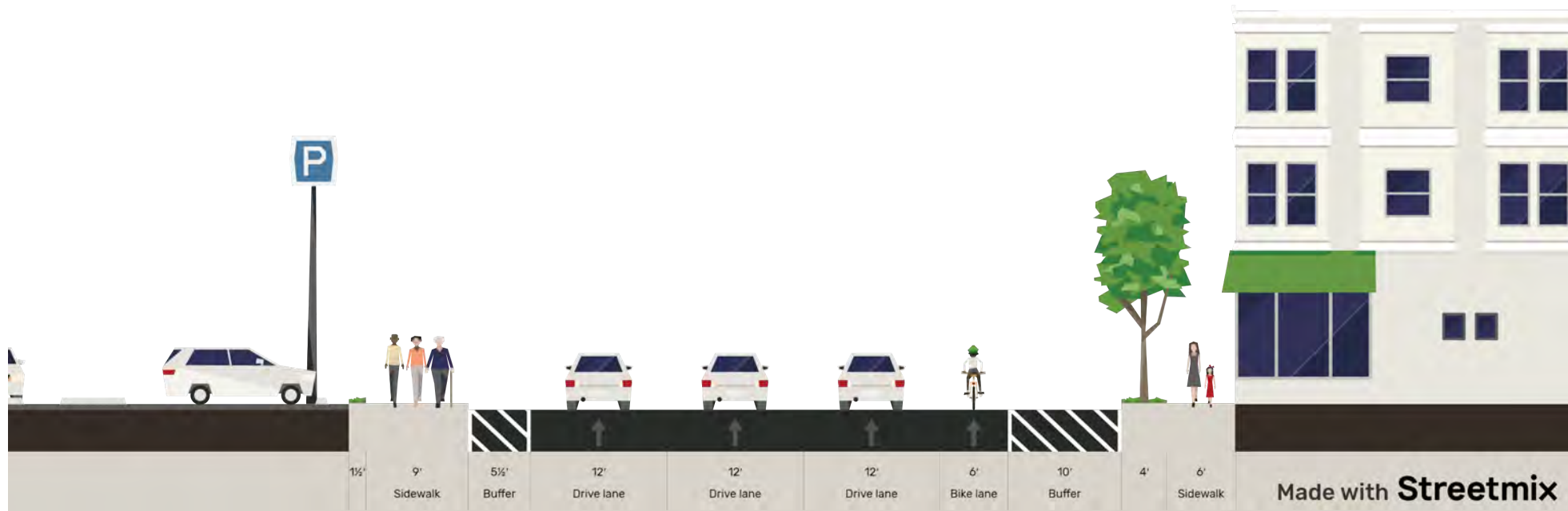
- Recommended
- Potential
- Alignment

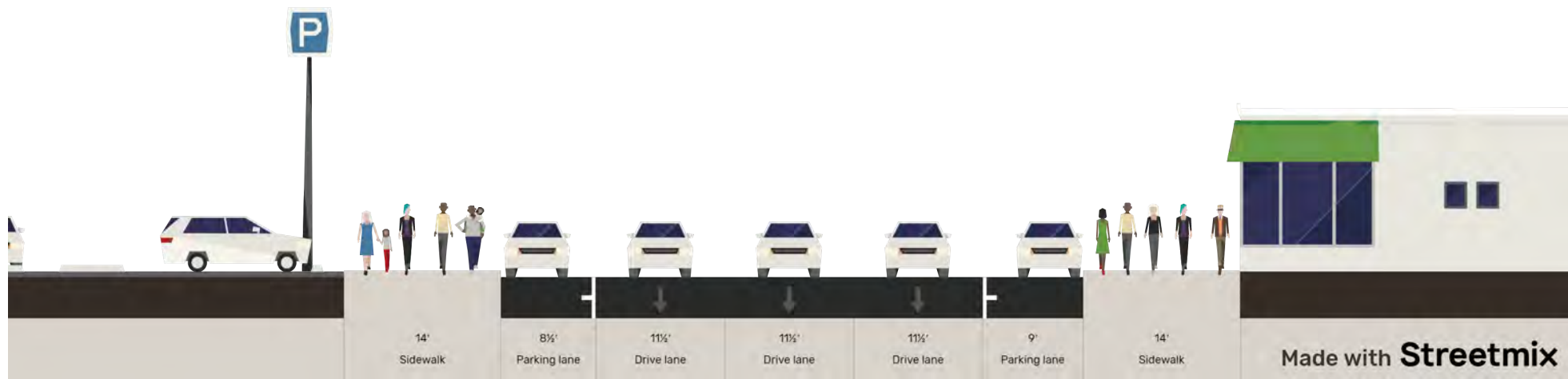
Transit

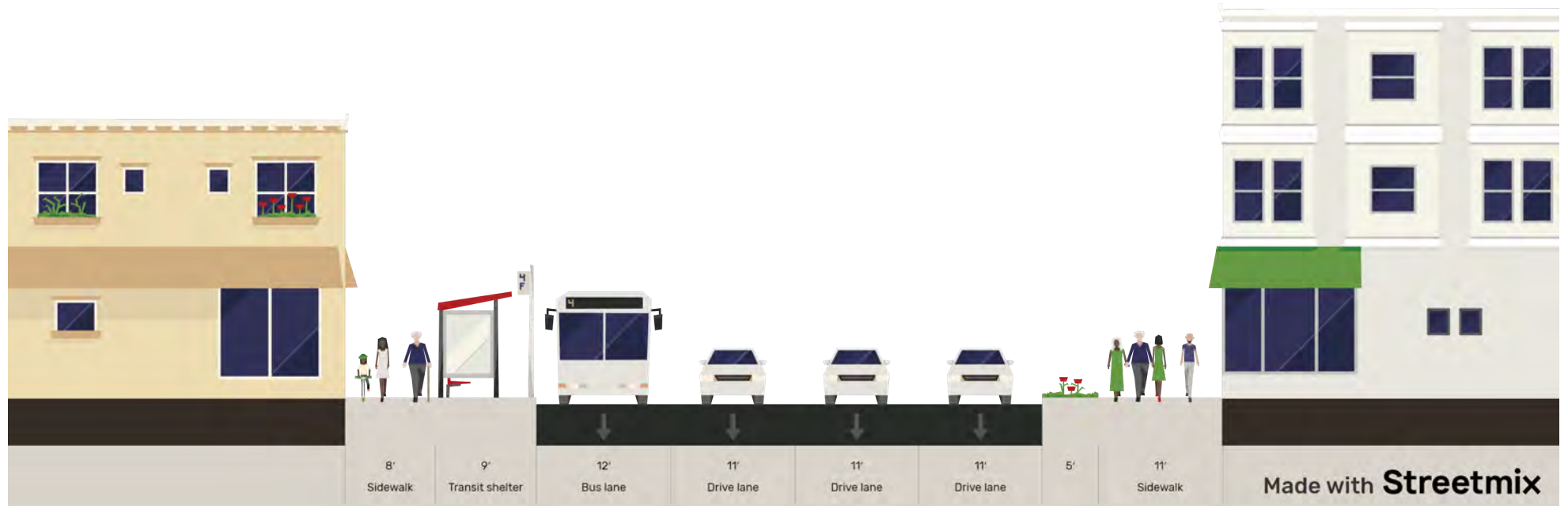
Potential Stop Locations - 27th Street

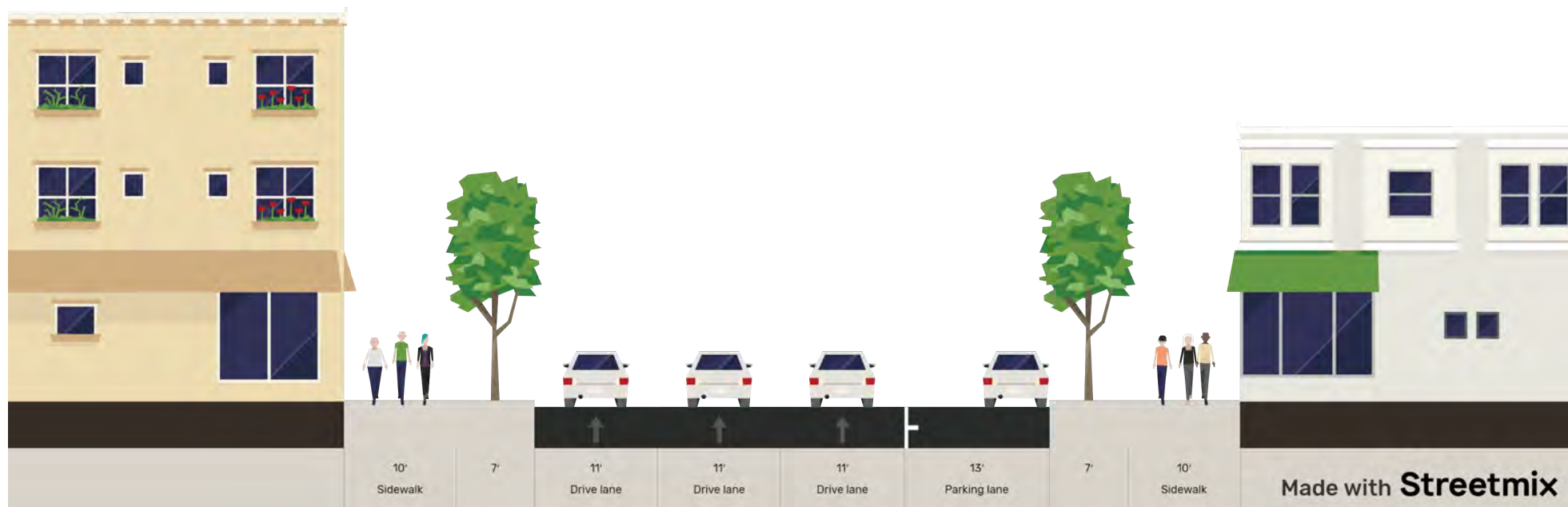


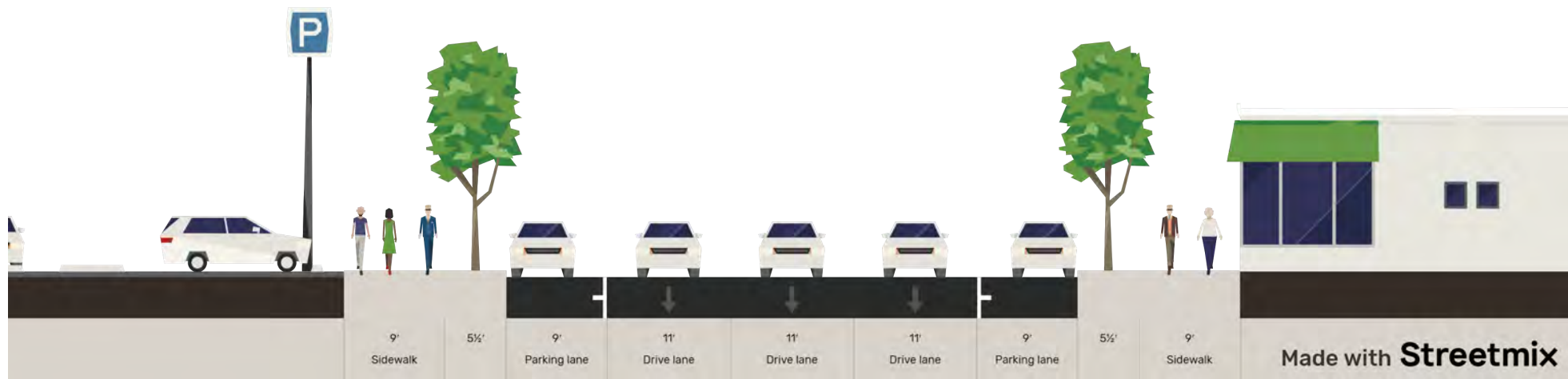


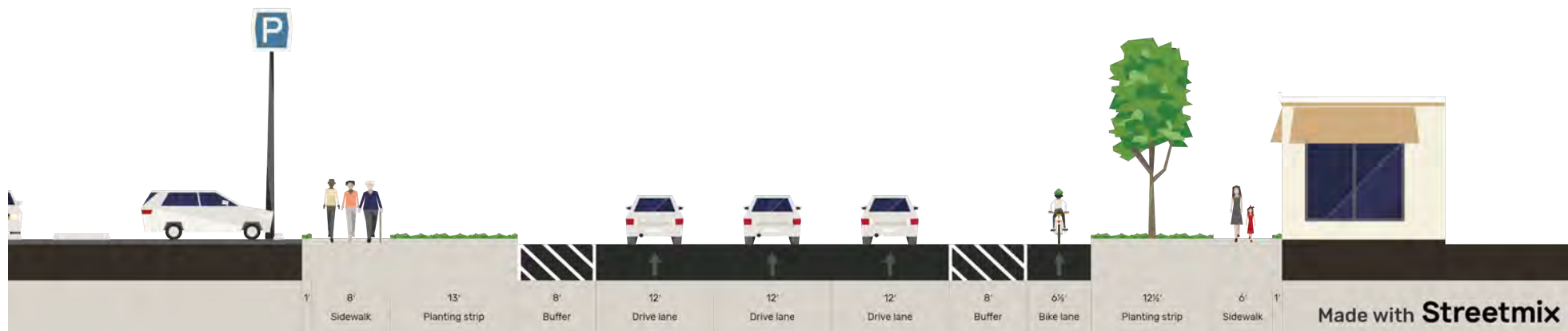












State Street Alignment

Inbound buses will travel southeast on State Street, stopping at the Idaho Transportation Department building, 27th Street, 23rd Street, 18th Street, 15th Street, and 11th Street, serving the Boise High School and the Downtown YMCA via the 11th Street stop. Buses will then turn right onto southwest 9th Street, stopping at Bannock Street (potential). Buses will then enter the