

Resolution 19/20-14

Exhibit A

Findings of Fact for the Sherbeck Field Improvements Project Final Environmental Impact Report SCH No. 2018041025

**Pursuant to Sections 21081, 21081.5, and 21081.6 of the Public
Resources Code and Sections 15091 and 15093 of the CEQA
Guidelines**

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1 Introduction

1.1 Purpose

This statement of Findings of Fact (Findings) addresses the environmental effects associated with the Reduced Project Alternative as described in the Environmental Impact Report (EIR). The Draft EIR, which was available for public review from May 15, 2019 to June 28, 2019, described the proposed Sherbeck Field Improvements Project and four project alternatives, including the No Project Alternative: No Development/Continued Use of Yorba Linda High School; a Reduced Project Alternative; an Alternative Site Location at California State University, Fullerton; and an Alternative Site Location at Fullerton Union High School. The California Environmental Quality Act (CEQA) requires that EIRs “describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives” (14 CCR 15126.6(a)). Based on the potential for the Reduced Project Alternative to lessen the significant effects of the proposed Sherbeck Field Improvements Project, the North Orange County Community College District (District) has selected the Reduced Project Alternative as the proposed Sherbeck Field Improvements Project (proposed project). Thus, the previously identified Reduced Project Alternative will be referred to as ‘proposed project’ throughout these Findings.

These Findings are made pursuant to the California Environmental Quality Act (CEQA; California Public Resources Code, Section 21000 et seq.), specifically California Public Resources Code, Sections 21081, 21081.5, and 21081.6, and the CEQA Guidelines (14 CCR 15000 et seq.), specifically Sections 15091 and 15093. The Sherbeck Field Improvements Project EIR examines the full range of potential effects of construction and operation of the proposed project and identifies standard mitigation practices that could be employed to reduce, minimize, or avoid those potential effects.

California Public Resources Code, Section 21081, and CEQA Guidelines Section 15091 require that the lead agency, in this case the District, prepare written findings for identified significant effects, accompanied by a brief explanation of the rationale for each finding. Specifically, CEQA Guidelines Section 15091 states, in part, that:

- a) No public agency shall approve or carry out a project for which an EIR has been certified which identifies one or more significant environmental effects of the project unless the public agency makes one or more written findings for each of those significant effects, accompanied by a brief explanation of the rationale for each finding. The possible findings are:
 - 1) Changes or alterations have been required in, or incorporated into, the project which avoid or substantially lessen the significant environmental effect as identified in the final EIR.
 - 2) Such changes or alterations are within the responsibility and jurisdiction of another public agency and not the agency making the finding. Such changes have been adopted by such other agency or can and should be adopted by such other agency.
 - 3) Specific economic, legal, social, technological, or other considerations, including provision of employment opportunities for highly trained workers, make infeasible the mitigation measures or project alternatives identified in the final EIR.

In accordance with California Public Resource Code, Section 21081, and CEQA Guidelines Section 15093, whenever significant effects cannot be mitigated to below a level of significance, the decision-making agency is required to balance, as applicable, the benefits of the project against its unavoidable environmental risks when

determining whether to approve the project. If the benefits of a project outweigh the unavoidable adverse environmental effects, the adverse effects may be considered “acceptable.” In that case, the decision-making agency may prepare and adopt a Statement of Overriding Considerations (SOC), pursuant to the CEQA Guidelines.

Section 15093 of the CEQA Guidelines state that:

- a) CEQA requires the decision-making agency to balance, as applicable, the economic, legal, social, technological, or other benefits of a proposed project against its unavoidable environmental risks when determining whether to approve the project. If the specific economic, legal, social, technological, or other benefits of a proposed project outweigh the unavoidable adverse environmental effects, the adverse environmental effects may be considered "acceptable."
- b) When the lead agency approves a project which will result in the occurrence of significant effects which are identified in the final EIR but are not avoided or substantially lessened, the agency shall state in writing the specific reasons to support its action based on the Final EIR and/or other information in the record. The statement of overriding considerations shall be supported by substantial evidence in the record.
- c) If an agency makes a statement of overriding considerations, the statement should be included in the record of the project approval and should be mentioned in the notice of determination. This statement does not substitute for, and shall be in addition to, findings required pursuant to Section 15091.

The Final EIR identified potentially significant effects that could result from the proposed project. The District finds that the inclusion of certain mitigation measures as part of the approval of the proposed project will reduce most, but not all, of those effects to less-than-significant levels. Those impacts that are not reduced to less-than-significant levels are identified and overridden due to specific proposed project benefits (see Chapter 7, Statement of Overriding Considerations).

As required by CEQA, the District, in adopting these findings, also adopts a Mitigation Monitoring and Reporting Program (MMRP) for the proposed project. The District finds that the MMRP, which is incorporated by reference and made a part of these findings, meets the requirements of California Public Resources Code, Section 21081.6, by providing for the implementation and monitoring of measures intended to mitigate potentially significant effects of the proposed project.

In accordance with the CEQA Statutes and Guidelines, the District adopts these findings as part of its certification of the Final EIR for the proposed project. Pursuant to California Public Resources Code, Section 21082.1(c)(3), the District also finds that the Final EIR reflects the District’s independent judgment as the lead agency for the proposed project.

1.2 Organization and Format

The content and format of these CEQA Findings of Fact are designed to meet the latest CEQA statutes and Guidelines. The Findings of Fact is organized into the following sections:

Chapter 1, Introduction, outlines the organization of this document and identifies the location and custodian of the record of proceedings.

Chapter 2, Project Description, summarizes the proposed project, including its location, and provides a list of project objectives.

Chapter 3, CEQA Review and Public Outreach, describes the steps that the District has undertaken to comply with the CEQA statutes and Guidelines as they relate to public input, review, and participation during the preparation of the Draft and Final EIRs.

Chapter 4, CEQA Findings of Independent Judgment, provides the findings of the project as determined in the EIR.

Impacts Determined to Be Significant and Unavoidable provides findings for all potentially significant and unavoidable environmental impacts for which implementation of identified feasible mitigation measures would not avoid or substantially reduce the environmental impacts to less than significant levels.

Impacts Determined to Be Less Than Significant with Mitigation provides findings for all potentially significant environmental impacts for which implementation of identified feasible mitigation measures would avoid or substantially reduce the environmental impacts to less than significant levels.

Impacts Determined Not to Be Significant or Less Than Significant provides a list of those environmental issue areas where no reasonably foreseeable impacts would occur and provides a list of those impacts determined to be below the threshold of significance without the incorporation of mitigation measures.

Chapter 5, Findings on Project Alternatives, provides a summary of the alternatives considered for the project and describes the associated findings.

Chapter 6, General CEQA Findings, addresses the District's findings regarding the mitigation monitoring and reporting program, CEQA Guidelines Sections 15091 and 15092, and recirculation.

Chapter 7, Statement of Overriding Considerations, provides the reasons for considering the project acceptable although significant impacts are not avoided or substantially lessened.

Chapter 8, Certification of the EIR, provides a summary of the findings of the Final EIR and the District's approval action on the project.

Chapter 9, References provides the references discussed in this document.

1.3 Nature of Findings

Any finding made by the District shall be deemed made, regardless of where it appears in this document. All of the language included in this document constitutes findings by the District, whether or not any particular sentence or clause includes a statement to that effect. The District intends that these findings be considered as an integrated whole and, whether or not any part of these findings fail to cross-reference or incorporate by reference any other part of these findings, that any finding required or committed to be made by the District with respect to any particular subject matter of the Final EIR, shall be deemed to be made if it appears in any portion of these findings.

1.3.1 Record of Proceedings

For the purposes of CEQA and the Findings herein set forth the record of proceedings for the proposed project and consists of those items listed in CEQA Section 21167.6(e), along with other miscellaneous items contained within the District's files that are relevant to the consideration of the project. The record of proceedings for the District's

decision on the proposed project consists of the following documents, at a minimum and without limitation, which are incorporated by reference and made part of the record supporting these findings:

- The Notice of Preparation, Notice of Availability, and all other public notices issued by the District in conjunction with the proposed project
- The Draft EIR for the proposed project and all technical appendices and documents relied upon or incorporated by reference
- All written comments submitted by agencies, organizations, or members of the public during the public review comment period on the Draft EIR and the District's responses to those comments
- The Final EIR for the proposed project
- The MMRP for the proposed project
- All reports, studies, memoranda, maps, staff reports, or other planning documents relating to the proposed project prepared by the District or consultants to the District with respect to the District's compliance with the requirements of CEQA and with respect to the District's action on the proposed project
- All documents submitted to the District by other public agencies or members of the public in connection with the Draft EIR, up through the close of the public review period for the project on June 28, 2019
- Any minutes and/or verbatim transcripts of all information sessions, public meetings, and public hearings held by the District in connection with the proposed project
- Any documentary or other evidence submitted to the District at such information sessions, public meetings, and public hearings
- All resolutions adopted by the District regarding the proposed project, and all staff reports, analyses, and summaries related to the adoption of those resolutions
- Matters of common knowledge to the District, including, but not limited to federal, state, and local laws and regulations
- Any documents expressly cited in these findings, in addition to those cited above; and any other materials required for the record of proceedings by CEQA Section 21167.6(e)

1.3.2 Custodian and Location of Records

The documents and other materials that constitute the Record of Proceedings for the District's actions related to the project are located at the North Orange County Community College District, 1830A West Romneya Drive Anaheim, California 92801. The District is the custodian of the Record of Proceedings for the project.

1.4 Board of Trustees Independent Judgment

The Final EIR for the Sherbeck Field Improvements Project reflects the Districts' independent judgment. The District has exercised independent judgment in accordance with Public Resources Code 21082.1(c)(3) in retaining its own environmental consultant in the preparation of the EIR, as well as reviewing, analyzing and revising material prepared by the consultant.

Having received, reviewed, and considered the information in the Final EIR, as well as any and all other information in the record, the District hereby makes findings pursuant to and in accordance with Sections 21081, 21081.5, and 21081.6 of the California Public Resources Code.

2 Project Description

2.1 Project Location

Sherbeck Field (project site) is located in the northeastern portion of the Fullerton College campus. Fullerton College is located at 321 East Chapman Avenue in the City of Fullerton (City) and occupies an approximately 70-acre site in northern Orange County. The City is surrounded by the Cities of La Habra and Brea to the north, Placentia to the east, Anaheim to the south, and Buena Park to the west. Specifically, Fullerton College is bounded by residential development to the north, south, and east, and Fullerton Union High School to the west. Student Parking Lots 4 and 5 are located immediately north and west of the project site. Farther north are the Horticulture Building 1600 Complex and Child Development classrooms. North Berkeley Avenue borders the eastern side of the field, and farther east are single-family residences. Softball, baseball, and soccer fields are located south of Sherbeck Field.

2.2 Summary of Project Description

The proposed project involves improvements to Sherbeck Field, which is located on the campus of Fullerton College. Fullerton College is part of the District. Sherbeck Field is 4.36 acres and currently consists of a turf football field that is surrounded by a 400-meter-long track, with a two-story field house at the western edge of the field and a scoreboard at the eastern end of the field. Currently, Sherbeck Field does not have permanent seating or lighting.

The proposed project would involve the following improvements to Sherbeck Field:

- Permanent prefabricated aluminum bleachers with capacity for 2,000 spectators ;
- Six field lighting stanchions, with two stanchions on the north side of the field, two stanchions at the south side of the field, one stanchion on the eastern edge of the field, and one stanchion on the western edge of the field;
- Sound system to be used exclusively for athletic competition events;
- Press box at the south side of the field; and
- Storage building to be located to the west of the bleachers at the north side of the field.

2.3 Project Objectives

The proposed project's main objectives are as follows:

- Provide a facility for the Fullerton College football program at Fullerton College that meets the college field and goalpost sizing requirements of the California Community College Athletic Association Regulations, Bylaw 4.6A.
- Provide a facility for the Fullerton College football program for full-season play so that the college does not have to request waivers from the Southern California Football Association.
- Provide an on-campus facility with field lighting to allow for more evening class options for the physical education program to meet student demand, and to allow for evening soccer games and occasional evening football games.

- Provide a facility with permanent bleachers so that Fullerton College can host regular season and playoff football games at the college.
- Provide a facility so that Fullerton College can reduce the costs associated with renting bleachers for the annual Fullerton College commencement ceremony.
- Provide a facility for the Fullerton College football program that includes a press box, which is required for football games in order to house football coaching staff, media, and statisticians.
- Provide a facility to address the inadequacy of the current storage of football equipment and track and field equipment at the field house.

2.4 Discretionary Actions

The District, as lead agency for the proposed project, is responsible for CEQA clearance and site plan review. A public agency, other than the lead agency, that has discretionary approval over the project is known as a “responsible agency,” as defined by the CEQA Guidelines (14 CCR 15000 et seq.). The responsible agencies and their corresponding approvals for this project are listed below.

State of California

- Division of the State Architect (approval of construction drawings)

Regional Agencies

- Orange County Fire Authority (emergency access)

Local Agencies

- City of Fullerton (approval of Construction Management Plan and Traffic Management Plan)

3 CEQA Review and Public Outreach

3.1 Notice of Preparation and Scoping

CEQA establishes mechanisms whereby the public and decision makers can be informed about the nature of the project being proposed and the extent and types of impacts that the project and its alternatives would have on the environment should the project or alternatives be implemented. In accordance with CEQA Guidelines Section 15063, the District prepared an Initial Study (dated April 2018) for the proposed project that identified the topics to be analyzed in the EIR. Pursuant to Section 15082 of the CEQA Guidelines, a notice of preparation (NOP) dated April 9, 2018, was circulated to interested agencies, organizations, and individuals. The NOP was sent to 23 local agency departments and organizations, including the local library where a hard copy of the NOP and Initial Study were available for review. The NOP was posted at the County Clerk's office on April 9, 2018, for a period of 30 days. The NOP was also sent to the State Clearinghouse at the California Governor's Office of Planning and Research. The State Clearinghouse assigned a state identification number (SCH No. 2018041025) to the Draft EIR. Fullerton College also mailed a notice of the EIR scoping meeting to approximately 4,000 property owners, residents, and organizations located within a 1-mile radius of the campus.

The NOP is intended to encourage interagency communication regarding the proposed project so that agencies, organizations, and individuals are afforded an opportunity to respond with specific comments and/or questions regarding the scope and content of the EIR. Pursuant to Section 15082 of the CEQA Guidelines, recipients of the NOP were requested to provide responses within 30 days after their receipt of the NOP. A public scoping meeting was held on the Fullerton College campus on May 1, 2018, to gather additional public input on the scope of the environmental document. Approximately 30 staff members and 200 community members attended the scoping meeting. The 30-day public scoping period ended on May 8, 2018. All comments received during the NOP public notice period were considered during the preparation of this Draft EIR.

A total of 62 comment letters and 24 scoping comment cards were received during the NOP public review period. The following issues were raised in the written responses to the NOP:

- Several commenters were concerned with impacts related to light pollution, increased glare from the lights, noise pollution, traffic, and parking issues.
- Commenters suggested use of the Fullerton Union High School Stadium, California State University, Fullerton Titan Stadium, or other venues as alternatives.
- Other issues raised were related to safety and the need for police patrolling during events.
- The City asked that the EIR include effective and enforceable mitigation measures that will protect the surrounding residential areas from light, noise, and traffic intrusion. Other comments include recommendations for the aesthetics, noise, traffic, and alternatives analyses. In addition, the City requested that the EIR evaluate impacts to public infrastructure, using anticipated quantities of discharge into storm drains and sewers, and anticipated water usage.

The Initial Study found the proposed project would not result in significant impacts to agriculture and forestry resources, biological resources, cultural resources, geology and soils, hydrology and water quality, land use and planning, mineral resources, population and housing, and utilities and service systems. Based on the City's comments, the EIR carried forward analysis of Section 4.10, Utilities and Service Systems, as it relates to water, wastewater, and

stormwater. Based on the Initial Study and other comments received during the NOP scoping period, the following issues were determined to be potentially significant and are therefore addressed in the EIR:

- Aesthetics
- Air Quality
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Noise
- Public Services
- Recreation
- Transportation
- Tribal Cultural Resources
- Utilities and Service Systems
- Energy
- Wildfire

3.2 Draft Environmental Impact Report

The District prepared the EIR in accordance with CEQA and the CEQA Guidelines. The EIR is a full-disclosure document that informs public-agency decision makers and the public of the significant environmental effects of the proposed project. Measures to minimize significant effects are identified in the EIR and reasonable alternatives to the proposed project are evaluated.

The Draft EIR was made available to the public for review and comment for a 45-day period. The review and comment period began on May 15, 2019, and concluded on June 28, 2019. A copy of the Draft EIR was available for public review at the Fullerton Public Library (353 West Commonwealth Avenue, Fullerton, California 92832). The Draft EIR was also available for review on the District website: <http://www.nocccd.edu/> and the Fullerton College website www.fullcoll.edu/campusprojects. All comment letters received in response to the Draft EIR were reviewed and are included in the Final EIR, along with written responses to each of the comments.

3.3 Final Environmental Impact Report

Section 15088 of the CEQA Guidelines requires that the Lead Agency responsible for the preparation of an EIR evaluate comments on environmental issues and prepare a written response addressing each of the comments. The intent of the Final EIR is to provide a forum to address comments pertaining to the information and analysis contained within the Draft EIR, and to provide an opportunity for clarifications, corrections, or minor revisions to the Draft EIR as needed.

The Final EIR assembles in one document all the environmental information and analysis prepared for the proposed project, including comments on the Draft EIR and responses by the District to those comments.

In accordance with CEQA Guidelines Section 15132, the Final EIR for the proposed project consists of: (i) the Draft EIR and subsequent revisions; (ii) comments received on the Draft EIR; (iii) a list of the persons, organizations, and public agencies commenting on the Draft EIR; (iv) written responses to significant environmental issues raised during the public review and comment period and related supporting materials; and, (v) other information contained in the EIR, including EIR appendices.

4 CEQA Findings of Independent Judgment

4.1 Impacts Determined to Be Significant and Unavoidable

This section identifies the significant unavoidable impacts that require a statement of overriding considerations to be issued by the District, pursuant to Section 15093 of the CEQA Guidelines, if the proposed project is approved. Based on the analysis contained in the EIR, the following impacts have been determined to fall within the “significant unavoidable impacts” category: noise impacts due to periodic operations of the proposed project and cumulative noise impacts; as discussed throughout the entirety of this EIR, impacts resulting from construction of recreational facilities and cumulative recreation impacts; and operational impacts to City of Fullerton and California Department of Transportation (Caltrans) intersections, along with cumulative transportation impacts.