commercial heart of downtown and turn left onto Main Street, then right onto southwest Capitol Boulevard, then turn right to enter the underground Main Street station (Main Street & Capitol Boulevard).

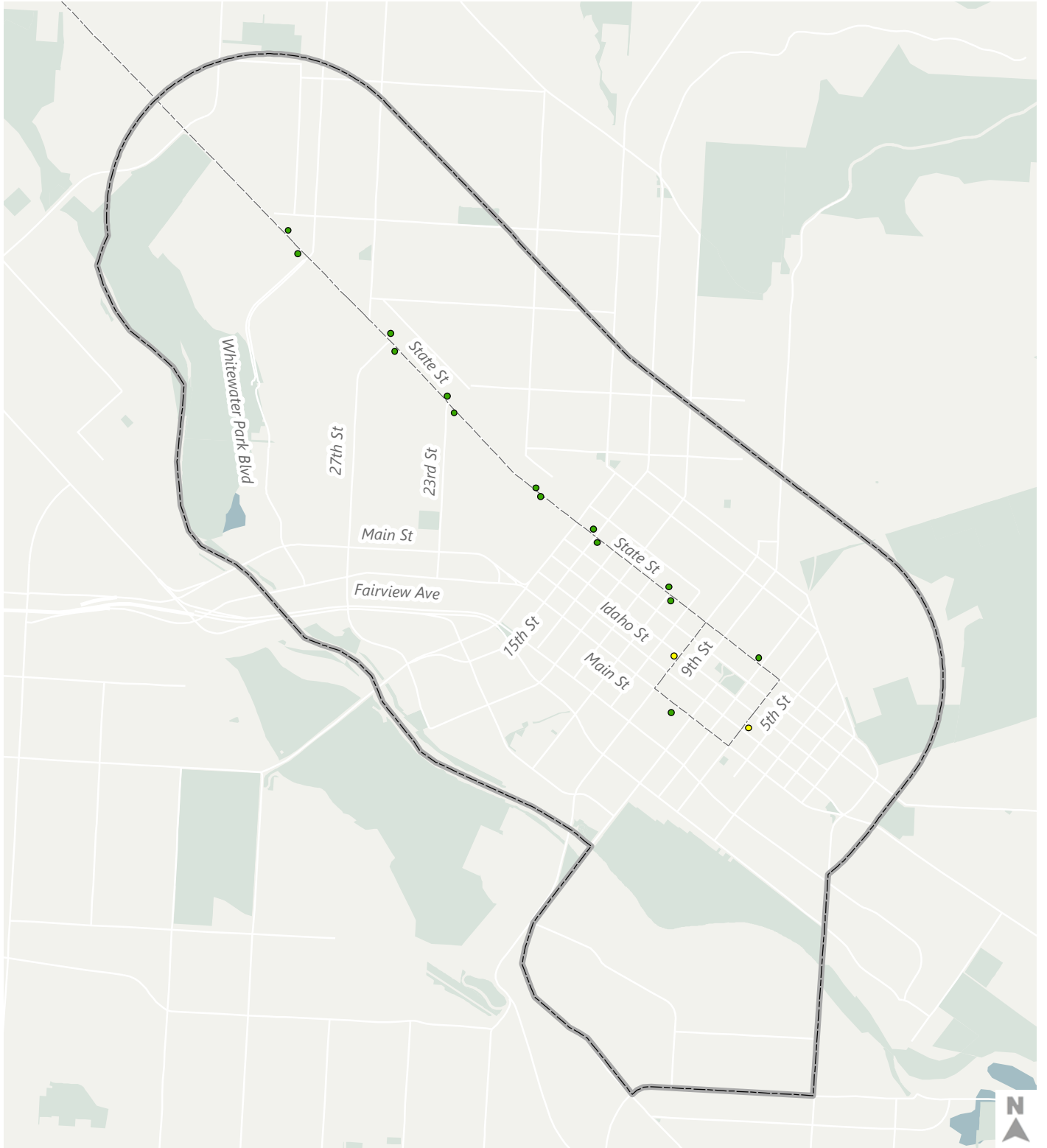
Outbound buses will depart Main Street Station by heading southeast on Main Street before turning left onto northbound 5th Street. Buses will stop at Idaho Street (potential) and then make another left turn onto State Street and stop near 6th Street & State Street behind the Capitol Building. Buses will pass by Boise High School and the Downtown YMCA and continue northwest on State Street, stopping at 11th Street, 15th Street, 18th Street, 23rd Street, 27th Street, and 32nd Street before continuing northwest.

Table 3. State Street Alignment Stops - Existing, New, and Modified

| Stop Name | Corner | Action | Comment |
|---|--------|-----------------|---|
| State & Whitewater | SE | Modify | Move to near side of intersection for ITD building (SW corner) |
| State & 29 th | SW | Eliminate | Close stop spacing. 20 existing on/off; 875' to next stop. |
| State & 27 th | SW | No Changes | |
| State & 23 rd | SE | No Changes | |
| State & 21 st | SW | Eliminate | Close stop spacing, small trip generator. 4 existing on/off; 980' to next stop. |
| State & 18 th | SE | No Changes | |
| State & 15 th | SW→SE | Modify | Move to far side of intersection |
| State & 11 th | SW→SE | Modify | Move to far side of intersection |
| State & 9 th | SW | Eliminate | Close stop spacing. 25 existing on/off; 615' to next stop. |
| 9 th & Bannock | SW | Add (Potential) | Provide at-grade stop near downtown restaurants |
| Main Street Station | - | No Changes | |
| Idaho & 5 th | NE | Add (Potential) | Provide NB stop for transfer |
| State & 6 th | NW | Add | Provide access to government buildings |
| State & 9 th | NW | Eliminate | Close stop spacing. 37 existing on/off; 790' to next stop. |
| State & 11 th | NE→NW | Modify | Move to far side of intersection |
| State & 15 th | NE→NW | Modify | Move to far side of intersection |
| State & 18 th | NW | No Changes | |
| State & 21 st | NE | Eliminate | Close stop spacing, small trip generator. 6 existing on/off; 990' to next stop. |
| State & 23 rd | NE→NW | Modify | Move to far side of intersection |
| State & 26 th | NE→NW | Modify | Move to far side of intersection |
| State & 31 st → 32 nd | NE→NW | Modify | Move to far side of intersection at 32 nd |

Source: Fehr & Peers.

Below is a map of the stops.