4.1.1 Noise

Long-Term Operational Noise

On-Site Noise Impacts

The operational noise impacts associated with the proposed project includes periodic increases in on-site noise resulting from the proposed improvements to Sherbeck Field. The periodic on-site operational noise would be generated by crowd noise, on-field/sideline noise, the proposed speaker system, and existing traffic noise in the project area. The primary on-site noise source would be from the proposed PA system. Combined sound levels range from approximately 66 dBA L_{eq} at residences to the northeast of the project site, to approximately 71 dBA L_{eq} at the nearest residences, due east of the proposed project site. Compared to the existing modeled noise levels, the periodic sound level increase at the nearby residences would range from approximately 4 to 8 decibels (dB).¹ Based on the Fullerton Municipal Code, the proposed project is exempt from City on-site operational noise standards due to the exemption in Section 15.90.040.A.1 of the Noise Ordinance. Therefore, the standards provided in the Noise Ordinance are not applicable. However, the periodic increase in noise of up to 8 dB is considered a substantial noise increase based on the Federal Interagency Committee on Noise (FICON) guidance. Therefore, the on-site operational noise associated with the project would be a significant noise impact.

Various mitigation measures were considered, including noise barriers on the project property line, the proposed bleachers, and at the residential property line, and were determined to be either ineffective or infeasible.² A focused PA speaker system was also considered as potential mitigation, but it , was determined to not reduce the periodic

¹ The noise levels reported here are “worst case” and reflect a conservative analysis for the football games (approximately five regular and up to two playoff football games per season) that would be held at Sherbeck Field.

² Due to the height of the speakers and bleachers, noise barrier walls to shield these sources would need to be constructed to a very high elevation to provide acoustic shielding to residential receptors, as speaker arrays and the top row of the crowd are located at elevations of 30 feet above grade. Similarly, noise barrier walls on the bleachers would likely add significant structural weight for little acoustic benefit, and are therefore also not considered feasible.

noise increases to a level of less than significant.³ To reduce operational noise impacts, the District would restrict field event times at Sherbeck Field in accordance with Mitigation Measure (MM) NOI-2. Additionally, MM-NOI-3 (see Section 3.5.1 of the Draft EIR, Construction and Installation) ensures the speaker system would not exceed 86 dBA L_p in the bleachers at any events. Further, as discussed in Section 3.5.2, Proposed Programming of the Draft EIR, the PA system would only be used by Fullerton College and outside groups would be prohibited from using any PA or sound amplification systems. The proposed project would be required to comply with the District’s Administrative Procedures Chapter 6, Business and Fiscal Affairs policies, specifically regulations governing Sherbeck Field (MM-NOI-4). However, this would not necessarily reduce noise levels during Fullerton College-hosted events to a less than significant level. Therefore, the on-site operational noise from the proposed project is considered to be a significant unavoidable adverse impact.

MM-NOI-2 The Fullerton College Athletic Department shall require the Facilities Department and any rental agreements to restrict field events at Sherbeck Field to occur only during the following times:

- Spring Semester: Monday through Thursday between 6:00 a.m. to 9:15 p.m.; Friday between 6:00 a.m. to 8:00 p.m.; Saturday and Sunday between 8:00 a.m. to 8:00 p.m.
- Summer Semester: Monday through Thursday between 6:00 a.m. to 9:15 p.m.; Friday between 6:00 a.m. to 8:00 p.m.; Saturday and Sunday between 8:00 a.m. to 8:00 p.m.
- Fall Semester: Monday through Thursday between 6:00 a.m. to 9:15 p.m.; Friday between 6:00 a.m. to 8:00 p.m.; Saturday and Sunday between 8:00 a.m. to 8:00 p.m. (with the exception of up to two Fullerton College football games per year from 7:00 p.m. to 10:00 p.m.).
- Outside groups using the field are prohibited from using any public address or sound amplification systems.
- North Orange County Community College District will be responsible for making sure the rental parties comply with their rental agreements in which these timelines will be stipulated and also through compliance with the project’s MMRP.

MM-NOI-3 The speaker system used at Sherbeck Field will not exceed 86 dBA A-weighted decibels sound pressure level in the bleachers at any events. North Orange County Community College District will be responsible for making sure the speaker system does not exceed 86 A-weighted decibels sound pressure level. This will be accomplished either by limiting the levels during final speaker system design and installation, or by periodic testing of the system prior to large games.

MM-NOI-4 Programming for each of the uses on Sherbeck Field is required to comply with the North Orange County Community College District’s Administrative Procedures Chapter 6, Business and Fiscal Affairs, 5.0 Sherbeck Field Usage. Regulations governing Sherbeck Field usage are as follows:

- No Fullerton College football games shall be played on Friday evening.
- No high school football games shall be played at Sherbeck Field.
 - Exceptions may be made for temporary use during extenuating circumstances.
- Field lighting shall not be used for any outside groups at any time on Saturday and Sunday.
- No field rentals for the purpose of musical performances or concerts by outside groups or individuals will be permitted.

³ As shown in Tables 6 through 13 of the Veneklasen Associates report (see Appendix E), the increase in combined (or cumulative) noise compared to existing would be up to 11 dB under these alternative scenarios.

- The public address system is only for use by Fullerton College. Outside groups using the field are prohibited from using any public address or sound amplification systems.

Off-Site Noise

The operational noise impacts associated with the proposed project also include periodic increases in off-site noise generated by vehicular traffic. On Saturdays, when football games would take place, greater numbers of vehicle trips would be generated during the approximately 2 hours of arrival time (generally in the late-morning/early-afternoon hours) and 2 hours of departure time (generally in the late afternoon hours). For the existing traffic scenario, project-related, peak-hour traffic noise levels are predicted to increase approximately 0 to 4 dB, depending on the location. For Year 2030 traffic scenarios, project-related, peak-hour traffic noise levels are predicted to increase approximately 0 to 4 dB, depending on the location. Changes in noise levels of 5 dB are considered clearly audible but changes in the traffic noise level of up to 4 dB are in the range of not being clearly audible to most receptors.

Because the project-related traffic noise increases are predicted to occur for relatively short periods (for the 2 hours prior to and 2 hours after the games), these increases would not result in a significant change in the overall 24-hour noise levels. The maximum periodic traffic noise of 4 dB would result in a 1 dB or less increase in terms of the community noise equivalent level (CNEL), which is not perceptible or significant. Because the project would result in periodic noise level increases of up to 4 dB, the vehicular-based noise, is considered a less than significant impact.

Cumulative Noise Impacts

Non-transportation noise sources (e.g., project operation) and construction noise impacts are typically project-specific and highly localized (i.e., these do not generally affect the community noise level at distances beyond several hundred feet). Construction activities associated with proposed or future development within the area would contribute to cumulative noise levels, but in a geographically limited and temporary manner. As other development occurs in the area, noise from different types of uses (e.g., traffic, aircraft, fixed noise sources) would continue to combine, albeit on a localized basis, to cause increases in overall background noise conditions within the area. As a result, such sources do not significantly contribute to cumulative noise impacts at distant locations and are not evaluated on a cumulative level.

The proposed project's traffic-related impacts on a regular basis (i.e., weekdays) would result in a 0 dB increase (rounded to whole numbers) along adjacent roadways. The increase in project noise levels is due to on-site noise and may be additive to other cumulative project noise. Therefore, the increase in noise associated with on-site activities would be cumulatively considerable and significant.

Finding

The District finds that the above mitigation measures are feasible, are adopted, and will reduce the proposed project's noise impacts attributable to operational noise. Implementation of feasible mitigation measures would limit noise attributed to third-party rentals. However, there are no feasible mitigation measures that would reduce noise levels during Fullerton College-hosted events to a level below significant. Therefore, these impacts must be considered significant and unavoidable even after implementation of all feasible mitigation measures. Pursuant to Section 21081(a)(3) of the California Public Resources Code, as described in the Statement of Overriding Considerations, the District has determined that specific economic, legal, social, technological, or other considerations make infeasible the alternatives identified in the EIR, and the identified noise impacts are thereby acceptable because of specific overriding considerations (see Chapter 7).

Rationale

Based on the impact analysis, the proposed project would result in significant cumulative noise impacts arising from the period operations of the proposed project. Implementation of the above mitigation measures would restrict field event times at Sherbeck Field to reduce period operational noise. Various mitigation measures were considered, including noise barriers on the project property line, the proposed bleachers, and at the residential property line, and were determined to be either ineffective or infeasible. There is no feasible mitigation to address Fullerton College-hosted events and vehicular-based noise.

4.1.2 Recreation

Require the Construction or Expansion of Recreational Facilities

Since the proposed project includes a recreational facility, the impacts are analyzed throughout the EIR. As such, the potential environmental impacts related to recreational facilities are part of the impacts assessment conducted for the entirety of the proposed project. The proposed project would result in significant and unavoidable noise and transportation impacts; therefore, impacts related to recreation are significant and unavoidable.

In an effort to avoid construction noise impacts, MM-NOI-1 is required to control construction noise to the extent practicable and feasible (see Section 4.2.2, Noise, for full text of MM-NOI-1). With implementation of MM-NOI-1, construction noise impacts would be less than significant. To reduce operational noise impacts, the District would restrict field event times at Sherbeck Field in accordance with MM-NOI-2. MM-NOI-3 would limit the maximum sound level of the speaker system in the bleachers to 86 dBA at events. MM-NOI-4 would require uses on Sherbeck Field to comply with the District's Administrative Procedures Chapter 6, Business and Fiscal Affairs, 5.0 Field Usage. However, these measures would not necessarily reduce noise levels during Fullerton College-hosted events to a less than significant level. Therefore, the on-site noise from the proposed project is considered to be a significant unavoidable adverse impact.

In the Traffic Impact Analysis (TIA) prepared for the Draft EIR that included LOS calculations for 31 key study intersections. Additionally, as discussed in Section 2.2, the reduced project in comparison to the project analyzed in the Draft EIR would reduce the total number of spectator seating from 4,417 to 2,000 seats. Given the reduction in spectator seats, it is anticipated the trip generation associated with the proposed project would be less than the project analyzed in the Draft EIR. As such, an Alternative Project Analysis Memorandum (Appendix C) was prepared for Friday traffic conditions and Saturday traffic conditions and focused to the following five key study intersections that were impacted by the larger proposed project (i.e., field with a seating capacity of 4,417 seats).

The proposed project during a Saturday field event would not significantly impact key study intersections under Existing plus Project and Year 2020 plus Project traffic conditions. The proposed project would significantly impact the key study intersection of State College Boulevard/Chapman Avenue under Year 2030 Buildout plus Project traffic conditions. The proposed project during a Friday field event would significantly impact the key study intersection of Lemon Street/Fullerton College Drive under Existing plus Project and Year 2020 plus Project traffic conditions. The implementation of improvements (i.e., Traffic Management Plan) at the impacted key study intersection of Lemon Street/Fullerton College Drive would improve the intersection's level of service (LOS) operation to an acceptable level. With implementation of MM-TRA-2 (see Section 4.1.3, Transportation, for full text of MM-TRA-2), cumulative impacts at the impacted key study intersection of Lemon Street/Fullerton College Drive would be less than significant.

Additionally, implementation of improvements at the impacted key study intersection of State College Boulevard/Chapman Avenue would completely offset the impact of project traffic (MM-TRA-3, see Section 4.1.3 for full text of MM-TRA-3). MM-TRA-3 is proposed to mitigate the Year 2030 Buildout plus Project Saturday field event traffic scenario at the intersection of the State College Boulevard/Chapman Avenue. Although implementation of improvements at State College Boulevard/Chapman Avenue would completely offset the impact of project traffic, the proposed project cannot guarantee that these improvements, which are located in the City of Fullerton, will be implemented. Therefore, impacts would be significant and unavoidable.

Under the Caltrans methodology, Year 2030 Buildout plus Project traffic conditions would impact one of the six state-controlled Caltrans intersections. The remaining five state-controlled study intersections are forecast to continue to operate at acceptable LOS D or better with the addition of project generated traffic in the Year 2030. MM-TRA-4 (see Section 4.1.3 for full text of MM-TRA-4) is proposed to mitigate Year 2030 Buildout plus Project weekly academic instruction traffic scenario under the Caltrans methodology at the state-controlled intersection State Route (SR) 57 northbound (NB) Ramps at Chapman Avenue. Although implementation of improvements at the impacted state-controlled intersection of the SR-57 NB Ramps/Chapman Avenue would completely offset the impact of project traffic, the proposed project cannot guarantee that these improvements, which are located in the City of Fullerton and/or also under the jurisdiction of Caltrans, will be implemented. Therefore, impacts would be significant and unavoidable.

Cumulative Recreational Impacts

The geographic context for analysis of cumulative impacts to recreational facilities is the City of Fullerton. However, existing recreational facilities within the City would not experience a significant increase in visitors as a result of the proposed project. Projects within the City could result in cumulative impacts to recreational facilities in the City through the increase in demand for recreational facilities. Only residential projects or growth-stimulating projects that increase population create demand for recreational facilities. The City's Municipal Code Chapter 21.12 establishes a fee for any dwelling unit in the City (with exceptions) to provide for the acquisition, development, and improvement of public parks and recreational facilities in the City. All past, present, and future residential projects in the surrounding area would be required to comply with the requirements of Chapter 21.12 of the City's Municipal Code. However, the proposed project would result in potentially significant and unavoidable impacts to operational noise and future traffic and circulation conditions. Since the proposed project entails the construction of recreational facilities, the proposed project would contribute to cumulatively considerable impacts.

Finding

The District finds that the above mitigation measures are feasible, are adopted, and will reduce the potential impacts associated with the construction of a recreational facility. However, since the proposed project itself entails the construction of recreational facilities, the assessment of potential effects related to recreational facilities are based on the analysis provided in other sections of the EIR. As there are no feasible mitigation measures that would reduce noise and transportation impacts to a level below significant, these impacts must be considered significant and unavoidable even after implementation of all feasible mitigation measures. Pursuant to Section 21081(a)(3) of the California Public Resources Code, as described in the Statement of Overriding Considerations, the District has determined that specific economic, legal, social, technological, or other considerations make infeasible the alternatives identified in the EIR, and the identified impacts associated with the construction of a recreational facility are thereby acceptable because of specific overriding considerations (see Chapter 7).

Rationale

Since the proposed project includes a recreational facility, the impacts are analyzed throughout the EIR. As such, the potential environmental impacts related to recreational facilities are part of the impacts assessment conducted for the entirety of the proposed project. Mitigation measures would reduce potential impacts related to construction noise, hazards and hazardous materials, transportation, tribal cultural resources, and utilities to less than significant. However, noise impacts associated with periodic operation and operational transportation impacts resulting from the proposed project would remain as significant unavoidable adverse impacts. There is no feasible mitigation to address Fullerton College-hosted events and vehicular-based noise. Additionally, mitigation measures proposed to reduce operational transportation impacts cannot be guaranteed as they are located in the City of Fullerton and Caltrans jurisdiction.

4.1.3 Transportation

Conflict with a Program, Plan, Ordinance or Policy or with an Applicable Congestion Management Program

Operational Traffic Impact

A TIA was prepared for the Draft EIR that included LOS calculations for 31 key study intersections for Existing plus Project traffic conditions, Year 2020 plus Project traffic conditions, and Year 2030 Buildout plus Project traffic conditions. Traffic conditions were further evaluated by weekly academic instruction, Saturday field event, and Friday field event impacts. Additionally, as discussed in Section 2.2, the reduced project in comparison to the project analyzed in the Draft EIR would reduce the total number of spectator seats from 4,417 to 2,000. Given the reduction in spectator seats, it is anticipated the trip generation associated with the proposed project would be less than the project analyzed in the Draft EIR. As such, an Alternative Project Analysis Memorandum (Appendix C) was prepared for Friday traffic conditions and Saturday traffic conditions and focused to the following five key study intersections that were impacted by the proposed project (i.e., field with a seating capacity of 4,417 seats).

- 4) Lemon Street at Berkeley Avenue
- 12) State College Boulevard at Chapman Avenue
- 27) Lemon Street at Fullerton College Drive
- 28) Berkeley Avenue at College Driveway No. 1
- 29) Berkeley Avenue at College Driveway No. 2

According to the Alternative Project Analysis Memorandum (Appendix C), the proposed project is forecast to generate 1,950 daily trips, 706 Event Arrival peak hour trips, and 757 Event Departure peak hour trips. Consistent with the TIA prepared for the Draft EIR, The weekly academic instruction Year 2030 Caltrans impact at intersection #14 (SR-57 NB Ramps at Chapman Avenue) will remain with the reduced project.

The proposed project during a Saturday field event would not significantly impact key study intersections under Existing plus Project and Year 2020 plus Project traffic conditions. The proposed project would significantly impact the key study intersection #12 State College Boulevard/Chapman Avenue (requiring a second westbound left-turn lane on Chapman Avenue) under Year 2030 Buildout plus Project traffic conditions. The proposed project during a Friday field

event would significantly impact the key study intersection #27 Lemon Street/Fullerton College Drive under Existing plus Project and Year 2020 plus Project traffic conditions. The implementation of improvements (i.e., Traffic Management Plan) at the impacted key study intersections would improve the intersections' LOS operation to an acceptable level. With implementation of MM-TRA-2, cumulative impacts to the two key study intersections would be less than significant.

MM-TRA-2 The North Orange County Community College District shall implement a Traffic Management Plan (TMP) during the Friday field event arrival and departure periods, as applicable, at the intersection of Lemon Street/Fullerton College Drive. The TMP shall be implemented in coordination with the City of Fullerton and requires approval by the City Traffic Engineer and shall include, as necessary: the placement of police department staff or staff with equivalent training at the affected intersections to manage traffic flow; intersection signal timing adjustments to further improve traffic flow; routing of traffic via traffic cones/delineators; and/or the implementation of programmable changeable message signs. If Fullerton police officers are employed for traffic control purposes it requires a request be made to the Police Department and is dependent on the availability of off-duty officers. The District will be responsible for the cost of services received.

Additionally, implementation of improvements at the impacted key study intersection of State College Boulevard/Chapman Avenue would completely offset the impact of project traffic (MM-TRA-3). MM-TRA-3 is proposed to mitigate the Year 2030 Buildout plus Project Saturday field event traffic scenario at the intersection of the State College Boulevard/Chapman Avenue. Although implementation of improvements at State College Boulevard/Chapman Avenue would completely offset the impact of project traffic, the proposed project cannot guarantee that these improvements, which are located in the City of Fullerton, will be implemented. Therefore, impacts would be significant and unavoidable.

MM-TRA-3 Prior to 2030, the North Orange County Community College District shall pay its proportional "fair share" (13.0%) of the costs to implement the following improvements at the intersection of State College Boulevard/Chapman Avenue: Widen and/or restripe the westbound approach of Chapman Avenue to provide a second westbound left-turn lane; And modify the existing traffic signal as necessary.

Under the Caltrans methodology, Year 2030 Buildout plus Project traffic conditions would impact one of the six state-controlled Caltrans intersections (at Intersection #14 SR-57 NB Ramps at Chapman Avenue) under the reduced project related to weekday instruction, which is not anticipated to change under the reduced project. The remaining five state-controlled study intersections are forecast to continue to operate at acceptable LOS D or better with the addition of project generated traffic in the Year 2030. MM-TRA-4 is proposed to mitigate Year 2030 Buildout plus Project weekly academic instruction traffic scenario under the Caltrans methodology at the state-controlled intersection SR 57 NB Ramps at Chapman Avenue. Although implementation of improvements at the impacted state-controlled intersection of the SR-57 NB Ramps/Chapman Avenue would completely offset the impact of project traffic, the proposed project cannot guarantee that these improvements, which are located in the City of Fullerton and/or also under the jurisdiction of Caltrans, will be implemented. Therefore, impacts would be significant and unavoidable.

MM-TRA-4 Prior to 2030, the North Orange County Community College District shall pay its proportional "fair share" (0.6%) of the costs to implement the following improvements at the intersection of the State Route (SR) 57 Northbound (NB) Ramps and Chapman Avenue: widen and/or restripe the westbound approach of Chapman Avenue to provide a third westbound through lane; and, modify the existing traffic signal as necessary.

Adequate storage is provided at the off-ramps for all six state-controlled study intersections under Existing plus Project, Year 2020 plus Project, and Year 2030 Buildout plus Project traffic conditions during the weekday PM peak hour, Saturday Event Arrival peak hour, and Saturday Event Departure peak hour. Therefore, impacts associated with off-ramp queuing would be less than significant.

The proposed project would not physically preclude implementation of any regional or local policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities. Therefore, impacts associated with alternative transportation policies, plans, programs, and facilities would be less than significant.

However, as indicated previously, implementation of improvements at State College Boulevard/Chapman Avenue would completely offset the impact of project traffic, but the proposed project cannot guarantee that these improvements, which are located in the City of Fullerton, will be implemented. In addition, implementation of improvements at the impacted state-controlled intersection of the SR-57 NB Ramps/Chapman Avenue would completely offset the impact of project traffic, but the proposed project cannot guarantee that these improvements, which are located in the City of Fullerton and/or also under the jurisdiction of Caltrans, will be implemented. Therefore, impacts would be significant and unavoidable.

Cumulative Transportation Impacts

The analysis of future conditions (Year 2020 and Year 2030) presented above takes into account existing traffic, ambient growth, and cumulative projects traffic. The cumulative traffic projections for Year 2020 account for existing traffic volumes, increases in the existing traffic volumes due to overall regional growth, and traffic generated by specific development projects expected to be constructed by the Year 2020 in the vicinity of the project study area. Similar to the approach in forecasting Year 2020 traffic volumes, Year 2030 peak hour background traffic volumes were forecast based on application of growth rates provided by the City of Fullerton to existing traffic volumes, and by further adding traffic volumes from all future cumulative projects (i.e., buildout of the City).

Under the Year 2020 plus Project Friday event traffic conditions, as presented above, the proposed project would result in significant cumulative impacts at one of the 31 key study intersections. The remaining 30 key study intersections are forecast to continue to operate at an acceptable LOS with the addition of project-generated traffic under Year 2020 traffic conditions. With implementation of MM-TRA-2, cumulative impacts to the key study intersections of Lemon Street/Fullerton College Drive would be reduced to less than significant.

Under the Year 2030 Buildout plus Project traffic conditions, the proposed project would result in significant cumulative impact at one of the 31 key study intersections. Implementation of improvements at the impacted key study intersection of State College Boulevard/Chapman Avenue would completely offset the impact of project traffic. However, because the implementation of improvements proposed cannot be guaranteed within the jurisdiction of the City of Fullerton, this cumulative impact would be significant and unavoidable (MM-TRA-3).

Under the Caltrans methodology, Year 2030 Buildout plus Project traffic conditions would result in significant cumulative impacts at one of the six state-controlled Caltrans intersections (Intersection #14 SR-57 NB Ramps at Chapman Avenue) related to weekday instruction under the reduced project. The remaining five state-controlled study intersections are forecast to continue to operate at acceptable LOS D or better with the addition of project generated traffic in the Year 2030. The implementation of improvements at the impacted state-controlled intersection of the SR-57 NB Ramps/Chapman Avenue would completely offset the impact of the proposed project. However, because the implementation of improvements at a Caltrans intersection is not guaranteed and is not within the jurisdiction of the District, this cumulative impact is significant and unavoidable (MM-TRA-4).

Adequate storage is provided at the off-ramps for all six state-controlled study intersections under Existing plus Project, Year 2020 plus Project, and Year 2030 Buildout plus Project traffic conditions during the weekday PM peak hour, Saturday Event Arrival peak hour, and Saturday Event Departure peak hour. Therefore, the proposed project's contribution to impacts at the off-ramps would not be cumulatively considerable.

The development of the proposed project in combination with cumulative development and ambient traffic growth is anticipated to significantly impact one of the eight freeway segments under Existing plus Project Saturday traffic conditions, two of the eight freeway segments under Year 2020 Cumulative plus Project Saturday traffic conditions, and three of the eight freeway segments under Year 2030 Buildout plus Project Saturday traffic conditions. The three segments forecast to operate at an unacceptable level of service during a Saturday Field Event in Year 2030 are key freeway segment no. 4, SR-57 at Chapman, key freeway segment no. 6, westbound SR-91 west of Harbor Boulevard; and key freeway segment no. 7, eastbound SR-91 west of Harbor Boulevard. The proposed project's incremental impacts to these key freeway study segments are considered significant and unavoidable as there are no feasible mitigation measures available that will reduce cumulative mainline impacts to below significance thresholds or achieve acceptable service level goals.

Additionally, the development of the proposed project in combination with cumulative development and ambient traffic growth would significantly impact one of the eight freeway ramps forecast to operate at an unacceptable level of service in the Year 2020 during the Saturday Event peak hours (i.e., no. 7 –diverge segment). Three of the eight freeway ramps are forecast to operate at an unacceptable level of service in the Year 2030 during the Saturday Event peak hours (i.e., no. 4 – merge segment; no. 6 – merge segment; and no. 7 – diverge segment). The proposed project's contribution to the freeway system can be considered significantly impacted at these three freeway ramps. In sum, the proposed project would have cumulatively considerable transportation impacts.

Finding

The District finds that the above mitigation measures are feasible, are adopted, and will reduce the proposed project transportation impacts attributable to trips generated by the proposed project. Implementation of the TMP would reduce impacts to intersection #27 at Lemon Street/Fullerton College Drive to a less-than-significant level. Although mitigation measure MM-TRA-4 is proposed to reduce impacts to the Intersection #12 State College Boulevard/Chapman Avenue, these improvements require right-of-acquisition from the City of Fullerton, and thus, the proposed project cannot guarantee that these improvements would be implemented by the City of Fullerton. Additionally, although MM-TRA-3 is proposed to reduce impacts to the intersection of SR-57 NB at Chapman, the proposed project cannot guarantee that these improvements, which are under the jurisdiction of Caltrans, will be implemented. Therefore, these impacts must be considered significant and unavoidable even after implementation of all feasible mitigation measures. Pursuant to Section 21081(a)(3) of the California Public Resources Code, as described in the Statement of Overriding Considerations, the District has determined that specific economic, legal, social, technological, or other considerations make infeasible the alternatives identified in the EIR, and the identified transportation impacts are thereby acceptable because of specific overriding considerations (see Chapter 7).

Rationale

Mitigation measures are proposed to reduce potential transportation impacts, but due to such limitations as roadway intersections and freeway segments being under the jurisdiction and control of the City of Fullerton and Caltrans, mitigation and improvements are rendered infeasible. The significance determinations are based on a

conservative worst-case scenario whereby it is assumed that mitigation for all significant impacts outside the control of Fullerton College are infeasible and therefore, the impacts are significant and unavoidable.

4.2 Impacts Determined to Be Less Than Significant with Mitigation

This section identifies significant adverse impacts of the proposed project that require findings to be made under California Public Resources Code, Section 21081(a), and CEQA Guidelines Section 15091(a)(1). Based on substantial evidence, the District finds that adoption of the mitigation measures set forth below will reduce the identified significant impacts to less than significant levels.

4.2.1 Hazardous and Hazardous Materials

Cortese List

There is one site within the project boundary identified in Government Code Section 65962.5 (i.e., Cortese List). The Fullerton College site references a prior release of petroleum (spillage from overfilling) discovered during the UST closure in 1993 (SWRCB 1993). A cleanup action plan addressed the issue, and a no further action letter was issued by the Regional Water Quality Control Board (RWQCB) in 2004 (SWRCB 2017). However, because release cases can be closed with residual contamination in place in soils, a hazardous materials contingency plan (Contingency Plan) was prepared for Fullerton College to reduce any impacts from potentially contaminated soils.

The Contingency Plan details the procedures to be followed within the campus if potentially contaminated soils or contaminated sources (such as buried fuel tanks) are encountered during excavation activities. The Contingency Plan notes that potential soil contaminants within the project area include diesel from underground storage tanks and pesticides and arsenic from the former orchards located on the eastern portion of campus. However, diesel-impacted soils are easily identified via odors and staining, and the construction contractor is required to cease excavation if contaminant sources are found or suspected in the soil. The Contingency Plan requires the construction contractor to ensure that all workers are appropriately trained to identify contaminated soils. Additionally, because the potential for pesticides and arsenic to impact the soil is considered low, and because the earthwork processes that took place to develop the current field would have reduced any existing pesticide concentrations, impacts related to the former orchard would be less than significant (Black Rock Geosciences 2018; Kinnebrew, pers. comm. 2018). Should construction activities at the project site not follow applicable procedures, impacts would be potentially significant. Procedures outlined in the Contingency Plan would further reduce any impacts from potentially contaminated soils to less than significant. The proposed project would comply with the procedures to be followed within the project site if potentially contaminated soils or contaminant sources are encountered during excavation activities (MM-HAZ-1). Compliance with the Contingency Plan would ensure that hazards to the public or environment as a result of contaminated soils would not occur. Therefore, with implementation of MM-HAZ-1 impacts relating to location on a site included on a list of hazardous materials sites would be less than significant.

MM-HAZ-1 The North Orange County Community College District is responsible for ensuring the proposed Sherbeck Field project complies with applicable procedures set forth in the Hazardous Materials Contingency Plan for Fullerton College, 321 East Chapman Avenue Fullerton, California 92832,

and dated February 2018. The Hazardous Materials Contingency Plan, as it applies to the Sherbeck Field project, shall be followed during construction activities.

Cumulative Hazards and Hazardous Materials Impacts

Cumulative impacts related to hazards and hazardous materials would result from projects that combine to increase exposure to hazards and hazardous materials. The proposed project would have less than significant impacts with mitigation measures incorporated. The proposed project would comply with all federal, state, and local regulations pertaining to the use, transport, and release of hazardous materials. The potential release of hazardous materials during ground-disturbing activities would be reduced by compliance with the Contingency Plan (MM-HAZ-1). Although cumulative projects have the potential to result in significant impacts to hazards and hazardous materials, these projects would also be subject to federal, state, and local regulations that would help reduce potential impacts. Cumulative projects may also require similar mitigation measures to help further reduce potential impacts. Therefore, the proposed project combined with the cumulative projects would not result in a cumulative significant impact related to hazards and hazardous materials.

Finding

The District finds that the above mitigation measure is feasible, is adopted, and will reduce the potential hazards and hazardous material-related impacts of the proposed project related to the listing of the site on hazardous materials sites list compiled pursuant to Government Code Section 65962.5; and cumulative hazards and hazardous materials impacts to less-than-significant levels. Accordingly, the District finds that, pursuant to California Public Resources Code, Section 21081(a)(1), and CEQA Guidelines Section 15091(a)(1), changes or alterations have been required in, or incorporated into, the proposed project that mitigate or avoid potentially significant hazards and hazardous material-related impacts of the proposed project identified in the Final EIR.

Rationale

Mitigation measure related to reducing potential impacts associated with being located on a hazardous materials site is necessary to minimize risk to people working or residing near the project site. The proposed project would comply with the procedures of the Contingency Plan within the project site if potentially contaminated soils or contaminant sources are encountered during excavation activities.

4.2.2 Noise

Short-Term Construction Noise

Construction of the proposed project would generate noise that could expose nearby receptors to elevated noise levels that may disrupt communication and routine activities. When construction takes place near the eastern side of the project site noise levels are estimated to range from approximately 69 A-weighted decibels (dBA) energy equivalent level (L_{eq}) to approximately 79 dBA L_{eq} at nearby residences. This represents a temporary increase in noise levels of up to 12 decibels (dB), compared to measured ambient noise levels.⁴ The loudest construction phases would be during project site paving and site preparation. More typically, construction noise levels are estimated to range from approximately 68 to 73 dBA L_{eq} .

⁴ As shown in Table 4.5-2 of the Draft EIR, measured daytime ambient noise levels ranged from 67 to 70 dBA L_{eq} ; 79 dBA L_{eq} minus 67 dBA L_{eq} represents a difference of 12 dB.

Fullerton College is subject to building permit approvals by the Division of the State Architect, but the City's Noise Control Ordinance provides guidance regarding normal hours for construction activities (Monday through Saturday, 7:00 a.m. to 8:00 p.m.) (City of Fullerton 2001). As part of the standard construction procedures for the project, the District would limit construction activities to those hours set by the City's Noise Control Ordinance. No construction activities are expected on Sundays or on City-recognized holidays, and construction would not occur after 8:00 p.m. on Mondays through Saturdays. Accordingly, the proposed project would not result in generation of noise levels in excess of standards established in the City's Noise Control Ordinance or other applicable noise standards.

However, the proposed project would generate noise from construction that would be audible and would temporarily elevate the local ambient noise level at locations within several hundred feet of construction. In addition, the predicted temporary increase in the ambient noise level would exceed the California Energy Commission threshold of 10 dB; therefore, impacts are considered potentially significant. In an effort to avoid construction noise impacts, MM-NOI-1 is required to control construction noise to the extent practicable and feasible. With implementation of MM-NOI-1, construction noise impacts would be less than significant.

MM-NOI-1 Prior to initiation of construction on the Fullerton College campus, the North Orange County Community College District shall approve a construction noise mitigation program to include the following:

- Construction equipment shall be properly outfitted and maintained with feasible noise-reduction devices to minimize construction-generated noise.
- Stationary noise sources such as generators shall be located away from noise-sensitive land uses if feasible.
- Laydown and construction vehicle staging areas shall be located away from noise-sensitive land uses if feasible.
- A temporary construction noise barrier shall be constructed at the eastern boundary of the project site. The noise barrier shall be a minimum of 8 feet in height, must have a surface density of at least 4 pounds per square foot, and be free of openings and cracks.
- Whenever possible, academic, administrative, and residential areas that will be subject to construction noise shall be informed 1 week before the start of construction.
- Compliance with the City's Noise Control Ordinance regarding normal hours for construction activities (Monday through Saturday, 7:00 a.m. to 8:00 p.m.) No construction activities would occur on Sundays or on City-recognized holidays.
- All construction pursuant to the proposed project shall be required to implement the above measures for control of construction noise. North Orange County Community College District will be responsible for making sure the construction contractor implements this measure. Compliance will be reported and tracked through weekly inspections during construction in an MMRP.

Finding

The District finds that the above mitigation measure is feasible, is adopted, and will reduce the potential construction-related noise impacts of the proposed project to less-than-significant levels. Accordingly, the District finds that, pursuant to California Public Resources Code, Section 21081(a)(1), and CEQA Guidelines Section 15091(a)(1), changes or alterations have been required in, or incorporated into, the proposed project that mitigate or avoid potentially significant construction-related noise impacts of the proposed project identified in the Final EIR.

Rationale

Mitigation measure would reduce construction related noise impacts through a construction noise mitigation program. The construction noise mitigation program includes property outfitted and maintained construction equipment; stationary sources and construction laydown areas located away from noise-sensitive land uses, if feasible; temporary construction noise barrier; notification to other uses, whenever possible; and compliance with the City's Noise Control Ordinance.

4.2.3 Transportation

While the EIR did not identify any significant environmental effects associated with parking related to the proposed project, in response to public comments, the District has added a project design feature to the Findings and the MMRP to address concerns stated by members of the community about parking in neighborhoods during events.

PDF-TRA-1 Parking on campus shall be provided free of charge for football and soccer game attendees.

Conflict with a Program, Plan, Ordinance or Policy or with an Applicable Congestion Management Program

Construction Traffic Impact Analysis

Construction-related trips associated with trucks and workers traveling to and from the site in the morning and afternoon may result in some minor traffic delays; however, potential traffic interference caused by construction vehicles would create a temporary/short-term impact to vehicles using Berkeley Avenue and Chapman Avenue in the morning and afternoon hours, and the number of construction workers will vary depending on the specific construction activities.

Traffic impacts to the adjacent roadway network would be minimal and not long-term. Further, since the construction-related trip generation potential of the proposed project (i.e., all five construction components) is less than that of the proposed project's operational trips (i.e., weekday academic instruction) and the proposed project (i.e., field event) is not expected to significantly impact any of the key study intersections, no significant impacts resulting from construction traffic are anticipated aside from the nuisance traffic that would occur as a result of construction-related traffic (e.g., construction materials, construction workers). Nonetheless, to reduce the impact of construction-related traffic, the implementation of a Construction Management Plan is recommended to minimize traffic impacts upon the local circulation system in the area (MM-TRA-1). With implementation of MM-TRA-1, impacts associated with construction traffic would be less than significant.

MM-TRA-1 Construction Management Plan Criteria: To ensure impacts to the surrounding street system are less than significant, the North Orange County Community College District, in coordination with the City of Fullerton, shall, prior to the commencement of construction activities, develop a Construction Management Plan to be implemented during project construction. The Construction Management Plan shall include the following components:

- Implement traffic control for any street closure, detour, or other disruption to traffic circulation.
- Identify the routes that construction vehicles will utilize to access the site for the delivery of construction materials to minimize to the extent feasible traffic-related impacts, traffic controls and detours, and proposed construction phasing plan for the project.