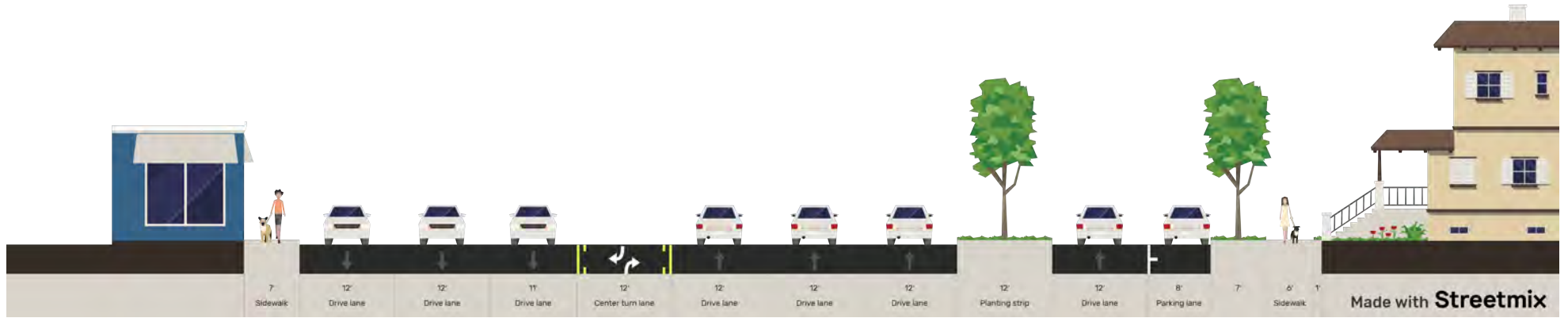


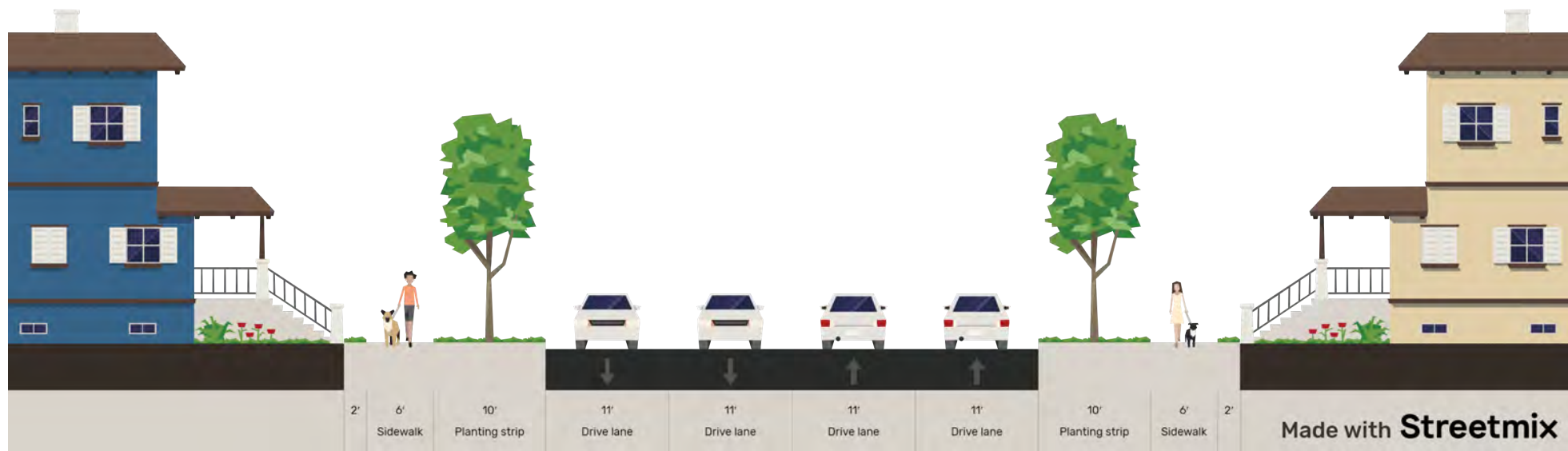
LEGEND

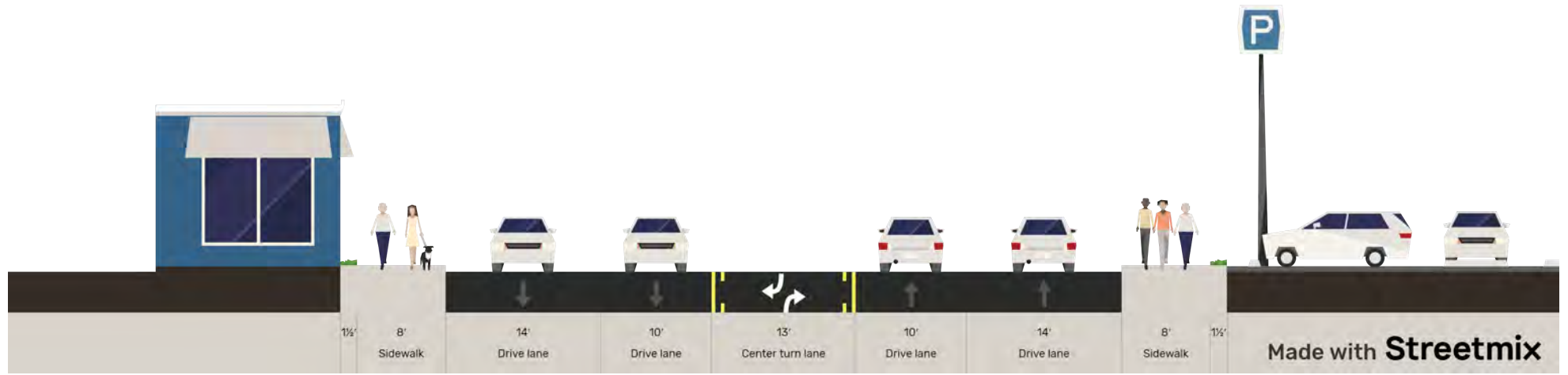
- Recommended
- Potential
- Alignment

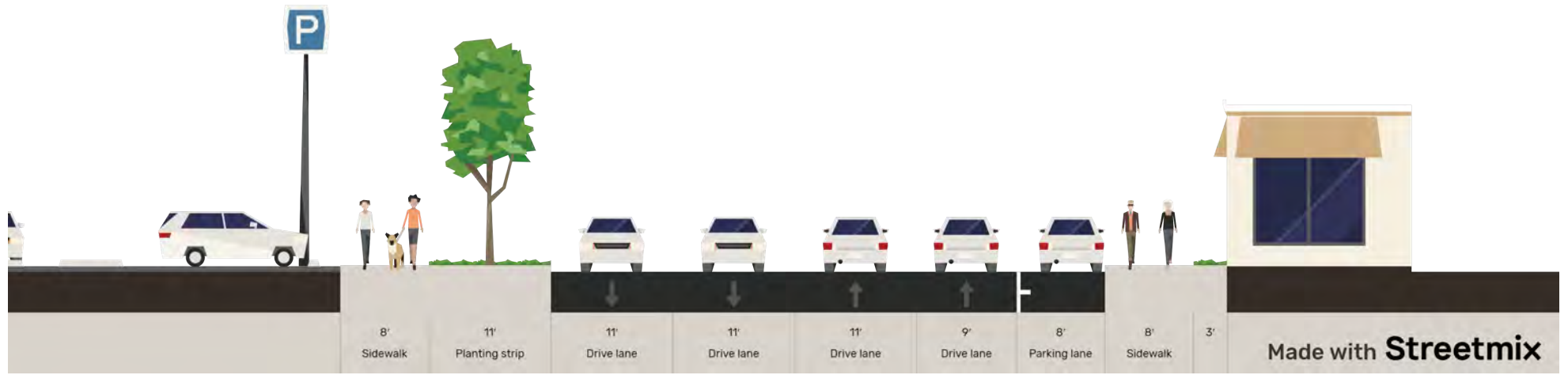
Transit

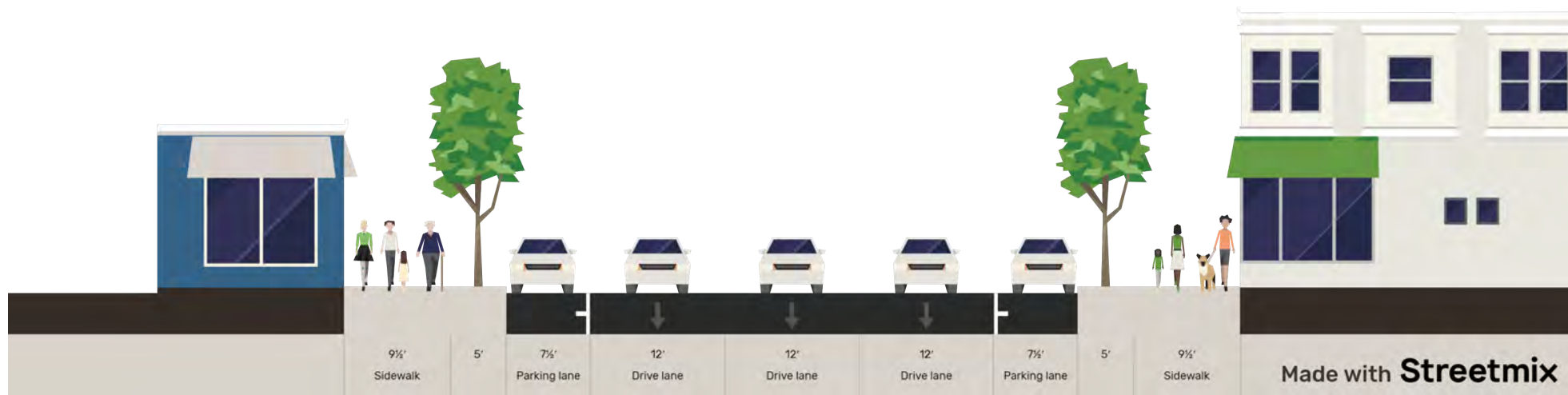
Potential Stop Locations - State Street

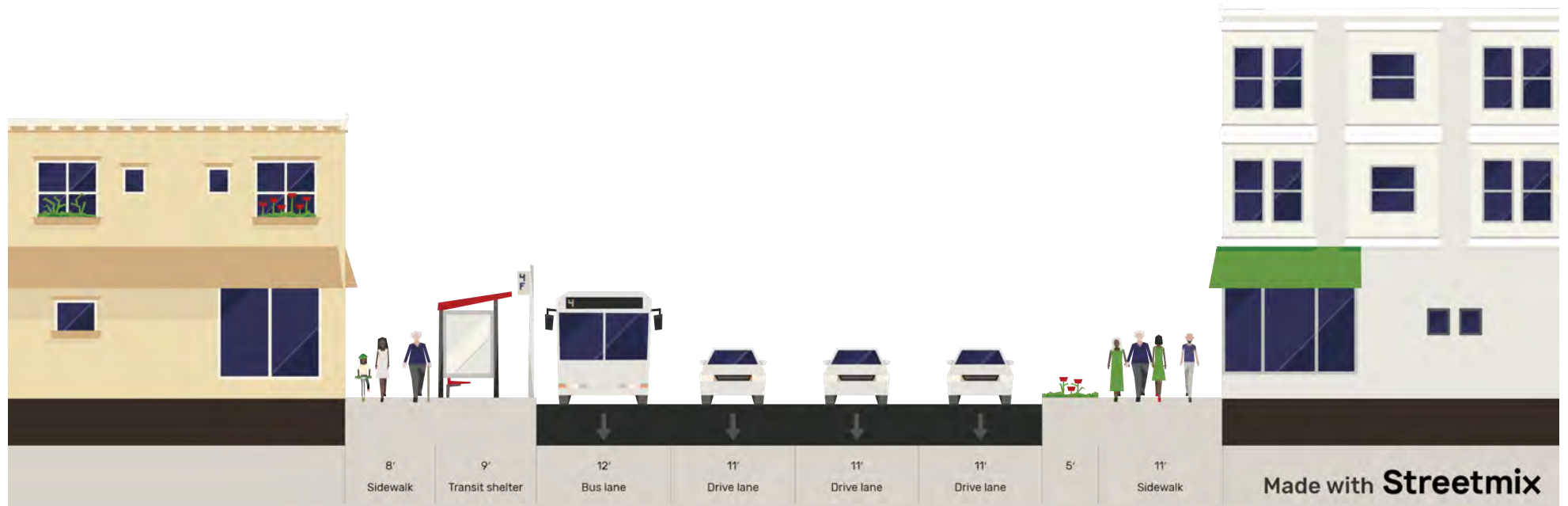


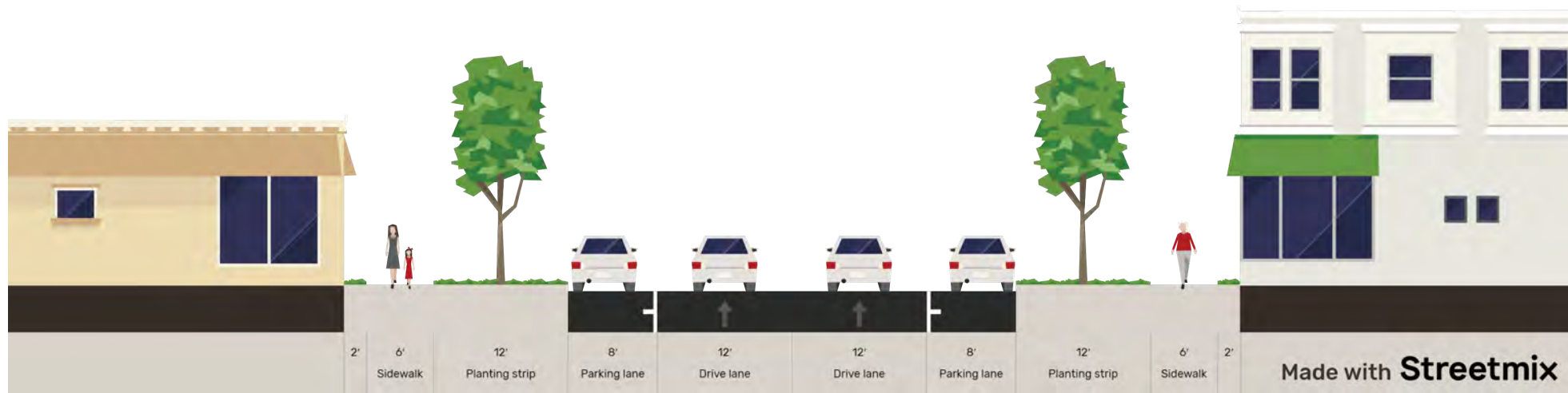














C. ALTERNATIVES SCREENING TECHNICAL MEMORANDUM



BUILDING A BETTER
State Street

MEMORANDUM

Date: June 2021
To: Valley Regional Transit
From: Fehr & Peers
Subject: State Street Transit Alternatives Analysis: Alternatives Screening Process

UT20-2200

Introduction

This technical memorandum describes the evaluation of alignment alternatives for the State Street transit project. It includes discussion of the alignments under consideration, and the decisions made by the project team to narrow the field of alternatives to an eventual preferred alignment.