- Specify the hours during which transport activities can occur and methods to minimize construction-related impacts to adjacent streets.
- Require that the hauling or transport of oversize loads be limited to the non-peak hours of 9:00 a.m. to 4:00 p.m. only, Monday through Friday, unless approved otherwise by the City Engineer.
- Use of local collector street (as defined by Exhibit 6 of The Fullerton Built Environment) by construction vehicles shall be prohibited.
- Haul trucks entering or exiting public streets shall at all times yield to public traffic.
- All construction-related parking and staging of vehicles shall be kept out of the adjacent public roadways and occur on site.
- The Construction Management Plan shall meet standards established in the current *California Manual on Uniform Traffic Control Devices* as well as City of Fullerton requirements, and requires approval by the City Traffic Engineer and Public Works Department.

Finding

The District finds that the above mitigation measure is feasible, is adopted, and will reduce the potential construction-related transportation impacts of the proposed project to less-than-significant levels. Accordingly, the District finds that, pursuant to California Public Resources Code, Section 21081(a)(1), and CEQA Guidelines Section 15091(a)(1), changes or alterations have been required in, or incorporated into, the proposed project that mitigate or avoid potentially significant construction-related transportation impacts of the proposed project identified in the Final EIR.

Rationale

The above mitigation measure would be incorporated into the construction management plan for project construction, and will reduce impacts to a less than significant level.

4.2.4 Tribal Cultural Resources

Public Resource Code Section 5024.1

The proposed project is subject to compliance with Assembly Bill 52 (California Public Resources Code, Section 21074), which requires the consideration of impacts to tribal cultural resources as part of the CEQA process, and requires the District to notify groups that are traditionally or culturally affiliated with the geographic area of the proposed project and who have requested notification. The District received one request from California Native American tribes for Assembly Bill 52 project notification. Specifically, the request came from Andrew Salas, Chairman of the Gabrieleño Band of Mission Indians–Kizh Nation, with whom the District consulted previously on the Fullerton College Facilities Master Plan. Mr. Salas sent a letter to the District, as the lead agency, dated April 1, 2018, to request formal notification of proposed projects within the Gabrieleño Band of Mission Indians–Kizh Nation’s geographic area of traditional and cultural affiliation.

Pursuant to Section 15082 of the CEQA Guidelines, a Notice of Preparation (NOP) dated April 9, 2018, was circulated for a 30-day public comment period. During the public review period, the District contacted Mr. Salas on April 12, 2018, via email, to provide formal notification of the proposed project. The District provided Mr. Salas an attachment of the Initial Study and NOP. In accordance with CEQA Section 21080.3.1, the District had provided formal notification prior to the release of the EIR. However, the California Native American tribe did not respond

within 30 days of receipt of the formal notification. The District followed up with an email to Mr. Salas on June 14, 2018, but as of the publication date of the Draft EIR (May 2019), the District received no response from Mr. Salas or the Gabrieleño Band of Mission Indians–Kizh Nation. Because the District did not receive any response, there was no requirement for consultation, and thus no consultation occurred.

No archaeological resources were identified within the project site as a result of the CHRIS records search or Native American consultation. In addition, grading activities associated with the proposed project would consist of excavation to an average depth of 3 feet. Since the existing project site has already been graded to a depth of greater than 3 feet for the existing utilities and other developments located on site, it is unlikely tribal cultural resources would be exposed during construction. Therefore, the District also has determined that no significant resources pursuant to the criteria set forth in California Public Resources Code, Section 5024.1(c), exist on Sherbeck Field or would be impacted by the proposed project. In summary, no known geographically defined tribal cultural resources were identified within, or in the immediate vicinity of, the Fullerton College campus.

Nonetheless, because it is always possible that intact archaeological deposits are present at subsurface levels and could be uncovered during ground-disturbing activities, MM-TCR-1 is included to reduce impacts to archaeological resources that are significant under CEQA (14 CCR 15064.5(f); California Public Resources Code, Section 21082) to a less than significant level. Therefore, given compliance with all applicable rules, ordinances, and regulations and implementation of MM-TRC-1, significant impacts to tribal cultural resources would be reduced to less than significant levels.

MM-TRC-1 In the event that archaeological resources (sites, features, or artifacts) are exposed during construction activities for the proposed project, all construction work occurring within 100 feet of the find shall immediately stop until a qualified archaeologist, meeting the Secretary of the Interior’s Professional Qualification Standards, can evaluate the significance of the find and determine whether additional study is warranted. Depending on the significance of the find under the California Environmental Quality Act (CEQA), the archaeologist may simply record the find and allow work to continue. If the discovery proves significant under CEQA, additional work, such as preparation of an archaeological treatment plan, testing, or data recovery, may be warranted.

Finding

The District finds that the above mitigation measure is feasible, is adopted, and will reduce the potential cultural resource-related impacts of the proposed project related to archaeological resources to less-than-significant levels. Accordingly, the District finds that, pursuant to California Public Resources Code, Section 21081(a)(1), and CEQA Guidelines Section 15091(a)(1), changes or alterations have been required in, or incorporated into, the proposed project that mitigate or avoid potentially significant archaeological resource-related impacts of the proposed project identified in the Final EIR.

Rationale

The above mitigation measure is proposed if tribal cultural resources are inadvertently discovered during the construction phase of the proposed project to ensure that any significant impact to such tribal cultural resources that could result from the proposed project would be mitigated to a less than significant level.

4.2.5 Utilities and Service Systems

Require Construction of New Water, Wastewater Treatment, Stormwater Drainage, Electric Power, Natural Gas, or Telecommunications Facilities

Stormwater

The pervious area on the project site consists of approximately 0.11 acres on the northern portion and 0.57 acres on the southern portion. The project site is largely developed, and implementation of the proposed project would not result in the new construction or installation of stormwater drainage facilities. However, because the proposed project would increase impervious areas on the project site and in response to the City of Fullerton's comment on the notice of preparation regarding anticipated quantities of discharge into storm drains, a preliminary drainage analysis was performed for the proposed project. The preliminary drainage analysis determined that approximately 90% of the pervious drainage areas would become impervious upon implementation of the proposed project. However, due to the nature of the proposed project it is not anticipated that any major drainage patterns would need to be altered to effectively treat stormwater on the project site. The proposed installation would not substantially change the amount of distribution of impervious surfaces relative to existing conditions because the project site is largely developed and surrounded by urban land uses; therefore, the proposed project is not anticipated to substantially modify existing topography, drainage-shed boundaries, or runoff rates/patterns.

The preliminary drainage analysis prepared for the proposed project conducted a stormwater design and analysis per the Orange County Technical Guidance Document (TGD). In accordance with the TGD, any increase in runoff that would be generated from a project-related increase in impervious areas must be treated through best management practices (BMPs) or captured and reused. Based on the TGD and site characteristics, the proposed project would ensure that the site runoff is captured and directed into bioswales on the northern and southern sides of the site. Each swale would be designed as a trapezoid with side slopes of no more 2:1, with a 3-foot base width, as shown in the preliminary drainage analysis prepared for the proposed project (MM-UTL-1). Implementation of MM-UTL-1 would ensure that the proposed project would not result in an increase in stormwater runoff from the project site.

MM-UTL-1 Based on the Orange County Technical Guidance Document and site characteristics, the proposed project would ensure that the site runoff is captured and directed into bioswales on the northern and southern sides of the site. Each swale shall be designed as a trapezoid with side slopes of no more than 2:1, with a 3-foot base width, as shown in the preliminary drainage analysis prepared for the proposed project. All overflow drainage in excess of the water quality treatment flow requirements will be directed into the existing curb and gutter system around the site.

Cumulative Utilities and Service Systems Impact

Stormwater Drainage

Because the drainage sheds would maintain the same boundaries, and because changes in impervious surfaces would be relatively minor, the proposed project is not anticipated to exceed the capacity of existing off-site stormwater drainage systems, requiring the construction or expansion of stormwater drainage facilities. However, because the proposed project would increase impervious areas on the project site and in response to the City's NOP comment regarding anticipated quantities of discharge into storm drains, a preliminary drainage analysis was performed for the proposed project. Implementation of MM-UTL-1 would ensure that the proposed project includes design features that

would slow and retain stormwater runoff. The proposed project would not require the construction of new stormwater drainage facilities or the expansion of existing facilities. Other projects in the vicinity of the proposed project would need to be evaluated on an individual basis with regard to stormwater drainage facilities. There are existing stormwater conveyance facilities in the area, and combined with other projects, the proposed project is not expected to cause a significant impact related to stormwater runoff because all projects would be designed to meet stormwater capacity. The proposed project would not substantially change total surface runoff and would not combine with surrounding projects to contribute to significant cumulative impacts; therefore, cumulative impacts would be less than significant with mitigation.

Finding

The District finds that the above mitigation measure is feasible, is adopted, and will reduce the potential utilities and service system-related impacts of the proposed project related to the construction of new stormwater drainage facilities impacts to less-than-significant levels. Accordingly, the District finds that, pursuant to California Public Resources Code, Section 21081(a)(1), and CEQA Guidelines Section 15091(a)(1), changes or alterations have been required in, or incorporated into, the proposed project that mitigate or avoid potentially significant utilities and service system-related impacts of the proposed project identified in the Final EIR.

Rationale

The above mitigation measure is required to ensure that the proposed project would not result in an increase in stormwater runoff resulting from the increase in impervious areas. The measure involves installation of bioswales on the northern and southern sides of the site.

4.3 Impacts Determined to Be Less Than Significant

4.3.1 Aesthetics

Scenic Vistas

The proposed project would involve improvements to the existing Sherbeck Field, including installation of permanent bleachers, lighting stanchions, a sound system, and construction of a storage building and press box. Construction activities, including grading and excavation, could have a temporary impact on views due to the presence and staging of equipment. However, the area surrounding the project site is characterized by residential and commercial uses. The City of Fullerton General Plan does not identify any scenic areas or vistas in the vicinity of the campus. There is a designated scenic corridor at the intersection of Brea Boulevard and Harbor Boulevard approximately 0.4 miles northwest of the project site (City of Fullerton 2012a); however, Fullerton College is located in an area where the presence of existing development limits the availability of views to this scenic corridor. There are no scenic vistas visible to or from the proposed project site; therefore, impacts would be less than significant.

Scenic Resource Damage within a State Scenic Highway

The proposed project would involve installation of permanent bleachers, lighting stanchions, a sound system, a storage building, and a press box, which could obstruct views of the surrounding area. Construction activities, including grading and excavation, could have a temporary impact on views due to the presence and staging of equipment. However, the proposed project would not have an impact on scenic resources associated with a state

scenic highway. According to Caltrans, the nearest eligible scenic roadway is the stretch of SR-57 from SR-90 to SR-60, which is approximately 1.9 miles from the project site at its closest point. There are no designated scenic roadways within the project vicinity. There are no other scenic resources near or within the proposed project site that are visible from a scenic roadway. The proposed project would not damage scenic resources within a state scenic highway, and impacts on scenic resources would be less than significant.

Regulations Governing Scenic Quality

The project site is zoned Public Land (P-L). Permitted and conditionally permitted uses within the P-L zone are described in Sections 15.25.020 and 15.25.025 of the Fullerton Zoning Code. No development standards or design criteria have been established for the P-L zone. As the Fullerton Zoning Code does not identify regulations governing scenic quality for development in the P-L zone, the proposed project would not conflict with applicable zoning.

The project site is designated as a School land use in The Fullerton Plan. The Fullerton Plan does not contain specific development regulations regarding scenic quality for School land uses. Further, the policies from The Fullerton Plan are not specific to scenic quality. Project components including proposed bleachers and light stanchions would not substantially interrupt existing views or obstruct scenic resources from view. As such, the proposed project would not conflict with the City's ability to implement the goals and policies of The Fullerton Plan related to community development and design. Impacts would be less than significant.

Sources of Light or Glare

Light

The proposed project would include installation of lighting stanchions and house lighting, which would introduce a new source of nighttime light to the project site.

The total power load of the field lighting would be 76.02 kilowatts. The stanchions would be made of galvanized steel and would be grey or silver. As proposed, field lighting would be hooded and individual fixtures would be directed downward onto the playing field surface and bleachers. The inclusion of hooded fixtures would limit opportunities for excessive light trespass or spillage off the Fullerton College campus and onto North Berkeley Avenue and residential neighborhoods to the north and east of Sherbeck Field. Hooded fixtures and downward-directed lighting would also reduce potential skyglow associated with the operation of field lighting during evening and nighttime hours. While streetlights and parking lot lights operate in the immediate project area, the kilowatt load associated with the field lights would be greater, as is necessary to illuminate the playing field surface and the home and visitors' bleachers.

As proposed, Sherbeck Field would be used for academic instruction, competitive athletics, and rentals. On Monday through Thursday evenings, field lights would operate until 9:15 p.m. to accommodate classes and rentals, and house lights would operate until 9:30 p.m. to allow students to exit the field safely. On Friday evenings, field lights would operate until 8:15 p.m. at the latest, and house lights would operate until 8:30 p.m. at the latest to allow students to exit the field safely. On Saturday evenings, field lights would operate until 10:00 p.m. at the latest, and house lights would operate until 10:30 p.m. at the latest to accommodate the occasional/special circumstance football games that would occur during the 16-week fall semester (evening games would not be regularly scheduled). On Sunday evenings, field lights would operate until 6:00 p.m. at the latest to accommodate soccer rentals. Field lighting shall not be used for any outside groups at any time on Saturday and Sunday.

To better understand the lighting levels associated with the operation of proposed field lighting, Fullerton College contacted Musco Lighting to prepare an illumination summary. The illumination summary depicts the calculated lighting

levels (in foot-candles) of the field lighting at specific mounting heights on proposed galvanized steel support poles to be installed at Sherbeck Field. Calculations were prepared by Musco to ensure that sufficient lighting would be cast on the playing surface and visitor areas. The football/soccer field will be lighted to 50 horizontal footcandles, with a uniformity ratio of 2:1, which is consistent with the on-field lighting levels at the nearby Fullerton Union High School stadium. The track will be lighted to 30 horizontal footcandles with a uniformity ratio of 3:1, and bleachers are lit to approximately 10 footcandles with a 1-footcandle minimum for egress. The light levels for the field and track are consistent with the NCAA Best Lighting Practices for Intercollegiate Play, and conform to the Engineering Society of North America (IESNA) recommended practices for Class II facilities (defined as college, semi-professional, sports clubs, amateur leagues, and high schools for facilities with spectator capacity of fewer than 5,000).

In addition, calculations were prepared for the current lighting design to determine the level of field lighting that would be cast outside the Sherbeck Field boundary and “spillover” onto adjacent areas. For example, calculations detailed that the average spill lighting level at the eastern curb of North Berkeley Avenue (east of Sherbeck Field) was calculated to be 0.051 foot-candles, and maximum spill lighting level was calculated to be 0.14 foot-candles. Further, lighting levels outside of the Sherbeck Field and Fullerton College boundary to the north would quickly diminish such that spill light levels along North Berkeley Avenue to the northeast, north, and northwest would be 0.0 footcandles during operation of proposed field lighting. A foot-candle is a unit of illuminance or illumination equivalent to the illumination produced by a source of one candle at a distance of 1 foot. In addition, foot-candles are generally the most common unit of measure used by lighting professionals to calculate light levels in businesses and outdoor spaces.

The District, the City, and Appendix G of the CEQA Guidelines do not have established foot-candle thresholds for spill lighting associated new development. While not applicable to the project and referenced only for comparison, the County of San Diego has an established significance guideline that sets a light trespass threshold of 0.2-foot candles as measured 5 feet onto adjacent property to determine significant lighting effects (County of San Diego 2007). As mentioned above, the maximum spill lighting level was calculated to be 0.08 foot-candles at the eastern curb of North Berkeley Drive. Spill lighting levels for the project calculated at residential properties located east of North Berkeley Avenue determined that these properties would receive no measureable spill lighting from proposed project lighting due to the distance from lighting sources. Given that the calculated spill lighting levels on the nearest residential properties are anticipated to be lower than the maximum levels (i.e., 0.14 foot-candles) calculated at the eastern curb of North Berkeley Drive, and lighting would be hooded and directed downward, impacts associated with lighting and would be less than significant. In order to add additional clarification regarding lighting, the following PDFs are incorporated into the project description:

PDF-AES-1 During operation of field lighting at Sherbeck Field, the football/soccer field shall be lit to a maximum of 50 horizontal footcandles, with a uniformity ratio of 2:1, which is consistent with the on-field lighting levels at the nearby Fullerton Union High School stadium. The track shall be lit to a maximum of 30 horizontal footcandles with a uniformity ratio of 3:1, and bleachers shall be lit to a maximum of approximately 10 footcandles with a 1-footcandle minimum for egress. The light levels for the field and track shall be consistent with the NCAA Best Lighting Practices for Intercollegiate Play, and conform to the Engineering Society of North America (IESNA) recommended practices for Class II facilities (defined as college, semi-professional, sports clubs, amateur leagues, and high schools for facilities with spectator capacity of fewer than 5,000).

PDF-AES-2 All light fixtures installed on stanchions at Sherbeck Field shall be hooded and directed downward onto their targeted areas (i.e., football/soccer field, track, and bleachers).

PDF-AES-3 Fullerton College will implement a lighting curfew similar to other parks and public facilities in the City of Fullerton. The only exceptions would be during the week when classes are in session on the field until 9:15 p.m., for graduation in the event that it is held in the evening, or a Saturday football game that has to be held at night due to extenuating circumstances (e.g., hot weather, opposing team schedule).

Glare

The six stanchions to be installed at Sherbeck Field would be made of galvanized steel and would be grey or silver in color. Although metal elements can be a potential source of glare during daytime hours, there is a low likelihood of incoming sunlight reflecting off the proposed stanchions and being received by motorists along North Berkeley Drive (and other local roads) and by area residents. Firstly, galvanized steel is less reflective than other metallic elements such as polished steel or stainless steel. Further, the proposed stanchions would be cylindrical and would have limited flat surfaces for reflecting incoming light. In addition, the presence of existing trees along North Berkeley Avenue and along public and private roads in local neighborhoods to the north and east of Sherbeck Field would help to intercept incoming light reflected off the installed stanchions. Lastly, only six lighting stanchions would be installed, and this limited number of galvanized steel poles at Sherbeck Field would not constitute the introduction of highly reflective materials or elements to the project site and area.

In addition to calculating spill lighting from the proposed field lights, Musco assessed potential environmental glare impacts. According to Musco, the highest levels of potential glare would occur on the playing field surface of Sherbeck Field and would be contained within the boundaries of the Fullerton College campus. Some glare may be experienced by North Berkeley Avenue motorists to the immediate east of Sherbeck Field (where the road parallels the field, at a distance of approximately 375 feet) while the proposed field lights are in operation. However, clear and unimpeded views to luminaires atop the stanchions would be obscured by existing landscaping/trees installed on the Fullerton College campus to the west of North Berkeley Avenue. Due to the height of stanchions and the viewing angle provided along North Berkeley Avenue, directly viewing the newly installed lighting would require motorists to look up and at an angle that would take their eyes off the road. The curving alignment of the road, automobiles entering the roadway from college parking lots and East Brookdale Place, and the presence of automobiles parked along the road are variables requiring the focus of motorists on the road. Regarding reception of glare on residential properties to the north and east of Sherbeck Field, the Musco Lighting report indicates that properties east of North Berkeley Avenue would generally experience minimal to no glare during field lighting use.

Based on the rationale provided above, the installation of six lighting stanchions and operation of field lights would not introduce a new source of substantial glare that would adversely affect day or nighttime views in the area. Impacts would be less than significant.

Cumulative Aesthetics Impacts

In addition to buildout of the 10-year Facilities Master Plan for Fullerton College, approximately 30 proposed, in construction, or constructed development projects in the City of Fullerton were considered in the cumulative analysis scenario. As with the proposed project, cumulative development would be generally located on previously developed sites within the urban/suburban setting of the City of Fullerton. Further, cumulative development projects within the City would be subject to CEQA and would be required to evaluate potential effects on the environment, including effects on existing views and visual character. The cumulative projects would be required to comply with applicable zoning and regulations regarding scenic quality. Because the majority of cumulative projects identified in the City would occur on previously developed sites that generally support structures of similar

scale, mass, and use, the likelihood for cumulative effects to existing character and quality of particular sites and surrounding areas is low. Although none of the identified cumulative projects would entail the introduction of similar elements as the proposed project (i.e., bleachers and field lighting), proposed, in construction, and constructed development would generally be compatible with existing development in the surrounding area and would not substantially degrade the character and quality of the area. In addition, the lighting and glare impacts of the proposed project were determined to be less than significant and the vast majority of identified cumulative projects would be located on previously developed sites and would include lighting and building materials similar to that which is currently supported in the surrounding area. As such, the introduction of field lights at Sherbeck Field would not contribute to a cumulative effect on day- and nighttime views due to lighting and glare, and project impacts would not be cumulatively considerable. Therefore, the project would not contribute to a cumulative effect to visual character and quality, and nighttime light and glare.

Finding

The District finds that, based upon substantial evidence in the record, the proposed project would have a less than significant impact on aesthetics and visual resources as it relates to scenic vistas, scenic resource damage within a state scenic highway, regulations governing scenic quality, and sources of light and glare; therefore, no mitigation is required.

4.3.2 Agricultural and Forestry Resources

Prime Farmland, Unique Farmland, or Farmland of Statewide Importance

The entire project site and project vicinity are designated as urban and built-up land, pursuant to the Farmland Mapping and Monitoring Program of the California Natural Resources Agency (DOC 2017). As such, the proposed project would not convert Farmland to non-agricultural use. A parcel of Prime Farmland, located in Placentia, is located approximately 4.7 miles east of the campus and appears to contain a dirt lot on the entirety of the site. Additionally, a parcel of land designated as a mixture of Prime Farmland, Farmland of Statewide Importance, and Unique Farmland is located approximately 4.8 mile northwest of the campus in Yorba Linda (DOC 2017). The proposed project would not occur within these isolated Farmland locations, and would not result in the conversion of this land to non-agricultural use; therefore, no impact would occur.

Conflict with Existing Agricultural Zoning or Williamson Act Contract

The Williamson Act, also known as the California Land Conversion Act of 1969 (California Government Code, Section 51200 et seq.), preserves agricultural and open space lands from the conversion to urban land uses by establishing a contract between local governments and private landowners to voluntarily restrict their land holdings to agricultural or open space use. The project site is not located on any lands with Williamson Act contracts.

The Fullerton College campus, including Sherbeck Field, is designated as public land (P-L) in the City of Fullerton General Plan Land Use map (City of Fullerton 2017a), and is therefore not zoned for agricultural use. The area west of the project site consist of public land (P-L), two-family residential preservation (R-2P), limited density multifamily residential (R-3), limited density multiresidential preservation (R-3P), and central business district (C-3). The area to the north of the project site consists of single family residential (R-1), single family residential preservation (R-1P), and limited density multifamily residential (R-3) (City of Fullerton 2016a). East of the project site consists entirely of single-family residential (R-1), and south of the project site consists of office professional land (O-P) and public land (P-L) (City of Fullerton 2007). None of these zones allows agricultural uses. Additionally, according to the City of Fullerton

General Plan EIR, less than 1% (approximately 5.3 acres) of the City is devoted to agricultural uses (City of Fullerton 2012b). Therefore, the proposed project would have no impact on agriculturally zoned land.

Conflict with Existing Forestland, Timberland, or Timberland Production Zoning

The project site is designated public land. The surrounding land consists of commercial and residential uses. All construction would take place within the existing Sherbeck Field on the Fullerton College campus, and the proposed project would not conflict with existing zoning or cause rezoning of any of any forest or timberland, as none of those land types are located within the vicinity of the project site; no impact would occur.

Loss or Conversion of Forestland

The proposed project is located in an urban, developed area and is not located within or in the vicinity of forest land. The closest forests are located in Chino Hills State Park and Cleveland National Forest, approximately 5.5 miles northeast and 13.8 miles southeast, respectively, of the project site (USFS 2017). The proposed project would not contribute to the loss of forest land, and no impact would occur.

Changes in the Existing Environment Resulting in Conversion of Forestland or Farmland

No Farmland or Forestland exists within the vicinity of the proposed project site. Therefore, no Farmland or Forestland would be converted for non-agricultural or non-forest use due to the proposed project. No impact on Farmland or Forestland would occur due to the proposed project; therefore, no further analysis is required.

Cumulative Agricultural and Forestry Resource Impacts

As analyzed above, the proposed project would experience less than significant impacts related to all agricultural and forestry resource issue areas. Considering the proposed project would not be located within the vicinity of farmland or forestland, the proposed project would not combine with cumulative projects resulting in a significant impact to an agricultural or forestry resource. Therefore, impacts to agricultural and forestry resources would not be cumulatively considerable.

Finding

The District finds that, based upon substantial evidence in the record, the proposed project would have a less than significant impact on agriculture and forestry resources; therefore, no mitigation is required.

4.3.3 Air Quality

Applicable Air Quality Plan

The project site is located within the South Coast Air Basin (SCAB) and under the jurisdiction of the South Coast Air Quality Management District (SCAQMD), which is the local agency for administration and enforcement of air quality regulations for the area. SCAQMD has established criteria for determining consistency with the 2016 Air Quality

Management Plan (AQMP) in Chapter 12, Sections 12.2 and 12.3, in SCAQMD's CEQA Air Quality Handbook (SCAQMD 1993). The criteria are as follows:

- **Consistency Criterion No. 1:** The proposed project will not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay the timely attainment of air quality standards of the interim emissions reductions specified in the AQMP.
- **Consistency Criterion No. 2:** The proposed project will not exceed the assumptions in the AQMP or increments based on the year of project buildout and phase.

Consistency Criterion No. 1 – Increase in the Frequency or Severity of Violations?

As discussed in Section 2.2, the reduced project in comparison to the project analyzed in the Draft EIR would reduce the total number of spectator seating from 4,417 to 2,000 seats. Given the reduction in spectator seats, it is anticipated that criteria air pollutant emissions from mobile sources resulting from proposed project would be less than the project analyzed in the Draft EIR. As the project analyzed in the Draft EIR did not exceed any of the SCAQMD daily criteria pollutant emission's thresholds and the proposed project would result in fewer emissions than the project analyzed in the Draft EIR, the proposed project would not result in a significant impact associated with the violation of an air quality standard. Because the proposed project would not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, the project would not conflict with Consistency Criterion No. 1 of the SCAQMD CEQA Air Quality Handbook.

Consistency Criterion No. 2 – Exceed Assumptions in the AQMP?

While striving to achieve the National Ambient Air Quality Standards (NAAQS) for ozone (O₃) and fine particulate matter (PM_{2.5}) and the California Ambient Air Quality Standards (CAAQS) for O₃, coarse particulate matter (PM₁₀), and PM_{2.5} through a variety of air quality control measures, the 2016 AQMP also accommodates planned growth in the SCAB. Projects are considered consistent with, and would not conflict with or obstruct implementation of, the AQMP if the growth in socioeconomic factors (e.g., population, employment) is consistent with the underlying regional plans used to develop the AQMP (per Consistency Criterion No. 2 of the SCAQMD CEQA Air Quality Handbook). As discussed in Section 4.2.2, Relevant Plans, Policies, and Ordinances, of the Draft EIR, the demographic growth forecasts for various socioeconomic categories (e.g., population, housing, employment by industry) developed by SCAG for their 2016–2040 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), which are based on general plans for cities and counties in the SCAB, were used to estimate future emissions in the 2016 AQMP (SCAQMD 2017). Accordingly, the 2016 AQMP is generally consistent with local government plans.

The project site is zoned for Public Land (P-L); and, since the project would not change the site's zoning designations or land use designations, the project would be consistent with the existing general plan, and in turn the assumptions utilized in SCAG's RTP/SCS and SCAQMD's AQMP. Additionally, given the nature of the activity uses associated with the project, the project would not change the population, housing, or employment forecast considered by the SCAG and SCAQMD in their regional planning documents. Therefore, implementation of the proposed project would not result in a conflict with, or obstruct implementation of, the applicable air quality plan (i.e., the 2016 AQMP). Accordingly, the project would meet Consistency Criterion No. 2 of SCAQMD's CEQA Air Quality Handbook.

Cumulatively Considerable Net Increase of Criteria Pollutants

Air pollution is largely a cumulative impact. The nonattainment status of regional pollutants is a result of past and present development, and SCAQMD develops and implements plans for future attainment of ambient air quality standards. Based on these considerations, project-level thresholds of significance for criteria pollutants are relevant in the determination of whether a project's individual emissions would have a cumulatively significant impact on air quality.

When considering cumulative impacts from a proposed project in the SCAB, the analysis must specifically evaluate the project's contribution to the cumulative increase in pollutants for which the SCAB is designated as nonattainment for the CAAQS and NAAQS. If a project's emissions would exceed the SCAQMD significance thresholds, it would be considered to have a cumulatively considerable contribution to nonattainment status in the SCAB. Conversely, projects that do not exceed the project-specific thresholds are generally not considered to be cumulatively significant (SCAQMD 2003).

Construction and operation of the proposed project would result in emissions of criteria air pollutants from mobile, and area, sources, which may cause exceedances of federal and state ambient air quality standards or contribute to existing nonattainment of ambient air quality standards. The following discussion identifies potential short-term construction and long-term operational impacts that would result from implementation of the project.

Construction

Construction of the project would result in the temporary addition of pollutants to the local airshed caused by on-site sources (i.e., off-road construction equipment, soil disturbance, and VOC off-gassing) and off-site sources (i.e., vendor trucks and worker vehicle trips). Construction emissions can vary substantially from day to day depending on the level of activity, the specific type of operation, and for dust, the prevailing weather conditions. Therefore, such emission levels can only be approximately estimated with a corresponding uncertainty in precise ambient air quality impacts.

Construction criteria air pollutant emissions associated with the proposed project's temporary construction activities were quantified using the California Emissions Estimator Model (CalEEMod). For the 4,417 seat project analyzed in the Draft EIR, construction emissions were calculated for the estimated worst-case day associated with each phase of the approximately 4-month construction period and reported as the maximum daily emissions estimated during the calendar year in which construction would occur (2020). Construction schedule assumptions, including phase type, duration, and sequencing, were based on information default values provided in CalEEMod and are intended to represent a reasonable scenario based on the best information available. These assumptions remain the same for the reduced project as well.

Construction activities associated with the proposed project would not generate emissions in excess of the SCAQMD daily construction emissions thresholds for VOC, NO_x, carbon monoxide (CO), sulfur oxides (SO_x), PM₁₀, and PM_{2.5}. As such, impacts would be less than significant.

Cumulative localized impacts would potentially occur if project-related construction were to occur concurrently with construction activities associated with another, off-site project. Construction schedules for potential future projects near the project site are currently unknown; therefore, potential construction impacts associated with two or more

simultaneous projects would be speculative.⁵ However, future projects would be subject to air quality analysis prepared in accordance with CEQA and, where necessary (i.e., the project exceeds SCAQMD thresholds), mitigation. Criteria air pollutant emissions associated with construction activity of future projects also would be reduced through implementation of control measures required by SCAQMD. For example, cumulative PM₁₀ and PM_{2.5} emissions would be reduced because all future projects would be subject to SCAQMD Rule 403 (Fugitive Dust), which sets forth general and specific requirements for all construction sites in the SCAQMD. Based on the previous considerations, the project would not result in a cumulatively considerable localized increase in emissions of nonattainment pollutants. Impacts would be less than significant.

Operational

The proposed project involves the operation of a press box, lighting, sound system, and permanent bleachers, as well as expanded use of Sherbeck Field. Operation of the project would generate VOC, NO_x, CO, SO_x, PM₁₀, and PM_{2.5} emissions from mobile sources, including vehicle trips from students and event attendees; area sources, including the use of consumer products, architectural coatings for repainting, and landscape maintenance equipment; and energy sources, including electricity for the lighting and sound systems as well as the press box and storage building.

In the Draft EIR, pollutant emissions associated with long-term operations were quantified using CalEEMod. CalEEMod default values were used to estimate emissions from the project area sources. Energy source emissions were based on CalEEMod defaults and information provided by the District to account for the energy demand of the lighting stations and sound system. Mobile source and on-site road vehicular emissions associated with the project analyzed in the Draft EIR were modeled using the trip-generation rates from the project's traffic impact analysis. The proposed project would reduce spectator seating compared to the larger project analyzed in the Draft EIR. This would in turn reduce the trip generation and mobile emissions associated with the proposed project compared to the project analyzed in the Draft EIR. As the project analyzed in the Draft EIR did not exceed the SCAQMD thresholds or VOC, NO_x, CO, SO_x, PM₁₀, or PM_{2.5}, it is anticipated the proposed project would also not exceed the SCAQMD thresholds. Therefore, impacts during operation of the proposed project would be less than significant.

Under the "South Coast Air Basin Attainment Classification," the SCAB has been designated as a federal nonattainment area for O₃ and PM_{2.5} and a state nonattainment area for O₃, PM₁₀, and PM_{2.5}. The nonattainment status is the result of cumulative emissions from various sources of air pollutants and their precursors within the SCAB, including motor vehicles, off-road equipment, and commercial and industrial facilities. Construction and operation of the project would generate VOC and NO_x emissions (which are precursors to O₃) and emissions of PM₁₀ and PM_{2.5}. However, project-generated construction and operational emissions, respectively, would not exceed the SCAQMD emission-based significance thresholds for VOC, NO_x, PM₁₀, or PM_{2.5}.

Based on the previous considerations, the proposed project would not result in a cumulatively considerable increase in emissions of nonattainment pollutants. Impacts would be less than significant.

Expose Sensitive Receptors to Substantial Pollutant Concentrations

Localized Significance Thresholds Analysis

Sensitive receptors are those individuals more susceptible to the effects of air pollution than the population at large. According to SCAQMD, sensitive receptors include residences, schools, playgrounds, childcare centers, long-

⁵ The CEQA Guidelines state that if a particular impact is too speculative for evaluation, the agency should note its conclusion and terminate discussion of the impact (14 CCR 15145). This discussion is nonetheless provided in an effort to show good-faith analysis and comply with CEQA's information disclosure requirements.

term healthcare facilities, rehabilitation centers, convalescent centers, and retirement homes (SCAQMD 1993). The project is located in close proximity to several single-family homes, which are approximately 85 feet to the east of the project site.

An LST analysis was prepared to determine potential impacts to nearby sensitive receptors during construction of the project in the Draft EIR. The impacts of the proposed project were analyzed using methods consistent with those in the SCAQMD's Final LST Methodology (SCAQMD 2008). According to the localized significance thresholds analysis of the EIR, construction activities would not generate emissions in excess of site-specific localized significance thresholds. Due to the reduction in spectator seating, the proposed project is anticipated to result in similar if not reduced emissions during construction compared to the project analyzed Draft EIR. Therefore, site-specific construction impacts during construction of the proposed project would be less than significant.

Carbon Monoxide Hotspots

Mobile source impacts occur on two scales of motion. Regionally, project-related travel would add to regional trip generation and increase the vehicle miles traveled within the local air shed and the SCAB. Locally, project-generated traffic would be added to the City of Fullerton's roadway system near the project site. If such traffic occurs during periods of poor atmospheric ventilation, is composed of a large number of vehicles cold-started and operating at pollution-inefficient speeds, and operates on roadways already crowded with non-project traffic, there is a potential for the formation of microscale CO hotspots in the area immediately around points of congested traffic. Because of continued improvement in vehicular emissions at a rate faster than the rate of vehicle growth and/or congestion, the potential for CO hotspots in the SCAB is steadily decreasing.

Projects contributing to adverse traffic impacts may result in the formation of CO hotspots. To verify that the proposed project would not cause or contribute to a violation of the CO standard, a screening evaluation of the potential for CO hotspots was conducted. The potential for CO hotspots was evaluated based on the results of the project-specific traffic impact analysis and in accordance with Caltrans Institute of Transportation Studies' CO Protocol (Caltrans 2010). CO hotspots are typically evaluated when (1) the level of service (LOS) of an intersection decreases to LOS E or worse; (2) signalization and/or channelization is added to an intersection; and (3) sensitive receptors such as residences, schools, and hospitals are located in the vicinity of the affected intersection or roadway segment.

Based on the CO hotspot screening evaluation, the intersections that exceeded the CO hotspot screening criteria shown above all have similar geometries and are signalized. Therefore, three intersections with an LOS of F that exceeded the CO hotspot screening criteria were evaluated. The potential impact of the project on local CO levels was assessed at this intersection with the Caltrans CL4 interface based on the California LINE Source Dispersion Model (CALINE4), which allows microscale CO concentrations to be estimated along each roadway corridor or near intersections.

The maximum CO concentration measured at the Anaheim monitoring station over the last 3 years was 6.1 parts per million, which was measured in 2017. The 1-hour average CO concentration was added the ambient concentration to compare to the CAAQS. The 8-hour average CO concentration was added to the SCAQMD 8-hour CO ambient concentration of 4.6 parts per million for 2017 from the Anaheim monitoring station to compare to the CAAQS.

The maximum CO concentration predicted for the 1-hour averaging period at the studied intersections would be 4.1 ppm, which is below the 1-hour CO CAAQS of 20 ppm (CARB 2016). The maximum predicted 8-hour CO concentration of 2.90 ppm at the studied intersections would be below the 8-hour CO CAAQS of 9.0 ppm (CARB 2016). Neither the 1-hour nor 8-hour CAAQS would be equaled or exceeded at any of the intersections studied.