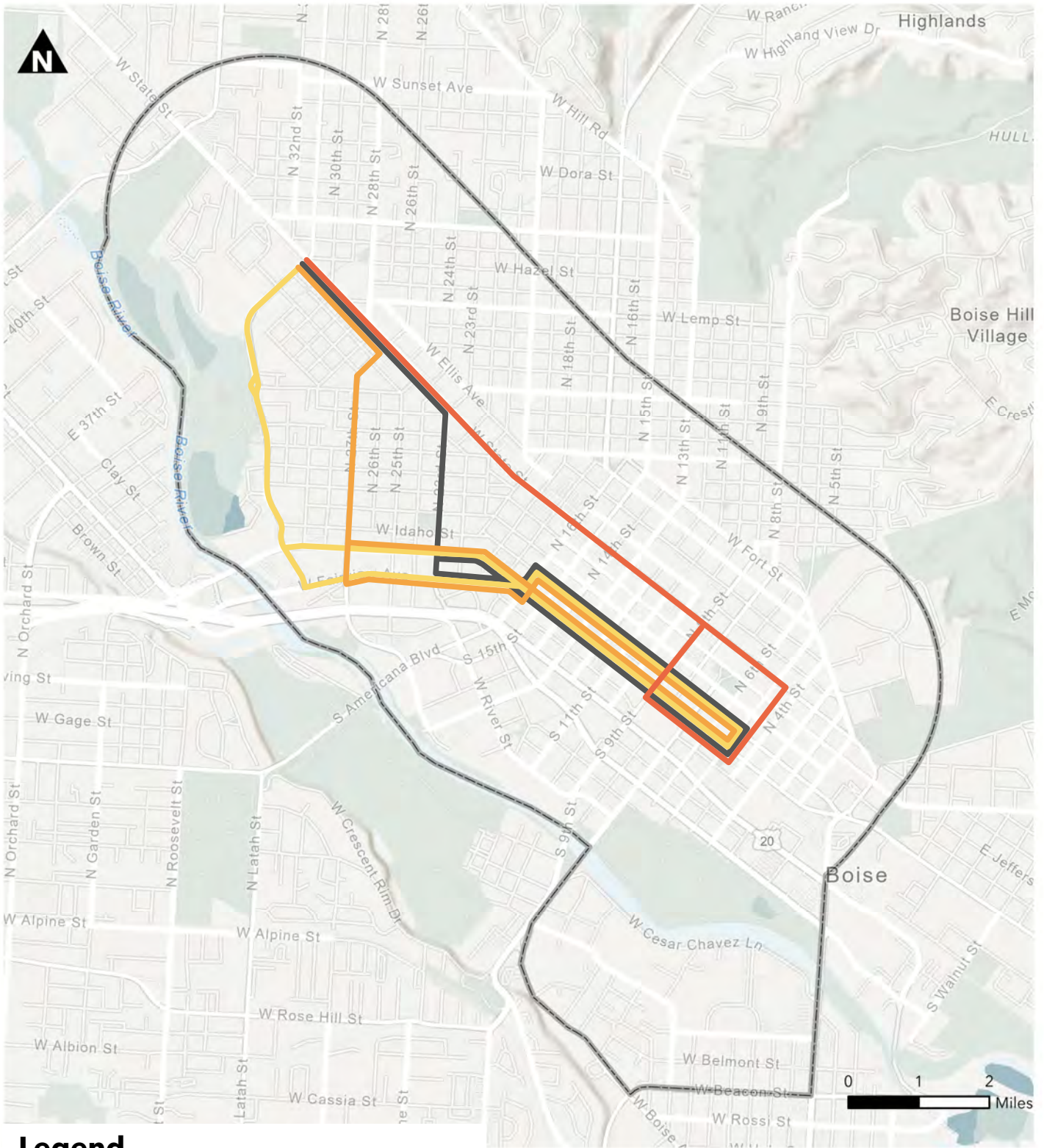
Overall Process

Four alternatives were originally identified for consideration, connecting Treasure Valley communities such as Star and Eagle to the Main Street Station in downtown Boise. The four alternatives were developed by Valley Regional Transit (VRT) with input from the State Street Technical Team (SSTT), which included representatives from the Ada County Highway District (ACHD), the Community Planning Association of Southwest Idaho (COMPASS), the City of Boise, Ada County, and the Idaho Transportation Department (ITD). The project team and the SSTT identified qualitative and quantitative screening criteria to assess whether each initial alternative met regional goals. Criteria were organized into two tiers. Tier 1 criteria were used to screen the initial alternatives from four alternatives to three. The remaining three alternatives were then evaluated using a combination of Tier 1 and Tier 2 criteria, and the highest-scoring alternative was selected as the locally preferred alternative (LPA) for the future transit route.

Initial Alternatives

The four initial alternatives are described below and shown in Figure 1.

- **State Street:** inbound buses would travel southeast on State Street, and turn right onto southwest 9th Street. Buses would then enter the commercial heart of downtown and turn left onto Main Street, then turn right to enter the underground Main Street station from Main Street & Capitol Boulevard. Outbound buses would depart Main Street Station by heading southeast on Main Street and turning left onto northbound 5th Street. Buses would then make another left turn onto State Street and continue northwest.
- **23rd Street:** inbound buses would travel southeast on State Street and turn right onto southbound 23rd Street. They would then turn left at Fairview Avenue to travel east towards downtown, and continue southeast onto Main Street. From Main Street, buses would turn right onto southwest Capitol Boulevard to enter the underground Main Street station. Outbound buses would head southeast on Main Street before turning left onto northbound 5th Street. Buses would make another left turn onto Idaho Street, continuing northwest until 16th Street. At 16th Street, buses would make a left turn and then a right turn onto westbound Main Street. Buses would continue on Main Street before turning right onto northbound 23rd Street. Buses would then make a left turn to head northwest-bound on State Street.
- **27th Street:** Inbound buses would travel southeast on State Street, turning right onto 27th Street. Buses would then turn left at Fairview Avenue to travel east towards downtown, and continue southeast onto Main Street. From Main Street, buses would turn right onto southwest Capitol Boulevard to enter the underground Main Street station. Outbound buses would head southeast on Main Street before turning left onto northbound 5th Street. Buses would make another left turn onto Idaho Street, continuing northwest until 16th Street. At 16th Street, buses would make a left turn and then a right turn onto westbound Main Street. Buses would continue on Main Street before turning right onto northbound 27th Street. Buses would then make a left turn to head northwest-bound on State Street.
- **Whitewater Park Boulevard:** Inbound buses would travel southeast on State Street before turning right onto southbound Whitewater Park Boulevard. Buses would then turn left at Fairview Avenue to travel east towards downtown. Buses would then continue southeast onto Main Street, turn right onto southwest Capitol Boulevard, and enter the underground Main Street station. Outbound buses would depart Main Street Station by heading southeast on Main Street before turning left onto northbound 5th Street. Buses would make another left turn onto Idaho Street, continuing northwest until 16th Street. At 16th Street, buses would make a left turn and then a right turn onto westbound Main Street. Buses would continue on Main Street before turning right onto northbound Whitewater Park Boulevard. Buses would then turn left onto State Street and continue northwest.



Legend

- 27th Street Alignment
- 23rd Street Alignment
- State Street Alignment
- Whitewater Park Boulevard Alignment



Initial Alternatives

Layout view only. All routes have some overlap.

Screening Criteria

The project team developed screening criteria based on previous planning efforts within the State Street corridor. These include:

- The State Street Corridor Strategic Plan Study Final Report, prepared for ACHD and the City of Boise in 2004;
- The State Street Corridor Market Strategy, prepared for the City of Boise, ACHD, and the State Street Steering Committee in 2007;
- The State Street Corridor Transit Oriented Development Guidelines, led by the City of Boise and with a partnership of regional agencies and local municipalities in 2008;
- The State Street Transit and Traffic Operational Plan (TTOP), prepared for ACHD, City of Boise, and VRT in 2011;
- The State Street Programming and Finance Plan, prepared for ACHD, the City of Boise, VRT, the State Street Coordinating Committee in 2012; and
- The State Street Corridor Transit Oriented Development Plan, prepared for a partnership of agencies along the corridor in 2019.

In addition, other documents provided context and guidance for transportation in the study area, including:

- ACHD's 2020-2024 Integrated Five-Year Work Plan;
- ACHD's Roadways to Bikeways Master Plan;
- ACHD's implementation plans for corridor improvements on State Street between 1st Street and 16th Street;
- Blueprint Boise;
- Boise's Transportation Action Plan;
- The Boise Circulator Study;
- CCDC's 30th Street Urban Renewal District plans;
- CCDC's Westside Refresh Plan;
- CCDC's Capital Improvements Plan, 2020-2024;
- VRT's Valley Connect Plan; and
- VRT's Bus Stop Location and Transit Amenities Development Guidelines.

Combined, these documents provided a body of regional policy and direction, from which some general goal statements could be derived for the corridor. These goals included:

- Improve mobility and access;
- Minimize negative impacts on key local resources while supporting economic development; and

- Provide cost-effective transit services.

These goal statements were in turn supported by objectives and qualitative or quantitative criteria, which could be used to rank alignment alternatives. Table 1 shows the objectives and criteria used to support the goals.

Table 1: Study Objectives and Evaluation Criteria

| Objectives | Evaluation Criteria |
|--|--|
| Goal: Improve mobility and access | |
| Create transportation choices that are convenient, safe, and affordable for people of all ages and abilities | Population density |
| | Employment density |
| Increase transit ridership and service while balancing transit and traffic needs | Total new daily transit boardings |
| | Major destinations served |
| | Level of impact on current traffic operations |
| | Observed travel time on corridor in study area |
| | Projected transit travel time end-to-end in study area |
| Improve multi-modal connections and access to existing transit systems | Projected population, household, and employment within 10-minute walk of bus stops |
| Goal: Minimize negative impacts on key local resources while supporting economic development | |
| Avoid, minimize, and mitigate negative impacts to key local resources, including neighborhood, land use, and environmentally-sensitive areas | Number of potentially impacted transportation facilities along alignments in study area (incl. # of signals) |
| Build public support for transit and complete street concepts | Level of public support indicated through outreach events |
| Goal: Provide cost-effective transit services | |
| Match transportation investment to level of travel demand in study area | Conceptual capital costs |

The goals, objectives, and criteria for evaluating alignment alternatives were approved by the SSTT in June 2020, prior to a group discussion to conduct the Tier 1 screening. The criteria were applied in both the Tier 1 and Tier 2 screening processes to refine the range of alternatives and identify those that most closely align with regional goals.

Tier 1 Screening

The purpose of the Tier 1 screening process was to eliminate one of the initial alternatives, allowing the project team to focus on three alignments for more detailed analysis in Tier 2. The Tier 1 screening process used the following criteria:

- Operational criteria including:
 - Transit travel time from Whitewater Park Boulevard to Main Street Station, for morning inbound buses and evening outbound buses;
 - The number of traffic signals along each alignment;

- Impacted corridors (calculated as the miles of alignment operating at greater than 75% capacity, using volume/capacity ratios for the 2019 model year from the official version of the COMPASS regional travel demand model as of February 2020);
- Land use criteria including:
 - Population density (using population per acre calculations from COMPASS travel demand model input data);
 - Employment density (using jobs per acre calculations from COMPASS travel demand model input data); and
 - Number of major destinations served.

Table 2 summarizes how each of the four alignments ranked on these criteria. The operational criteria were calculated by the consultant team and VRT, and the land use criteria were scored collaboratively by the SSTT in a meeting in June 2020. More detailed information on the population, employment and overall land use characteristics of the study area can be found in the Base and Future Year Technical Memorandum.

Table 2: Tier 1 Screening Results

| Scoring Criteria | | Alignment Scores | | | | |
|--|-----------------------------------|--|--|---|---|---|
| | Criteria | Definition and Scoring of Criteria | State Street | 23rd Street | 27th Street | Whitewater Park Blvd |
| Operational | AM Inbound Travel Time | Time (in minutes) from Whitewater Park Boulevard to Main Street Station | 11.1 | 10.4 | 11.1 | 11.9 |
| | AM Inbound Travel Time Score | 4= Fastest 1=Slowest | 3 | 4 | 3 | 2 |
| | PM Outbound Travel Time | Time (in minutes) from Main Street Station to Whitewater Park Boulevard | 12.6 | 12.8 | 12.1 | 12.8 |
| | PM Outbound Travel Time Score | 4= Fastest 1=Slowest | 3 | 2 | 4 | 2 |
| | Number of Signals | Count of Signalized Intersections Along Each Alignment | 38 | 36 | 36 | 35 |
| | Number of Signals Score | 4=Least 1=Most | 2 | 3 | 3 | 4 |
| | Impacted Corridors | Miles of alignment operating at greater than 75% of capacity (bi-directional) in 2019. | 0.84 | 1.55 | 2.53 | 1.08 |
| | Impacted Corridors Score | 4=Lowest # of impacted miles 1=Highest # of impacted miles | 4 | 2 | 1 | 3 |
| | Combined Operational Score | | | 12 | 11 | 11 |
| Land Use | Current Population Density | Areas of population density served by the alignment | Downtown neighborhoods, residential areas along State Street | Downtown, neighborhoods south of State Street | Downtown, neighborhoods south of State Street | Downtown, corner of Main/Whitewater, less overall residential density than other alignments |
| | Current Population Density Score | 4=Most population served 1=Least population served | 4 | 4 | 4 | 3 |
| | Current Employment Density | Areas of employment density served by the alignment | Downtown, State Street commercial corridor, Capitol | Downtown, Fairview/Main commercial zones | Downtown, Fairview/Main commercial zones | Downtown, Fairview/Main commercial zones |
| | Current Employment Density Score | 4=Most employment served 1=Least employment served | 3 | 3 | 4 | 4 |
| | Destinations Served | Major or important destinations within one city block of the alignment | 16 | 12 | 12 | 13 |
| | Score for destinations served | 4=Most destinations 1=Least destinations | 4 | 2 | 2 | 3 |
| Combined Land Use Score | | | 11 | 9 | 10 | 10 |
| Combined Operational and Land Use Score | | | 23 | 20 | 21 | 21 |

As shown in Table 2, the alignments are similar from an operational standpoint. There is very little difference in evening outbound travel times, and only a small difference in morning inbound travel times. However, congested sections of corridor are considerably more prevalent on some corridors than others. Specifically, 27th Street has much longer sections of congestion compared to State Street, although the State Street alignment has several more traffic signals. Population and employment density along the alignment corridors were generally similar, with new growth along the Fairview/Main corridors adding jobs and households. At the same time, the State Street corridor offers better connectivity to established residential neighborhoods and the Capitol/state office building complex.

Table 2 shows the combined operational and land use scores for the four alternatives. The SSTT agreed that the 23rd Street alignment, which represented the lowest score, should be screened

out. The project team then moved forward with analysis of the State Street, 27th Street, and Whitewater Park Boulevard alignments.

Tier 2 Screening

The Tier 2 screening process included a more in-depth analysis of the three remaining alternatives and ultimately identified a locally preferred alternative for further planning and design purposes. The Tier 2 process focused on the following criteria:

- Intersection level of service (LOS), using ACHD's Synchro traffic microsimulation model adapted to 2035 conditions;
- Average weekday transit ridership in 2035, from the official version of the COMPASS travel demand model as of September 2020;
- One-way trip distance and travel time in 2035, from the route's western terminus in Star to Main Street Station, from the official travel demand model;
- Conceptual cost estimates for infrastructure improvements associated with the alignments;
- Households and jobs in 2035 that will be accessible within a 10-minute walking distance from station areas for each alignment; and
- Level of public support, as indicated in public outreach activities conducted in late 2020 through early 2021.

The 2035 horizon year reflected the implementation time frame identified in the original State Street Transit and Traffic Operating Plan (TTOP). Intersection LOS using the Synchro model was prepared by the project team and reviewed by ACHD staff. The Synchro model network was developed in coordination with VRT, ACHD, and COMPASS staff to ensure appropriate assumptions were made regarding the identification of study intersections, volume growth rates, and transit accommodations at key intersections. More detail on the LOS analysis is provided in the Base and Future Year Technical Memorandum.

COMPASS conducted future model runs using agreed-upon transit parameters to estimate 2035 average weekday ridership and transit travel times. Transit parameters included assumptions regarding bus dwell times (20 seconds per station), transit vehicle travel speeds (10% slower than congested vehicle speeds), and standard industry model parameters for fare costs and transfer penalties. The transit travel times reflected the average of the inbound and outbound trip times, as the inbound and outbound trips are not identical.

The project team developed conceptual cost estimates for transit priority treatments at or adjacent to key intersections and along study routes. Unit costs were derived from ITD resources. More information on the conceptual cost estimates is provided in the Cost Estimation Technical Memorandum.

COMPASS led the analysis of accessibility using the regional travel demand model. The analysis considered the number of households and jobs projected within a 10-minute walking distance of stops located along each proposed alignment in 2035. The walking distance was measured using the street and sidewalk network around each stop, and the numbers expressed in the table below represent the total number of jobs and households captured within that walking distance.

VRT led a public outreach effort from late November 2020 through mid-February 2021, using a survey which presented information about the three route alignments and their Tier 2 screening scores. Participants ranked each alignment in order of preference and provided open-ended comments. VRT asked participants to note their current level of transit activity, whether they were frequent riders, occasional riders, or rode infrequently or not at all. VRT ultimately received 192 responses to the survey, which was available online. VRT also distributed paper copies of the survey to human service agencies, which gathered survey responses from individuals who were unable to access the online survey. The agency received 164 responses online, and 28 paper copies of the survey. The tabulated results from the public outreach process are noted in Table 3.

Table 3: Public Outreach Results

| Alignment | Ranked 1st Choice | Ranked 2nd Choice | Ranked 3rd Choice |
|--|-------------------|-------------------|-------------------|
| All Survey Responses | | | |
| Whitewater Park Boulevard | 58 | 79 | 53 |
| 27 th Street | 55 | 63 | 72 |
| State Street | 78 | 48 | 65 |
| Frequent or Occasional Transit Riders | | | |
| Whitewater Park Boulevard | 21 | 37 | 23 |
| 27 th Street | 25 | 28 | 26 |
| State Street | 31 | 15 | 31 |
| <i>Source: VRT</i> | | | |

Common themes heard from survey respondents included:

- The State Street alignment provides good access to a range of services and destinations.
- Respondents wanted to preserve existing transit service on State Street.
- Whitewater Park Boulevard would be a good way to access parks and community amenities, as well as planned future growth along the Main/Fairview couplet.
- Previous investments by ACHD added capacity on Whitewater to lessen the burden on 27th, which then received a road diet. Respondents were concerned that this would negate that investment.
- 27th Street alignment offered closer service to residents of the neighborhoods along that route.