Accordingly, the project would not cause or contribute to violations of the CAAQS, and would not result in exposure of sensitive receptors to localized high concentrations of CO. As such, impacts would be less than significant to sensitive receptors with regard to potential CO hotspots resulting from project contribution to cumulative traffic-related air quality impacts.

Health Effects of Other Criteria Air Pollutants

Construction and operational emissions of the proposed project would not exceed the SCAQMD thresholds for any criteria air pollutants, including VOC, NO_x, CO, SO_x, PM₁₀, and PM_{2.5}.

Health effects associated with O₃ include respiratory symptoms, worsening of lung disease leading to premature death, and damage to lung tissue (CARB 2019). VOCs and NO_x are precursors to O₃, for which the SCAB is designated as nonattainment with respect to the NAAQS and CAAQS. The contribution of VOCs and NO_x to regional ambient O₃ concentrations is the result of complex photochemistry. The increases in O₃ concentrations in the SCAB due to O₃ precursor emissions tend to be found downwind of the source location because of the time required for the photochemical reactions to occur. Further, the potential for exacerbating excessive O₃ concentrations would also depend on the time of year that the VOC emissions would occur, because exceedances of the O₃ NAAQS and CAAQS tend to occur between April and October when solar radiation is highest. Due to the lack of quantitative methods to assess this complex photochemistry, the holistic effect of a single project's emissions of O₃ precursors is speculative. That being said, because the proposed project would not exceed the SCAQMD thresholds and would be subject to applicable rules and regulations for the reduction of O₃ precursors (e.g., SCAQMD Rule 1113, Architectural Coatings), the proposed project would not contribute to health effects associated with O₃.

Health effects associated with NO_x include lung irritation and enhanced allergic responses (CARB 2019). Because project-related NO_x emissions would not exceed the SCAQMD mass daily thresholds, and because the SCAB is a designated attainment area for NO₂ and the existing NO₂ concentrations in the area are well below the NAAQS and CAAQS standards, it is not anticipated that the proposed project would contribute to exceedances of the NAAQS and CAAQS for NO₂ or result in potential health effects associated with NO₂ and NO_x.

Health effects associated with CO include chest pain in patients with heart disease, headache, light-headedness, and reduced mental alertness (CARB 2019). CO tends to be a localized impact associated with congested intersections. The associated potential for CO hotspots was discussed previously and determined to be less than significant. Thus, the project's CO emissions would not contribute to significant health effects associated with this pollutant.

Health effects associated with PM₁₀ include premature death and hospitalization, primarily for worsening of respiratory disease (CARB 2019). Construction and operation of the project would not exceed thresholds for PM₁₀ or PM_{2.5}, would not contribute to exceedances of the NAAQS and CAAQS for particulate matter, and would not obstruct the SCAB from coming into attainment for these pollutants. The project would also not result in substantial DPM emissions during construction and operation. Additionally, the project would be required to comply with SCAQMD Rule 403, which limits the amount of fugitive dust generated during construction. Due to the minimal contribution of particulate matter during construction and operation, the project is not anticipated to result in health effects associated with PM₁₀ or PM_{2.5}.

In summary, construction and operation of the proposed project would not result in exceedances of the SCAQMD significance thresholds for criteria pollutants, and potential health effects associated with criteria air pollutants would be less than significant.

Health Impacts of Toxic Air Contaminants

Project impacts may result from emissions of pollutants identified by the state and federal government as TACs or HAPs, respectively.

The greatest potential for TAC emissions during construction would be DPM emissions from heavy equipment operations and heavy-duty trucks during construction of the project and the associated health impacts to sensitive receptors. The closest sensitive receptors are existing residences located approximately 85 feet from the project site's eastern boundary. Maximum daily particulate matter (PM₁₀ or PM_{2.5}) emissions generated by construction equipment operation during site preparation (exhaust particulate matter, or DPM), combined with fugitive dust generated by equipment operation and vehicle travel, would be well below the SCAQMD significance thresholds. Moreover, total construction of the project would last approximately 4 months, after which project-related TAC emissions would cease.

No residual TAC emissions and corresponding cancer risk are anticipated after construction, and no long-term sources of TAC emissions are anticipated during operation of the project. Thus, the project would not result in a long-term (i.e., 9-year, 30-year, or 70-year) source of TAC emissions. Therefore, the exposure of sensitive receptors to project-related TAC emission impacts would be less than significant.

Other Emissions

The occurrence and severity of potential odor impacts depends on numerous factors. The nature, frequency, and intensity of the source; the wind speeds and direction; and the sensitivity of receiving location each contribute to the intensity of the impact. Although offensive odors seldom cause physical harm, they can be annoying and cause distress among the public and generate citizen complaints.

Odors would potentially be generated from vehicles and equipment exhaust emissions during construction of the project. Potential odors produced during construction would result from concentrations of unburned hydrocarbons from tailpipes of construction equipment, architectural coatings, and asphalt pavement application. Such odors would disperse rapidly from the project site and generally occur at magnitudes that would not affect substantial numbers of people. Therefore, impacts associated with odors during construction would be less than significant.

Land uses and industrial operations associated with odor complaints include agricultural uses, wastewater treatment plants, food-processing plants, chemical plants, composting operations, refineries, landfills, dairies, and fiberglass molding facilities (SCAQMD 1993). The project entails operation of a sports field and would not result in the creation of a land use that is commonly associated with odors. Therefore, project operations would result in an odor impact that would be less than significant.

Cumulative Air Quality Impact

Based on the cumulative nature of air quality impacts, cumulative impacts to air quality are addressed above under 'Cumulatively Considerable Net Increase of Criteria Pollutants.' Cumulative localized impacts would potentially occur if project-related construction were to occur concurrently with construction activities associated with another, off-site project. Construction schedules for potential future projects near the project site are currently unknown; therefore, potential construction impacts associated with two or more simultaneous projects would be speculative. However, future projects would be subject to air quality analysis prepared in accordance with CEQA and, where necessary (i.e., if the project exceeds SCAQMD thresholds), mitigation. Criteria air pollutant emissions associated with construction activity of future projects also would be reduced through implementation of control measures required by SCAQMD. With regard to operational cumulative impacts associated with nonattainment pollutants, the nonattainment status is the result of cumulative emissions from various sources of air pollutants

and their precursors within the SCAG, including motor vehicles, off-road equipment, and commercial and industrial facilities. Project-generated construction and operational emissions, respectively, would not exceed the SCAQMD emission-based significance thresholds for VOC, NO_x, PM₁₀, or PM_{2.5}. Therefore, the proposed project would not result in a cumulatively considerable contribution to the nonattainment pollutants in the SCAB, and this impact would be less than significant.

Finding

The District finds that, based upon substantial evidence in the record, the proposed project would have a less than significant impact on air quality as it relates to an applicable air quality plan, a cumulatively considerable net increase of criteria pollutants, an exposure of sensitive receptors to substantial pollution concentration, other emissions, and a cumulative air quality impact; therefore, no mitigation is required.

4.3.4 Biological Resources

Candidate, Sensitive, or Special-Status Species

According to the general biological investigation, which was prepared and included in the Draft EIR, no special-status species were observed within the study area during the site visit. The project site does not support any special-status plant species. Based on the species ranges, the types of land covers (i.e., developed, ornamental, ruderal, and transportation), and the soils present on site, there is no potential for special-status plant species to occur. A total of 50 special-status wildlife species were reported in the California Natural Diversity Database and U.S. Fish and Wildlife Service's environmental online system as occurring in the vicinity of the study area. However, no special-status wildlife species were observed within the study area during the site visit. Therefore, based on the lack of suitable habitat and the developed nature of the study area, there would be no direct or indirect impacts associated with special-status plant species.

The project site does not support any special-status wildlife species. Based on the species ranges, the types of land covers (i.e., developed, ornamental, ruderal, and transportation), and the soils present on site, there is no potential for special-status wildlife species to occur. A total of 50 special-status wildlife species were reported in the California Natural Diversity Database and U.S. Fish and Wildlife Service's environmental online system as occurring in the vicinity of the study area. However, no special-status wildlife species were observed within the study area during the site visit. Therefore, based on the lack of suitable habitat and the developed nature of the study area, there would be no direct or indirect impacts to special-status wildlife species.

Because the study area is composed of ornamental landscaping that supports mature trees, there are limited nesting habitats for raptors. Foraging opportunities may occur outside the project site within the ruderal grassland areas. No raptor species were observed within the study area during the site visit. Although the proposed project would not involve the removal or substantial trimming of trees, the proposed project would be required to comply with the Migratory Bird Treaty Act to reduce impacts to nesting bird habitat. Upon compliance with the Migratory Bird Treaty Act, impacts to candidate, sensitive, or special-status species would be less than significant.

Riparian Habitat or Sensitive Natural Community

Sherbeck Field site consists of developed land, ornamental plantings, and transportation uses. These are not natural vegetation communities considered sensitive by the California Department of Fish and Wildlife or the U.S. Fish and Wildlife Service. The project site is not located in riparian habitat or a sensitive natural community, and the project would not have an adverse effect on these habitats. Therefore, no impacts would occur.

Protected Wetlands

The project site does not support any aquatic resources regulated by the Army Corps of Engineers or the California Department of Fish and Wildlife as jurisdictional wetlands, “waters of the U.S.,” or “waters of the State.” No drainages were observed within the study area. The closest aquatic resource is Brea Creek (concrete box channel or wash) located 0.12 miles to the west of Fullerton College at its closest approach. Therefore, the proposed project would have no adverse effect on federally protected wetlands.

Interfere with the Movement of any Native Resident or Migratory Fish or Wildlife Species

No wildlife corridors or habitat linkages were identified near the general biological investigation study area. Given the extent of existing development north, east, south, and west of the project site and the Fullerton College campus’ location between several busy vehicular thoroughfares, the study area is expected to support limited wildlife movement, and lacks intact connectivity to other major habitat reserve areas. Therefore, the proposed project would have a less than significant impact on the migratory movement of any wildlife species. No impacts would occur.

Local Policies or Ordinances Protecting Biological Resources

Dudek contacted the City on October 10, 2016 to determine the potential locations of landmark trees within the study area. The City stated that there are currently no official landmark trees as designated by the past or present City Council decree. Therefore, there are no landmark trees within the study area or project site, and there would be no impact.

Habitat Conservation Plan, Natural Community Conservation Plan, or other Conservation Plan

Exhibit 25 of the City of Fullerton General Plan does not identify habitat conservation areas within the vicinity of the project site (City of Fullerton 2012c). The project site is not identified on a regional or state conservation plan. Consequently, the project would not conflict with provisions of an adopted habitat conservation plan or natural community conservation plan. There would be no impact.

Cumulative Biological Resources Impacts

A significant adverse cumulative biological resources impact would occur where the construction or operation of the cumulative projects would encroach into areas containing sensitive biological resources, affect the movement of wildlife species, or affect the functionality of a planned conservation area. The proposed project would take place in a highly urbanized area in the city. Developed and previously disturbed areas dominate the study area and include impervious surfaces and ornamental landscaping. Overall wildlife abundance and species richness appear to be low because of the urbanized nature of the study area. No special-status plant species were identified during the biological evaluation.

Projects surrounding the Fullerton College campus may have birds protected under the Migratory Bird Treaty Act but these determinations would be made on a case-by-case basis, and the effects of cumulative development on nesting birds would be mitigated to the extent feasible in accordance with CEQA and other applicable legal requirements. Therefore, cumulative adverse effects on species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service would be less than significant.

Finding

The District finds that, based upon substantial evidence in the record, the proposed project would have a less than significant impact on biological resources as it relates to a candidate or special-status species, riparian habitat, or sensitive natural community; protected wetlands; the interference with the movement of any native resident or migratory fish or wildlife species; local policies or ordinances protecting biological resources; a habitat conservation plan, natural community conservation, plan, or other conservation plan; and cumulative impacts to biological resources. Therefore, no mitigation is required.

4.3.5 Cultural Resources

Historical Resources

As part of the Cultural Resources Report, which was prepared and included as part of the Draft EIR, documents and photos available online through the Fullerton College library, available reports and historic documents on file with Fullerton College or the District, local newspapers, historic aerials, and other sources of information regarding the history and development of the campus were reviewed. In addition, a California Historical Resources Information System (CHRIS) records search of the Fullerton College campus and a 0.5-mile radius at the South Central Coastal Information Center occurred on December 14, 2016. The CHRIS search included a review of the National Register of Historic Places, the California Register of Historical Resources (CRHR), the California Points of Historical Interest list, the California Historical Landmarks list, the Archaeological Determinations of Eligibility list, and the California State Historic Resources Inventory list.

The Cultural Resources Report did not identify Sherbeck Field or any of its components as historical resources under CEQA. In addition, the proposed project would not involve demolition, relocation, or alteration of any structures. Therefore, no impacts to historical resources would occur

Archaeological Resources

No archaeological resources were identified on or adjacent to the project site as a result of the CHRIS records search or the Native American coordination efforts. However, it is always possible that intact archaeological deposits are present at subsurface levels and could be uncovered during ground-disturbing activities. Therefore, in the event that archaeological resources (sites, features, or artifacts) are exposed during construction activities for the proposed project, all construction work occurring within 100 feet of the find would be required to immediately stop until a qualified archaeologist, meeting the Secretary of the Interior's Professional Qualification Standards, can evaluate the significance of the find and determine whether additional study is warranted, as required by California Public Resources Code, Section 21082. Depending on the significance of the find under CEQA, the archaeologist may simply record the find and allow work to continue. If the discovery proves significant under CEQA, additional work, such as preparation of an archaeological treatment plan, testing, or data recovery, may be warranted. If any unanticipated archaeological resources are discovered during project construction, they would be handled in accordance with all applicable laws regulating archaeological resources; therefore, impacts would be less than significant.

Paleontological Resource

According to the Los Angeles County History Museum records search results (McLeod 2016), there are no documented fossil localities within a 1-mile radius of the Fullerton College campus. Geological mapping and

geotechnical investigations indicate that the site is underlain by Quaternary alluvium, including older, Pleistocene-age deposits anticipated at depth, and the Pleistocene La Habra Formation at the surface in the northwestern Fullerton College campus. Older Pleistocene alluvium and the La Habra Formation have produced numerous plant and animal fossils in the region; therefore, these geological units should be considered to have a high potential to contain significant paleontological resources (McLeod 2016). However, Quaternary alluvium is too young to yield fossils. Proposed excavation would reach a depth of up to 3 feet. Because only Quaternary alluvium is present at a depth of 3 feet at the project site, project construction is not anticipated to encounter paleontological resources. Therefore, impacts associated with paleontological resources are less than significant.

Disturbance of Human Remains

There is no evidence of human remains on the project site, and the potential for the inadvertent discovery of human remains on the project site is very low because there is no evidence of any historical camps or human settlement on the site. Additionally, existing regulations through California Health and Safety Code, Section 7050.5, et seq. state that if human remains are discovered during project construction, no further disturbance shall occur until the Orange County coroner has made the necessary findings as to origin. Further, pursuant to California Public Resources Code, Section 5097.98(b), remains shall be left in place and free from disturbance until a final decision as to the treatment and disposition has been made (California Public Resources Code, Section 5097.9 et seq.). If the county coroner determines the remains to be Native American, the Native American Heritage Commission shall be contacted within a reasonable time. Subsequently, the Native American Heritage Commissions shall identify the Most Likely Descendant. The Most Likely Descendant shall then make recommendations and engage in consultations concerning the treatment of the remains as provided in California Public Resources Code, Section 5097.98. Given the very low potential for human remains on the project site and required compliance with existing regulations pertaining to the discovery of human remains, the proposed project would result in less than significant impacts to human remains.

Cumulative Cultural Resources Impact

Cumulative impacts on cultural resources evaluate whether impacts of the proposed project and related projects, when taken as a whole, substantially diminish the number of cultural resources within the same or similar context or property type. As analyzed above, the proposed project would experience less than significant impacts related to all cultural resource issue areas. In the event that related projects would result in potentially significant impacts to cultural resources, then the proposed project would contribute to cumulatively considerable impacts. These determinations would be made on a case-by-case basis, and the effects of cumulative development on cultural resources would be mitigated to the extent feasible, in accordance with CEQA and other applicable legal requirements. Therefore, impacts to cultural resources would not be cumulatively considerable.

Finding

The District finds that, based upon substantial evidence in the record, the proposed project would have a less than significant impact on cultural resources as it relates to historical resources, archaeological resources, paleontological resources, and the disturbance of human remains; therefore, no mitigation is required.

4.3.6 Geology and Soils

Expose People or Structures to Fault Rupture, Strong Seismic Ground Shaking, Liquefaction, or Landslides

The project site is located in the La Habra Quadrangle. No active fault lies directly underneath the project site; however, the Whittier Fault Zone is located 4.5 miles northeast of the proposed project site (DOC 2010). Due to the proximity to this fault zone, the project site could be vulnerable to the effects of fault rupture, but the potential for direct surface ground rupture is considered very unlikely (Geotechnical Solutions Inc. 2018). In addition, the proposed project would occur entirely within the existing Sherbeck Field and would involve construction of only small structures and improvements, including bleachers, lighting stanchions, a press box, and a storage building. All improvements would be designed, fabricated, and constructed in accordance with applicable seismic standards and regulations, including the Division of the State Architect requirements and the California Building Standards Code. These codes impose design standards and requirements that seek to minimize the damage associated with seismic events. With adherence to applicable standards and regulations, the proposed project would not expose people or structures to substantial adverse risks associated with fault rupture or seismic ground shaking. The project site is also not identified as susceptible to liquefaction or landslides according to Exhibit 27 of the City of Fullerton General Plan Natural Environment Element (City of Fullerton 2012c) and has been identified as outside a potential liquefaction zone (Geotechnical Solutions Inc. 2018). For these reasons, the potential impacts of the proposed project would be less than significant.

Soil Erosion or Loss of Topsoil

Grading associated with the proposed project would consist of over-excavation within the bleacher areas, ramp areas, storage building area, and within proposed paved areas to a depth of 3 feet. Thus, the proposed project would involve minimal excavation and grading activities that would expose soils. As such, the proposed project would comply with the measures outlined in the District's Storm Water Management Plan (SWMP) (Ninyo & Moore 2015). The SWMP requires that the construction management team or contractor inspect the project site on a weekly basis to prevent erosion and stormwater runoff from occurring. Additionally, project construction would be subject to erosion best management practices (BMPs). Therefore, impacts related to soil erosion or loss of topsoil would be less than significant.