Table 4 below summarizes the results of the Tier 2 screening analysis.

Table 4: Tier 2 Screening Analysis

| Scoring Criteria | | Alignment Scores | | |
|---|--|------------------|-------------|----------------------|
| Criteria | Definition and Scoring of Criteria | State Street | 27th Street | Whitewater Park Blvd |
| Traffic Level of Service | Number of intersections at LOS E or F in 2035 with this build alternative | 3 | 3 | 4 |
| Traffic Level of Service Score | 3=best 1=worst | 3 | 3 | 2 |
| Ridership | Average weekday daily ridership in 2035 | 1,110 | 1,510 | 1,440 |
| Ridership Score | 3=highest 1=lowest | 1 | 3 | 2 |
| Distance | One-way trip distance from Star to Main Street Station | 17.2 | 17.4 | 17.6 |
| Distance Score | 3=shortest 1=longest | 3 | 2 | 1 |
| Time | Minutes to complete one-way trip | 41.1 | 42.6 | 42.2 |
| Time Score | 3=fastest 1=slowest | 3 | 1 | 2 |
| Conceptual Costs | Estimated cost of infrastructure improvements | \$ 40,400 | \$ 112,980 | \$ 1,630,580 |
| Conceptual Costs Score | 3=least expensive 1=most expensive | 3 | 2 | 1 |
| Household Accessibility | Number of households accessible within a 10-minute walking distance of stops | 6,391 | 7,126 | 6,829 |
| Household Accessibility Score | 3=most households accessible 1=least households accessible | 1 | 3 | 2 |
| Job Accessibility | Number of jobs accessible within a 10-minute walking distance of stops | 41,253 | 43,204 | 43,171 |
| Job Accessibility Score | 3=most jobs accessible 1=least jobs accessible | 1 | 3 | 2 |
| Sum of Tier 2 Technical Criteria Scores | | 15 | 17 | 12 |
| Public Support (General Public) | Number of respondents ranking alignment as first choice | 78 | 55 | 58 |
| Public Support (General Public) Score | 3=most support 1=least support | 3 | 1 | 2 |
| Public Support (Transit Riders) | Number of transit-rider respondents ranking alignment as first choice | 31 | 25 | 21 |
| Public Support (Transit Riders) Score | 3=most support 1=least support | 3 | 2 | 1 |
| Sum of Tier 2 Public Support Criteria Scores | | 6 | 3 | 3 |
| Overall Tier 2 Criteria Scores | | 21 | 20 | 15 |

As shown in Table 4, after incorporating public support the State Street alignment scored higher than the other alignments.

Recommendation


The State Street Technical Team recommends a two-phased approach to implementing the preferred alternative. This approach includes the following:

- In the near term, increase transit service headways and upgrade station amenities along the State Street alignment between the western terminus in Star and Main Street Station

- This transit route will offer 10- to 15-minute headways in the peak period and 15-minute headways for the remainder of the daily span of service
- This service could include the following measures to prioritize transit movements along the route:
 - Install southbound transit signage on 9th Street between State and Main, indicating that the on-street parking lane is a bus-only lane during the weekday peak hours
 - Restripe lanes on 9th Street between State and Main to make space for a peak-hour bus bypass lane
 - Restrict southbound east-side parking during peak hours to accommodate the bus bypass lane
- When household and employment densities along the Main and Fairview corridors reach appropriate levels, and after State Street frequencies and investments described above are met, VRT should consider meeting the increased travel demand by providing additional service along Whitewater Park Boulevard and Main/Fairview. This service would connect riders from communities west of Boise to destinations along those routes. This would be supplemental to the proposed service on State Street, which would retain the frequencies described above. The Whitewater Park Boulevard and Main/Fairview service could have service frequencies as high as 10-15 minutes during the peak and 15 minute headways in the off peak. It is recommended that this additional service be scheduled with the service on State Street such that transit headways west of State Street/Whitewater Park Boulevard would be 5-7.5 minutes during the peak and 7.5 minutes in the off-peak. Final service recommendations should be developed within the context of the transit network needs at that time and review other options which may be available at that time including micro-transit. It is anticipated that household and employment densities would reach the appropriate levels by 2035, as indicated in this analysis, although it is possible that densities could increase to anticipated levels prior to 2035.
 - When the additional service along Whitewater/Main/Fairview is implemented, VRT would also upgrade the stations along Whitewater Park Boulevard. It is assumed that stations along the Main and Fairview corridors would have been upgraded already through a separate Best in Class transit improvement project.
 - This service could include the following measures to prioritize transit movements along the route:
 - Whitewater Park Boulevard & State Street
 - Widen Whitewater Park Boulevard to provide bus bypass lane & install northbound left turn transit signal (optional)

- Reprogram pre-emption equipment to provide transit pre-emption
- Whitewater Park Boulevard & Main Street
 - Install southbound through transit signal
 - Replace southbound raised median with a bus-only lane
- Whitewater Park Boulevard & Fairview Avenue
 - Install southbound left turn transit signal
 - Replace southbound raised median with a bus-only lane

This recommendation is shown in the figure below.

Figure  ecommendations

This recommendation is based on several key issues:

- Previous investment and plans discouraged transit investments on 27th Street. Furthermore, survey respondents (including those who currently use transit) indicated that 27th Street was their least preferred alignment. This suggests that larger public and political support for this alignment may be limited.
- While the Whitewater Park Boulevard alignment does not yet have significant transit-supportive land use, the planned high density and intensity development along that corridor will eventually support more ridership. The higher cost estimates for the Whitewater Park Boulevard alignment could also be decreased if VRT opts to apply transit signal priority strategies instead of queue bypass lanes.
- State Street represents a low-cost option to test increasing service and amenities, from which point additional service extensions could spin off.

VRT and the SSTT should continue working towards implementation through these next steps:

- Update the Federal Transit Administration Region 10 office on the results of this analysis and the desired path forward. The administration's officials may be able to offer funding resources or grant opportunities that are most appropriate to the scale of this project.
- Continue working with ACHD to identify and address transportation concerns, and to explore the application of TSP along the State Street corridor.
- Continue facilitating discussions with ACHD, COMPASS, and jurisdictions along the State Street corridor to clarify plans for the HOV/transit lane on State Street. These discussions should include an open discussion of assumptions contained within the Regional Transportation Plan, COMPASS's travel demand model, and ACHD's Synchro model regarding the HOV lanes and their operation. These agencies need to establish a clear understanding of the lanes and document it in writing, possibly in the form of a Memorandum of Understanding that would be signed by all parties with jurisdiction over parts of the corridor.

D. COST ESTIMATE TECHNICAL MEMORANDUM



MEMORANDUM

Date: June 18, 2021
To: Stephen Hunt, Valley Regional Transit
From: Chris Bender, Fehr & Peers
Maria Vyas, Fehr & Peers
Subject: State Street Transit Alternatives Analysis: Planning-Level Cost Estimate

UT20-2200

The State Street Transit Alternatives Analysis evaluated alignment alternatives for high-capacity transit service between Star and downtown Boise. The alignment alternatives were ranked based on several quantitative criteria, including the conceptual capital costs associated with each alignment alternative. This memorandum outlines the methodology used to generate cost estimates for the following modifications:

- Whitewater Park Boulevard Alignment
 - Whitewater Park Boulevard & State Street
 - Widen Whitewater Park Boulevard to provide bus bypass lane & install northbound left turn transit signal (*optional*)¹
 - Reprogram pre-emption equipment to provide transit pre-emption
 - Whitewater Park Boulevard & Main Street
 - Install southbound through transit signal
 - Replace southbound raised median with a bus-only lane
 - Whitewater Park Boulevard & Fairview Avenue
 - Install southbound left turn transit signal
 - Replace southbound raised median with a bus-only lane

¹ Widening Whitewater Park Boulevard to provide a northbound left turn lane at State Street is optional and represents the high-end cost of mitigations required for the Whitewater Park Boulevard Alignment. There is no cost associated with reprogramming pre-emption equipment.