Located on or Would Cause Unstable Soil

The project site is located in Southern California, which is an area that is generally seismically active. The project site's proximity to various faults, as previously described, means that there is an unavoidable potential for the geologic unit to become unstable. However, the proposed project site is not underlain by any known earthquake faults. The project site is also not identified as susceptible to liquefaction or landslides according to Exhibit 27 of the City of Fullerton General Plan Natural Environment Element (City of Fullerton 2012c) and has been identified as outside a potential liquefaction zone (Geotechnical Solutions Inc. 2018). Additionally, the scope of project improvements is relatively limited and would involve construction of only small structures and improvements, including bleachers, lighting stanchions, a press box, and a storage building, which do not have the potential to cause the geologic unit to become unstable. The proposed project would be designed, fabricated, and constructed in accordance with applicable seismic standards and regulations, including the Division of the State Architect requirements and the California Building Standards Code, which would minimize damage if the geologic unit becomes unstable. Therefore, the proposed project would not result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.

Located on Expansive Soil

The underlying soil on the project site is classified as very low expansive soil (Geotechnical Solutions Inc. 2018). Nonetheless, the scope of the project improvements is relatively limited and would result in new installations rather than new building construction. Additionally, the proposed project would comply with the Uniform Building Code of 1994 (now the International Building Code), which would minimize risks to life and property in relation to expanding soils. Therefore, the proposed project would not create a substantial risk to life or property as a result of being located on expansive soils; and impacts would be less than significant.

Soils Incapable of Supporting Septic Tanks

The proposed project does not include septic tanks or alternative wastewater disposal systems; therefore, no impact would occur.

Cumulative Geological Resource or Soil Impact

The geographic extent considered for potential cumulative impacts to people and structures related to geologic and seismic hazards is localized and site-specific. The proposed project would experience less than significant impacts related to all geological and soil issue areas. Impacts related to earthquakes and adverse soil conditions would be less than significant as a result of the required compliance with applicable building codes and geologic hazard regulations. Geologic/soil issues relate to local, site-specific soil conditions, ground response to earthquakes, and the potential for adverse soil conditions to damage the project's structural components. Although impacts identified as less than significant can compound to generate a significant cumulative impact, the geology and soils impacts of the proposed project are not cumulative in nature. The only projects in the cumulative scenario that would contribute to or compound the identified impacts would be those that are overlapping or adjacent to the proposed project. Such projects would likewise be subject to the CBC and geologic hazard regulations, and would, thus, be designed and constructed to avoid substantial adverse impacts with respect to geology, soils, and seismic hazards. For this reason, cumulative impacts with respect to geologic and seismic hazards would be less than significant.

Finding

The District finds that, based upon substantial evidence in the record, the proposed project would have a less than significant impact on geological resources or soils; therefore, no mitigation is required.

4.3.7 Greenhouse Gas Emissions

Generation of Greenhouse Gas Emissions

The CEQA Guidelines do not prescribe specific methodologies for performing an assessment, do not establish specific thresholds of significance, and do not mandate specific mitigation measures. Rather, the CEQA Guidelines emphasize the lead agency's discretion to determine the appropriate methodologies and thresholds of significance consistent with the manner in which other impact areas are handled in CEQA (CNRA 2009). To address impacts associated with greenhouse gas (GHG) emissions generated by the proposed project, the analysis conducted as part of the Draft EIR uses the SCAQMD recommended (not adopted) numeric CEQA significance thresholds for GHG emissions for lead agencies to use in assessing GHG impacts of residential and commercial development projects. The proposed project's net GHG emissions was conservatively compared to the SCAQMD recommendation of a project-level screening threshold for commercial projects 1,400 metric tons carbon dioxide equivalent (MT CO₂e) per year.

Construction of the proposed project would result in GHG emissions that would primarily be associated with the use of off-road construction equipment, on-road hauling and vendor trucks, and worker vehicles. Per the SCAQMD guidance, construction emissions should be amortized over the operational life of the project, which is assumed to be 30 years, and added to the total operational emissions for comparison with the GHG significance threshold of 1,400 MT CO_{2e} per year (SCAQMD 2009).

The larger project analyzed in the Draft EIR estimated total GHG emissions during construction would be approximately 176 MT CO_{2e} in 2020. Estimated project-generated construction emissions amortized over 30 years would be approximately 6 MT CO_{2e} per year. The proposed project is anticipated to result in similar if not reduced use of off-road and vehicular equipment. As with project-generated construction criteria air pollutant emissions, GHG emissions generated during construction of the project would be short term in nature, lasting only for the duration of the construction period, and would not represent a long-term source of GHG emissions.

Operation of the proposed project would generate GHG emissions through motor vehicle trips to and from the project site; landscape maintenance equipment operation; energy use (natural gas and generation of electricity consumed by the project); solid waste disposal, and generation of electricity associated with water supply, treatment, and distribution and wastewater treatment. The larger project analyzed in the Draft EIR estimated annual project-generated operational emissions in 2020 plus amortized project construction emissions would be approximately 1,067 MT CO_{2e} per year. As discussed in Section 2.2 the proposed project would provide 55% less spectator seating than the scenario analyzed in the Draft EIR. Therefore it is anticipated that the proposed project would result in a reduced amount of annual project-generated operational emissions in 2020 plus amortized project construction emissions as compared to the larger project analyzed in the Draft EIR, and therefore would not exceed the proposed SCAQMD threshold of 1,400 MT CO_{2e} for commercial sources. As a result, compared to SCAQMD's threshold, the proposed project would have a less than significant on GHG emissions.

Conflict with an Applicable Plan, Policy, or Regulation

Consistency with the City Climate Action Plan

The City adopted its Climate Action Plan (CAP) in February 2012, which is a long-range plan to reduce GHG emissions from municipal operations and community activities within the City. The CAP would also help the City adapt to effects of climate change. The City is committed to reducing its GHG emissions by 15% below 2009 levels by 2020, consistent with AB 32.

To reduce City-wide GHG emissions, the CAP identifies a series of climate action strategies that guide the City in four focus areas (transportation and mobile strategy, energy and conservation strategy, water use and efficiency strategy, and solid waste and recycling strategy) (City of Fullerton 2012a). However, most of the measures outlined in the CAP would not be directly applicable to the proposed project and are intended for the City to implement. Measures applicable to the proposed project include compliance with green building standards identified in Title 24, installation of energy-efficient lighting and equipment, and diversion of construction and demolition debris. For solid waste, the proposed project would comply with the 75% waste diversion requirement consistent with AB 341. Therefore, the proposed project would not conflict with the City's CAP.

Consistency with the SCAG 2016 RTP/SCS

SCAG's 2016 RTP/SCS is a regional growth-management strategy that targets per capita GHG reduction from passenger vehicles and light-duty trucks in the Southern California region. The 2016 RTP/SCS incorporates local land use projections and circulation networks in city and county general plans. The 2016 RTP/SCS is not directly

applicable to the proposed project because the underlying purpose of the 2016 RTP/SCS is to provide direction and guidance by making the best transportation and land use choices for future development. In this case, the proposed project involves focused improvements to an existing athletic field that would enhance its athletic, academic and institutional functionalities, and does not propose to site a new land use in a new location. However, development of the proposed project would support goals of the 2016 RTP/SCS by using energy-efficient design, including conforming to the CALGreen code and installing low-flow plumbing fixtures. Additionally, the proposed project is located near existing bus routes, which allows for the use of multimodal transportation options by users of and visitors to the field.

Consistency with the CARB Scoping Plan

The Scoping Plan, approved by CARB in 2008 and updated in 2014 and 2017, provides a framework for actions to reduce California’s GHG emissions and requires CARB and other state agencies to adopt regulations and other initiatives to reduce GHG emissions. The Scoping Plan also requires CARB and other state agencies to adopt regulations and other initiatives to reduce GHGs. The Scoping Plan is not directly applicable to specific projects, nor is it intended to be used for project-level evaluations.⁶ Under the Scoping Plan, however, there are several state regulatory measures aimed at the identification and reduction of GHG emissions. CARB and other state agencies have adopted many of the measures identified in the Scoping Plan. Most of these measures focus on area source emissions (e.g., energy usage, high-GWP GHGs in consumer products) and changes to the vehicle fleet (i.e., hybrid, electric, and more fuel-efficient vehicles) and associated fuels (e.g., Low Carbon Fuel Standard), among others.

The Scoping Plan recommends strategies for implementation at the statewide level to meet the goals of AB 32 and establishes an overall framework for the measures that will be adopted to reduce California’s GHG emissions. The proposed project would be consistent with the applicable strategies and measures in the Scoping Plan. As such, the proposed project would not conflict with the Scoping Plan.

The proposed project also would not impede the attainment of the GHG reduction goals for 2030 or 2050 identified in Executive Order (EO) S-3-05 and Senate Bill (SB) 32. EO S-3-05 establishes the following goals: GHG emissions should be reduced to 2000 levels by 2010, to 1990 levels by 2020, and to 80% below 1990 levels by 2050. SB 32 establishes for a statewide GHG emissions reduction target whereby CARB, in adopting rules and regulations to achieve the maximum technologically feasible and cost-effective GHG emissions reductions, shall ensure that statewide GHG emissions are reduced to at least 40% below 1990 levels by December 31, 2030. While there are no established protocols or thresholds of significance for that future year analysis, CARB forecasts that compliance with the current Scoping Plan puts the state on a trajectory toward meeting these long-term GHG goals, although the specific path to compliance is unknown (CARB 2014).

To begin, CARB has expressed optimism with regard to both the 2030 and 2050 goals. It states in the First Update that “California is on track to meet the near-term 2020 GHG emissions limit and is well positioned to maintain and continue reductions beyond 2020 as required by AB 32” (CARB 2014). With regard to the 2050 target for reducing GHG emissions to 80% below 1990 levels, the First Update states the following (CARB 2014):

This level of reduction is achievable in California. In fact, if California realizes the expected benefits of existing policy goals (such as 12,000 megawatts of renewable distributed generation by 2020, net zero energy homes after 2020, existing building retrofits under AB 758, and others) it could

⁶ The Final Statement of Reasons for the amendments to the CEQA Guidelines reiterates the statement in the Initial Statement of Reasons that “[t]he Scoping Plan may not be appropriate for use in determining the significance of individual projects because it is conceptual at this stage and relies on the future development of regulations to implement the strategies identified in the Scoping Plan” (CNRA 2009).

reduce emissions by 2030 to levels squarely in line with those needed in the developed world and to stay on track to reduce emissions to 80% below 1990 levels by 2050. Additional measures, including locally driven measures and those necessary to meet federal air quality standards in 2032, could lead to even greater emission reductions.

In other words, CARB believes that the state is on a trajectory to meet the 2030 and 2050 GHG reduction targets set forth in AB 32, SB 32, and EO S-3-05. This is confirmed in the 2017 Scoping Plan, which states (CARB 2017):

This Scoping Plan builds upon the successful framework established by the Initial Scoping Plan and First Update, while identifying new, technologically feasible, and cost-effective strategies to ensure that California meets its GHG reduction targets in a way that promotes and rewards innovation, continues to foster economic growth, and delivers improvements to the environment and public health, including in disadvantaged communities.

The proposed project would not interfere with implementation of any of the above-described GHG reduction goals for 2030 or 2050 because the project would not exceed SCAQMD's recommended draft interim threshold of 1,400 MT CO_{2e} per year (SCAQMD 2008). Additionally, the proposed project would not change the existing land use and would improve the existing facilities at the project site to better serve the college's needs, thereby reducing the need for the campus to use off-site facilities and amenities to accommodate its operations. This analysis provides support for the conclusion that the project would not impede the state's trajectory toward the above-described statewide GHG reduction goals for 2030 or 2050.

In addition, because the specific path to compliance for the state with regard to long-term goals will likely require development of technology or other changes that are not currently known or available, specific additional mitigation measures for the proposed project would be speculative and cannot be identified at this time. The project's consistency with the Scoping Plan would assist in meeting the City's contribution to GHG emission reduction targets in California. With respect to future GHG targets under SB 32 and EO S-3-05, CARB has also made clear its legal interpretation that it has the requisite authority to adopt whatever regulations are necessary, beyond the AB 32 horizon year of 2020, to meet SB 32's 40% reduction target by 2030 and EO S-3-05's 80% reduction target by 2050; this legal interpretation by an expert agency provides evidence that future regulations will be adopted to continue the state on its trajectory toward meeting these future GHG targets. Based on the above considerations, the proposed project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs, and no mitigation is required. This impact would be less than significant.

Cumulative GHG Impacts

GHG and climate changes impacts are by nature considered cumulative. The proposed project's contribution to global GHG emissions and the resultant effect on global climate should thus be evaluated on a cumulative basis. Under CEQA, a project would have a significant cumulative impact caused by the combined impact of past, present, and probable future projects if its incremental impact represents a "cumulatively considerable" contribution to such cumulative impacts (14 CCR 15064(h)). The proposed project would reduce spectator seating compared to the larger project analyzed in the Draft EIR. This would in turn reduce the trip generation and mobile emissions associated with the proposed project compared to the project analyzed in the Draft EIR. As the project analyzed in the Draft EIR would generate GHG emissions that would not contribute to potential cumulative impacts of GHG emissions on climate change, it is anticipated the proposed project's estimated annual project-generated operational emissions in 2020 plus amortized project construction emissions would be less than 1,067 MT CO_{2e} per year. Therefore, the proposed project would not exceed the proposed SCAQMD threshold of 1,400 MT CO_{2e} for

commercial sources. Therefore, the project's GHG contribution would be not cumulatively considerable and is less than significant.

Finding

The District finds that, based upon substantial evidence in the record, the proposed project would have a less than significant impact on GHG emissions; therefore, no mitigation is required.

4.3.8 Hazards and Hazardous Materials

Routine Transport, Use, or Disposal of Hazardous Materials

Hazardous substances and wastes could be transported to and stored, used, and generated on the project site during construction. These may include fuels for machinery and vehicles, motor oil, cleaning solvents, paints, and other substances and wastes typical of a construction site. However, these materials would be transported, used, and disposed of in accordance with all federal, state, and local laws regulating the management and use of hazardous materials. All waste would be removed and transported to a permitted waste facility for treatment, storage, or disposal. Use of these materials for their intended purposes during construction activities would not pose a significant risk to the public or the environment.

The proposed project would involve very little transport, storage, use, or disposal of hazardous materials, and would be associated with janitorial, maintenance, and repair activities (e.g., commercial cleaners, lubricants, or paints and household cleaning supplies). Use of these materials would be limited, and transport, storage, use, and disposal of these materials would be subject to all federal, state, and local laws regulating the management and use of hazardous materials. Because hazardous materials/chemicals used during operations would be transported, used, and disposed of in accordance with all federal, state, and local laws regulating the management and use of hazardous materials, impacts would be less than significant.

Release of Hazardous Materials

Hazardous substances and wastes could be stored and used on the proposed project site during construction. Accidental spills, leaks, fires, explosions, or pressure releases involving hazardous materials represent a potential threat to human health and the environment if not properly treated. The most likely spills or releases of hazardous materials during construction would involve petroleum products, such as diesel fuel, oils, and lubricants. All storage, handling, and disposal of these materials are regulated by the Department of Toxic Substances Control (DTSC), the U.S. Environmental Protection Agency, the Occupational Safety and Health Administration, and the City of Fullerton and Orange County Fire Departments.

The proposed project would involve very little use of hazardous materials, which would be associated with janitorial, maintenance, and repair activities (e.g., commercial cleaners, lubricants, or paints and household cleaning supplies). Use of these materials would be subject to all federal, state, and local laws regulating the management and use of hazardous materials. Because hazardous materials/chemicals used during operations would be in accordance with all federal, state, and local laws regulating the management and use of hazardous materials, impacts would be less than significant.

Hazardous Materials within One-Quarter mile of an Existing or Proposed School

The proposed project site is within 0.25 miles of Fullerton Union High School and Raymond Elementary School. However, with adherence to applicable laws, regulations, and standards, the proposed project would not create a significant risk to the public or the environment related to the use or upset of hazardous materials. As such, it would not create a risk to nearby schools. Impacts would be less than significant.

Near an Airport or within an Airport Land Use Plan

The Airport Land Use Commission for Orange County has adopted the Airport Environs Land Use Plan. The project site is located approximately 3.4 miles east of the Fullerton Municipal Airport. The project site is not located within the planning area for Fullerton Municipal Airport or any other land use plan (ALUC 2005). Proposed project activities would not pose a hazard for people residing or working in the project area. Although the proposed project would include construction of bleachers and lighting stanchions, the project site is not located within the height restriction zone for Fullerton Municipal Airport or any other airport. Therefore, impacts would not occur.

Within the Vicinity of a Private Airstrip

The proposed project is not located within the vicinity of a private airstrip. No private airstrips exist within 2 miles of the proposed project site; therefore, there would be no impact.

Impair or Interfere with an Adopted Emergency Response Plan or Emergency Evacuation Plan

Construction of the proposed project would not involve road closures and would not interfere with emergency response or evacuation plans. Operation of the proposed project may result in additional traffic on surrounding roadways and within campus parking lots, especially during football games and special events. Additional traffic would increase the difficulty of evacuating the campus population and the project site in the event of an emergency. However, the proposed project is not anticipated to significantly impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. Permitting requirements mandate that the fire department and the Division of the State Architect perform a fire and life safety review and an access compliance review, respectively, prior to approval of proposed project drawings and specification documents. Therefore, emergency response and evacuation as a result of the proposed project would be adequately evaluated to ensure the safest possible conditions for students, staff, and visitors to Sherbeck Field and the Fullerton College campus. Implementation of the proposed project would not interfere with an adopted emergency response or evacuation plan. Impacts would be less than significant.

Wildland Fires

It is unlikely that the project would expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands. The proposed project is in an urbanized area with no adjacent wildlands (City of Fullerton 2012c). Additionally, the area surrounding the project site is generally urbanized and developed. Therefore, impacts would be less than significant.

Finding

The District finds that, based upon substantial evidence in the record, the proposed project would have a less than significant impact on hazards and hazardous materials as it relates to routine transport, use, or disposal of

hazardous materials; accidental release of hazardous materials; hazardous materials within one-quarter mile of an existing school or proposed school; the proximity of the project to an airport or an airport land use plan, the proximity of the project to a private airstrip, the interference with an adopted emergency response plan or emergency evacuation plan, and wildland fires; therefore, no mitigation is required.