27th Street Alignment

- 27th Street & State Street
 - Reprogram pre-emption equipment to provide transit pre-emption
- 27th Street & Main Street
 - Update southbound signal
 - Restripe southbound striped median with a bus-only lane
- State Street Alignment
 - 9th Street between State Street & Main,
 - Install southbound transit signage,
 - Restripe lanes on 9th between State Street & Main to make room for bus bypass lane
 - Restrict southbound east parking in peak hours to use as bus bypass,

The following steps outline how the cost estimates for the proposed modifications were developed:

1. Fehr & Peers outlined a list of required materials for each of the proposed intersection and roadway modifications.
2. Based on measurements from aerial imagery and engineering judgement Fehr & Peers also approximated the quantities of the various materials required for the proposed modifications.
3. To develop unit costs for the materials assumed to be required to construct the modifications, Fehr & Peers referred to average unit prices of those materials published by ITD. The published unit prices include estimates submitted by contractors for state-funded construction projects from January 2013 to August 2020.
4. Since this is a planning-level cost estimate, Fehr & Peers developed average unit costs for each line item assumed to be required for the proposed modifications.
5. By multiplying the material quantities by the average unit costs, Fehr & Peers obtained the "construction subtotal costs" for each modification.
6. To better estimate the full cost of each modification, Fehr & Peers also assumed that a percentage of the total cost of the construction would need to be reserved for "design and project management costs" as well as "construction soft costs." The soft costs were intended to account for permit fees, mobilization, traffic control, inspection, and construction management.
7. Finally, an additional contingency cost was assumed for each mitigation to account for unforeseen costs of construction.



The following tables include (1) a combined summary of the costs for the proposed modifications and (2) detailed cost estimates for modifications at each intersection or roadway segment. Right-of-way costs were not included in these estimates. While most of the alternatives under consideration do not require additional right-of-way, the Whitewater Park Boulevard alternative may require right-of-way at the intersection of Whitewater and State Street, noted as "optional" in the descriptions above and the table below. The cost of this option would be some degree higher given the need to acquire right-of-way.

State Street BRT AA
Conceptual Cost by Alignment

| Alignment | Improvement Location | Cost per location | Total cost |
|--------------|--|-------------------|----------------------------|
| Whitewater | Whitewater at State <i>(optional cost)</i> | \$ 612,700 | \$990,600 - \$1,603,300 |
| | Whitewater at Main | \$ 520,900 | |
| | Whitewater at Fairview | \$ 469,700 | |
| 27th Street | 27th at Main | \$ 109,600 | \$ 109,600 |
| State Street | 9th Street, State - Main | \$ 30,800 | \$ 30,800 |

Whitewater Park Blvd Alignment - Whitewater Park Blvd at State street (optional)

| Prioritization | Item | Quantity | Unit | Unit Cost | Total |
|---|-------------------------------------|----------|------|---|----------------|
| NB left turn transit signal | Signal - Conductors & Conduits | 160 | LF | \$ 40.00 | \$ 6,400 |
| | Signal - Equipment - Transit Signal | 1 | EA | \$ 1,500.00 | \$ 1,500 |
| | Roadway Sign | 5 | EA | \$ 360.00 | \$ 1,800 |
| Widen west corner of Whitewater for queue bypass lane | Excavation | 1,625 | CY | \$ 22.00 | \$ 35,750 |
| | Full pavement section | 260 | SY | \$ 41.00 | \$ 10,660 |
| | Curb & Gutter | 585 | LF | \$ 43.00 | \$ 25,155 |
| | Concrete Sidewalk | 520 | SY | \$ 86.00 | \$ 44,720 |
| | Landcaping | 7,313 | SF | \$ 13.00 | \$ 95,063 |
| | Traffic Stripe | 1,170 | LF | \$ 1.00 | \$ 1,170 |
| | Signal Modification (one pole) | 1 | LS | \$ 50,000.00 | \$ 50,000 |
| | | | | <i>Construction Subtotal</i> | \$ 272,218 |
| | | | | <i>Design, Environmental, Project Management</i> | 25% \$ 68,100 |
| | | | | <i>Construction Soft Costs (Permits, Mobilization, Traffic Control, Inspection, CM)</i> | 25% \$ 68,100 |
| | | | | <i>Subtotal Total</i> | \$ 408,418 |
| | | | | <i>Contingency</i> | 50% \$ 204,200 |
| | | | | Total | \$ 612,618 |



Whitewater Park Blvd Alignment - Whitewater Park Blvd at Main Street

| Prioritization | Item | Quantity | Unit | Unit Cost | Total |
|------------------------------------|-------------------------------------|----------|------|------------------------------------|------------|
| SB through transit signal | Signal - Conductors & Conduits | 360 | LF | \$ 40.00 | \$ 14,400 |
| | Signal - Equipment - Transit Signal | 1 | EA | \$ 1,500.00 | \$ 1,500 |
| Replace median with bus-only lane. | Excavation (Median Removal) | 533 | CY | \$ 22.00 | \$ 11,733 |
| | Full pavement section | 4,800 | SF | \$ 41.00 | \$ 196,800 |
| | Traffic Stripe & Markings | 1 | LS | \$ 10,000.00 | \$ 10,000 |
| | Roadway Sign | 5 | EA | \$ 360.00 | \$ 1,800 |
| | Signal Modification (one pole) | 1 | LS | \$ 50,000.00 | \$ 50,000 |
| | | | | <i>Construction Subtotal</i> | \$ 286,233 |
| | | | | <i>Construction Management 15%</i> | \$ 42,900 |
| | | | | <i>Mobilization 15%</i> | \$ 42,900 |
| | | | | <i>Traffic Control 10%</i> | \$ 28,600 |
| | | | | <i>Subtotal Total</i> | \$ 400,633 |
| | | | | <i>Contingency 30%</i> | \$ 120,200 |
| | | | | Total | \$ 520,833 |

Whitewater Park Blvd Alignment - Whitewater Park Blvd at Fairview Avenue

| Prioritization | Item | Quantity | Unit | Unit Cost | Total |
|------------------------------------|-------------------------------------|----------|------|------------------------------------|------------|
| SB left turn transit signal | Signal - Conductors & Conduits | 350 | LF | \$ 40.00 | \$ 14,000 |
| | Signal - Equipment - Transit Signal | 1 | EA | \$ 1,500.00 | \$ 1,500 |
| Replace median with bus-only lane. | Excavation (Median Removal) | 462 | CY | \$ 22.00 | \$ 10,169 |
| | Full pavement section | 4,160 | SF | \$ 41.00 | \$ 170,560 |
| | Traffic Stripe & Markings | 1 | LS | \$ 10,000.00 | \$ 10,000 |
| | Roadway Sign | 5 | EA | \$ 360.00 | \$ 1,800 |
| | Signal Modification (one pole) | 1 | LS | \$ 50,000.00 | \$ 50,000 |
| | | | | <i>Construction Subtotal</i> | \$ 258,029 |
| | | | | <i>Construction Management 15%</i> | \$ 38,700 |
| | | | | <i>Mobilization 15%</i> | \$ 38,700 |
| | | | | <i>Traffic Control 10%</i> | \$ 25,800 |
| | | | | <i>Subtotal Total</i> | \$ 361,229 |
| | | | | <i>Contingency 30%</i> | \$ 108,400 |
| | | | | Total | \$ 469,629 |



27th Street Alignment - 27th Street at Main Street

| Prioritization | Item | Quantity | Unit | Unit Cost | Total |
|---|-------------------------------------|----------|------|------------------------------------|------------|
| SB signal update, restripe median as bus-only lane. | Remove Traffic Stripe | 260 | LF | \$ 2.00 | \$ 520 |
| | Traffic Stripe | 260 | LF | \$ 1.00 | \$ 260 |
| | Roadway Sign | 5 | EA | \$ 360.00 | \$ 1,800 |
| | Signal Modification (one pole) | 1 | LS | \$ 50,000.00 | \$ 50,000 |
| | Signal - Conductors & Conduits | 155 | LF | \$ 40.00 | \$ 6,200 |
| | Signal - Equipment - Transit Signal | 1 | EA | \$ 1,500.00 | \$ 1,500 |
| <i>Construction Subtotal</i> | | | | | \$ 60,280 |
| | | | | <i>Construction Management 15%</i> | \$ 9,000 |
| | | | | <i>Mobilization 15%</i> | \$ 9,000 |
| | | | | <i>Traffic Control 10%</i> | \$ 6,000 |
| <i>Subtotal Total</i> | | | | | \$ 84,280 |
| | | | | <i>Contingency 30%</i> | \$ 25,300 |
| Total | | | | | \$ 109,580 |

State Street Alignment - 9th Street between State/Main

| Prioritization | Item | Quantity | Unit | Unit Cost | Total |
|--|-----------------------|----------|------|------------------------------------|-----------|
| SB transit signage | Roadway Sign | 12 | EA | \$ 360.00 | \$ 4,320 |
| Restrict SB parking on east side of 9th during peak hours to allow bus to bypass traffic | Remove Traffic Stripe | 4,200 | LF | \$ 2.00 | \$ 8,400 |
| | Traffic Stripe | 4,200 | LF | \$ 1.00 | \$ 4,200 |
| <i>Construction Subtotal</i> | | | | | \$ 16,920 |
| | | | | <i>Construction Management 15%</i> | \$ 2,500 |
| | | | | <i>Mobilization 15%</i> | \$ 2,500 |
| | | | | <i>Traffic Control 10%</i> | \$ 1,700 |
| <i>Subtotal Total</i> | | | | | \$ 23,620 |
| | | | | <i>Contingency 30%</i> | \$ 7,100 |
| Total | | | | | \$ 30,720 |



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