4.3.9 Hydrology and Water Quality

Violate Water Quality Standards or Waste Discharge Requirements

Impacts to water quality could result from short-term effects of construction activities (e.g., erosion and sedimentation due to land disturbances, uncontained material and equipment storage areas, and improper handling of hazardous materials). Grading would consist of over-excavation within the bleacher areas, ramp areas, storage building area, and within proposed paved areas to a depth of 3 feet. Therefore, the proposed project would involve minimal excavation and grading activities that would expose soils. Additionally, the proposed project would comply with the measures outlined in the District's SWMP (Ninyo and Moore 2015). The SWMP requires that the construction management team or contractor inspect the project site on a weekly basis to prevent erosion and stormwater runoff from occurring. Additionally, project construction would be subject to stormwater BMPs. Therefore, impacts related to violation of water quality standards or waste discharge requirements would be less than significant.

Deplete Groundwater Supplies or Interfere with Groundwater Recharge

The City's water utility provides water services to the Fullerton College campus. The City receives its water from two main sources: (1) local well water from the Lower Santa Ana River Groundwater Basin, which is managed by the Orange County Water District (OCWD), (2) and imported water from the Metropolitan Water District of Southern California (City of Fullerton 2016a). Water supply from the City's groundwater wells accessing the Orange County Groundwater Basin is constrained by the allowable "basin production percentage,"⁷ which is set by the OCWD on an annual basis. The OCWD has been the primary agency managing the groundwater basin since 1933. The OCWD works collaboratively with the Metropolitan Water District and other local water districts, such as the City, to implement a program to manage the groundwater basin to ensure a safe and sustainable supply.

Under the existing condition, the project site consists of a turf football field that is surrounded by a 400-meter track, a two-story field house on the western edge of the field, a scoreboard on the eastern end of the field, and an existing sound system. The proposed project would involve installation of bleachers, lighting, a sound system, a press box, and a storage building. These project components would not result in an increase in water demand. Thus, the proposed project would not require additional water utility services from the City, and would not increase groundwater demand. Because the proposed project would not generate increased water demands that could substantially deplete groundwater supplies, and because OCWD actively manages groundwater basin supplies, the proposed project would result in less than significant impacts to groundwater resources.

Alter Existing Drainage Pattern Resulting in Erosion, Siltation, or Flooding

Increases in impervious areas associated with the project could alter the types and levels of pollutants that could be present in project site runoff. Under existing conditions, stormwater that is not infiltrated through landscaped areas moves as sheet flow toward street gutters, swales, and the inlets of underground storm drains. The storm drains direct runoff to the City storm drain system and the Fullerton Creek channel, and eventually into the Pacific Ocean through

⁷ The basin pumping percentage is the ratio of groundwater production to total water demand, expressed as a percentage.

Coyote Creek/Lower San Gabriel River. Under proposed conditions, stormwater runoff would generally behave in the same manner, and drainage plans would ensure that hydrologic and water quality standards are met. The site would continue to direct stormwater to the City's storm drain system.

The project site consists of a turf football field that is surrounded by a 400-meter track, a two-story field house, and existing scoreboard and sound system. The project site consists largely of impervious areas, such as the field house, track, and walkways. The proposed installations would include bleachers, lighting, a sound system, a press box, and a storage building. Due to the developed nature of the project site, and since the installations would occur largely on impervious areas, much of the new construction and installations that would occur would not substantially increase the amount of impervious areas at the project site.

Additionally, because the project site is largely built-out, is located on level or gently sloping topography, and is surrounded by urban land uses, the proposed project is not anticipated to substantially modify existing topography or runoff patterns. Further, the proposed project would be subject to the most current standards for drainage design and the SWMP, which requires appropriate BMPs for erosion control measures. Therefore, impacts associated with alteration of drainage patterns resulting in erosion, siltation, or flooding on or off site would be less than significant.

Exceed Capacity of Existing or Planned Stormwater Drainage System

The potential for the project to alter drainage patterns is low due to the built-out nature of the project site and because the change in impervious surfaces would be relatively minor. The proposed project would not modify existing topography, drainage sheds, or runoff rates/patterns. Therefore, the proposed project is not anticipated to exceed the capacity of the stormwater drainage systems. On-site modifications would be required to comply with the District's SWMP to include appropriate BMPs. For these reasons, impacts related to the capacity of stormwater drainage systems would be less than significant.

Otherwise Degrade Water Quality

Construction activities associated with the proposed project would involve the construction and installation of bleachers, lighting, a sound system, press box, and a storage building. The SWMP would incorporate BMPs to prevent or reduce, to the greatest extent feasible, adverse impacts to water quality related to the project. Thus, required compliance with the District's SWMP would ensure that water quality impacts resulting from construction-related activities would be less than significant.

Introduction of Housing within Flood Hazard Area

According to the Federal Emergency Management Agency's Flood Insurance Rate Map (06059C0043J), the project site is not located within the 100-year flood hazard area, and is outside of the 0.2% annual chance floodplain (FEMA 2009). Additionally, the proposed project does not include a housing component. Therefore, the proposed project would not locate housing within a 100-year flood hazard area. Impacts would not occur.

Introduction of Structures within Flood Hazard Area to Redirect Flood Flows

According to the Federal Emergency Management Agency's Flood Insurance Rate Map, the project site is not located within the 100-year flood hazard area, and is outside of the 0.2% annual chance floodplain (FEMA 2009). Therefore, the proposed project would not place structures that would impede or redirect flood flows in a 100-year flood hazard area. Impacts would not occur.

Loss, Injury, or Death Due to Dam or Levee Failure

The project site is located in the vicinity of two dams: the Brea Dam (1 mile away) and the Fullerton Dam (2.5 miles away). Both dams are owned by the U.S. Army Corps of Engineers and are typically kept almost empty; the flood control storage for the Brea and Fullerton Reservoirs are 7,420 acre-feet and 1,342 acre-feet, respectively (County of Orange 2011). The failure of either of these dams would cause downstream flooding and would likely result in loss of life and property, but the potential for such a failure to occur is extremely low. This is a preexisting environmental condition and the project would have no effect on the likelihood, severity, or extent of the dam failure/inundation. Because the project would have no effect on the likelihood, severity, or extent of the dam failure/inundation, would not disproportionately induce growth in an area subject to dam inundation, and because emergency plans and procedures are in place, the proposed project would have a less than significant impact with regard to dam and levee failure hazards.

Seiche, Tsunami, or Mudflow

The project site is approximately 14 miles from the Pacific Ocean, and the City of Fullerton is approximately 150 feet above mean sea level; therefore, the project site would not be exposed to impacts from a tsunami (City of Fullerton 2016c). The project site is not in the vicinity of any surface waters or potential mudflow sources. Additionally, according to the City of Fullerton's Local Hazard Mitigation Plan, earthquake-induced seiches are not considered a risk in the City of Fullerton (City of Fullerton 2010). No impacts would occur.

Cumulative Hydrology and Water Quality Impacts

The primary pollutants of concern on a college campus are associated with private vehicle maintenance (e.g., car washing and grease/oils associated with maintenance/repairs), landscaping/grounds work (e.g., improper/excessive use of pesticides, herbicides, and/or fertilizers), and/or trash (e.g., due to improper waste disposal). Because the cumulative effects of past projects have resulted in substantial water quality problems in the region's major waterways, and because water quality problems are generally cumulative in nature, all efforts must be made to reduce pollutant concentrations within stormwater discharges to the maximum extent practicable, even if the impact of an individual project appears inconsequential. However, since the proposed project would result in less than significant impacts with regard to hydrology and water quality, impacts would not be cumulatively considerable.

Finding

The District finds that, based upon substantial evidence in the record, the proposed project would have a less than significant impact on hydrology and water quality as it relates to the depletion of groundwater supplies; the introduction of housing within a flood hazards area; the introduction of structures within a flood hazard area to redirect flood flows; the loss, injury, or death due to a dam or levee failure; and seiche, tsunami, or mudflow. Therefore, no mitigation is required.

4.3.10 Land Use and Planning

Physically Divide an Established Community

The proposed project would involve construction and installation of bleachers, lighting, a sound system, a press box, and a storage building. None of the proposed elements would divide or isolate an established community. Therefore, impacts would be less than significant.

Conflict with an Applicable Land Use Plan, Policy, or Regulation

The project site currently has a zoning designation of public land (P-L), and the community development type is school; no change in zoning is proposed. The District in general, and Fullerton College specifically, are not subject to local government planning and land use plans, policies, or regulations. Therefore, impacts would be less than significant.

Conflict with any Applicable Habitat Conservation Plan or Natural Community Conservation Plan.

The proposed project is not located within any adopted habitat conservation plan, natural community conservation plan, or local or regional habitat conservation plan areas. Since the proposed project is not located within any approved plan areas, the proposed project would not impact the goals and objectives of any adopted plans. Therefore, impacts would not occur.

Cumulative Land Use and Planning Impacts

As analyzed above, the proposed project would experience less than significant impacts related to all land use and planning issue areas. Considering the proposed project would not divide an established community, conflict with an applicable land use plan, and would not conflict with an applicable habitat conservation plan, the proposed project would not combine with cumulative projects resulting in a significant impact to land use. Therefore, impacts to land use and planning would not be cumulatively considerable.

Finding

The District finds that, based upon substantial evidence in the record, the proposed project would have a less than significant impact on land use and planning as it related to division of an established community and compatibility with an applicable land use or conservation plan.

4.3.11 Mineral Resources

Loss of Availability of a Known Mineral Resource

According to the State of California Department of Conservation, Division of Oil, Gas, and Geothermal Resources, there are no gas, geothermal, or other known wells located on or in the vicinity of the project site. The nearest oil wells are located approximately 0.5 miles north of the project site and are operated by Dolke-Thomas Oil Syndicate (CDC 2017). The proposed project would not result in a land use conflict with the existing oil extraction, nor would it preclude future oil extraction on underlying deposits. The project site does not contain mineral resources; therefore, the proposed project would not result in a loss of availability of a known mineral resource and no impact would occur.

Loss of Availability of a Locally Important Mineral Resource Recovery Site

No mineral resource recovery sites are delineated in The Fullerton Plan (City of Fullerton 2012d). The proposed project would not result in a land use conflict with existing oil extraction, nor would it preclude future oil extraction on underlying deposits. Therefore, the proposed project would not result in the loss of availability of a locally important mineral resource, and no impact would occur.

Cumulative Mineral Resource Impacts

As analyzed above, the proposed project would experience less than significant impacts related to all mineral resource issue areas. Considering the proposed project would not be located within the vicinity of a known mineral resource or a locally important mineral resource recovery site, the proposed project would not combine with cumulative projects resulting in a significant impact to mineral resources. Therefore, impacts to mineral resources would not be cumulatively considerable.

Finding

The District finds that, based upon substantial evidence in the record, the proposed project would have a less than significant impact on mineral resources; therefore, no mitigation is required.

4.3.12 Noise

Excessive Groundborne Vibration or Groundborne Noise Levels

Construction activities that might generate excessive groundborne vibration or groundborne noise could cause a potentially significant impact. Groundborne vibration information related to construction activities has been collected by Caltrans. This information indicates that continuous vibrations with a peak particle velocity of approximately 0.1 in/sec begin to annoy people (Caltrans 2004). Groundborne vibration is typically attenuated over short distances. The closest residences to the demolition/construction areas would be approximately 85 feet away. More typically, residential land uses would be located approximately 250 feet or more from demolition and construction activities. The heavier pieces of construction equipment, such as large bulldozers and loaded trucks, would have peak particle velocities of approximately 0.089 in/sec or less at a distance of 25 feet (FTA 2006). At a distance of 85 feet and beyond, the peak particle velocity with the anticipated construction equipment would be approximately 0.014 in/sec or less. At 250 feet, the peak particle velocity with the anticipated construction equipment would be approximately 0.003 in/sec. Thus, the vibration levels from demolition and construction activities would be below 0.1 inches per second at the adjacent residences. Vibration is very subjective. Continuous vibration levels near the level of perception (or approximately a peak particle velocity of 0.01 inches per second) can be annoying to some. However, construction activities are not anticipated to result in continuous vibration levels that would reach a peak particle velocity of 0.01 inches per second; therefore, the vibration impact would be less than significant.

Pile driving, blasting, or other special construction techniques are not anticipated to be used for construction of the proposed project; therefore, excessive groundborne vibration and groundborne noise would not be generated. Additionally, groundborne vibration would not be associated with the proposed project following construction activities and no impacts related to excessive groundborne vibration would occur.

Expose People Residing or Working in Airport Land Use Plan to Excessive Noise Levels

The project site is not located within the planning area for Fullerton Municipal Airport or any other airport land use plan (ALUC 2005), and Fullerton Municipal Airport is approximately 3.1 miles west of the project site. Therefore, there is little potential to expose people residing or working in the project area to excessive noise levels. Therefore, the impact is less than significant.

Expose People Residing or Working within the Vicinity of a Private Airstrip to Excessive Noise Levels

The proposed project is not located within the vicinity of a private airstrip. No private airstrips exist within 2 miles of the proposed project site. People residing or working in the proposed project area would not be exposed to excessive noise levels from a private airstrip. No impacts would occur.

Finding

The District finds that, based upon substantial evidence in the record, the proposed project would have a less than significant impact on noise as it relates to excessive groundborne vibration or groundborne noise levels, a permanent increase in ambient noise levels, exposing people residing or working within an airport land use plan to excessive noise levels, exposing people residing or working within the vicinity of a private airstrip to excessive noise levels, and cumulative noise impacts; therefore, no mitigation is required.

4.3.13 Population and Housing

Induce Substantial Population Growth

The proposed project would involve improvements to Sherbeck Field, including the construction and installation of bleachers, lighting, a sound system, a press box, and a storage building. Although the field improvements would accommodate future growth, the proposed project would not directly or indirectly induce population growth. The field improvements would not involve habitable structures, the construction of which could generate residents. Additionally, campus programs would remain largely the same, without requiring additional campus employees. The project site is in a developed portion of the City with existing infrastructure and roads that could serve the project, and the project would not generate additional utility and service demands. Therefore, this impact would be less than significant.

Displace Substantial Numbers of Existing Housing

The proposed project would not displace existing housing. The project would involve construction and installation of bleachers, lighting, a sound system, a press box, and a storage building on an existing field. No housing units currently exist on campus. No impact would occur.

Displace Substantial Numbers of Existing People

The proposed project would not displace substantial numbers of people. There are no plans to move any facilities that would result in the displacement of people from the project area. No impact would occur.

Cumulative Population and Housing Impacts

Cumulative impacts to population and housing would result from a combination of projects that induce population growth, displace substantial numbers of housing, or displace substantial numbers of people. The proposed project would result in new student and employee growth. The City is highly urbanized, and cumulative projects are primarily urban infill projects that would not substantially induce new growth into the area. In combination with the proposed project, impacts to population growth or housing availability would not be cumulatively considerable.

Finding

The District finds that, based upon substantial evidence in the record, the proposed project would have a less than significant impact on population and housing; therefore, no mitigation is required.

4.3.14 Public Services

Expansion of Government Facilities

Fire

The proposed project would generate additional demand for fire protection and emergency medical services by adding additional uses to Sherbeck Field. Based on information from Orange County Fire Authority and Fullerton Fire Department, the proposed project is anticipated to generate one additional call for service during the fiscal year. In 2017, the Fullerton Fire Department responded to 14,644 total incidents (fire, emergency medical, etc.). In comparison, the proposed project's increase in annual calls represents 0.007%. Considering this nominal increase, the proposed project would have a less than significant impact to fire protection and emergency medical services.

In 2017 and 2018, the Fullerton Fire Department had average response times of 8 minutes and 49 seconds, and 8 minutes and 47 seconds, respectively (Ramirez, pers. comm. 2019). Thus, the Fullerton Fire Department does not currently meet its objective response time at 6 minutes and 30 seconds. However, considering the proposed project represents 0.007% of the Fullerton Fire Department's annual calls, the proposed project would not substantially impact the Fullerton Fire Department's ability to maintain response time goals.

Because the proposed project would result in a limited number of additional calls for fire or emergency medical service, in combination with the fact that the proposed project would not result in the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, the proposed project would have a less than significant impact on fire protection or emergency medical services.

Police

The proposed project would generate additional demand for police protection services by adding additional uses to Sherbeck Field. During the 2017 football season, four Fullerton College games occurred at Yorba Linda High School under the jurisdiction of Orange County Sheriff's Department (OCSD). However, OCSD discontinued service for the 2018 season and subsequent years due to lack of personnel. Based on communications with OCSD, one medical aid call was made on October 21, 2017. No additional calls for service occurred during the other three games (Mette, pers. comm. 2018).

Communication with the Fullerton Police Department regarding Fullerton Union High School football games was used to determine the potential number of calls generated by football games within the Fullerton Police Department jurisdiction. Based on communication with the Fullerton Police Department, there were a total of two calls for service to Fullerton Union High School during 2017 home games (Wright, pers. comm. 2019a). Based on the information from OCSD and the Fullerton Police Department, it is anticipated that the proposed project could result in 1 additional call for service per game, resulting in a total of up to 7 calls for service during the fiscal year.⁸ With the addition of 7 calls annually, in comparison to the 52,621 calls that were made in 2017, the proposed project would result in a marginal increase (0.013%) in annual calls. In addition, the Campus Safety Department would continue

⁸ Approximately five regular and up to two playoff football games per year would be held at Sherbeck Field.

to be the primary law enforcement agency on campus, and the proposed project site is already part of the normal patrol and enforcement area of the Campus Safety Department.

Considering the proposed project represents 0.0013% of the Fullerton Police Department's annual calls, and that the Fullerton Police Department is located approximately 0.5 miles southwest of the Fullerton College campus, the proposed project would not substantially impact the Fullerton Police Department's ability to maintain dispatch time goals.

Schools

The proposed project would not involve the development of campus housing that would generate additional students. Although the field lighting would allow for more evening class options for the physical education program to meet student demand, the project would not directly or indirectly induce substantial population growth. Therefore, the Fullerton School District and Fullerton Joint Union High School District located in the City would not experience adverse impacts resulting from the proposed project. Impacts would be less than significant.

Parks

The proposed project would not result in an increase in the use of existing parks. The project would involve improvements to Sherbeck Field, the Fullerton College campus recreational facility, so athletic activities and games could remain on campus. Therefore, nearby parks would not experience an increase in visitors and acceptable service ratios would be maintained. No impacts to parks would occur.

Other Public Facilities

The proposed project would have no impact on libraries or other public facilities. The nearest library is the Fullerton Public Library, which is located approximately 1 mile southwest of the project site. The project would not generate new permanent residents in the City who would use public facilities. As such, the proposed project would not increase demand in capacity of existing libraries or other public facilities. No impacts would occur.

Cumulative Public Service Impacts

The geographic extent for the analysis of cumulative impacts associated with public services consists of the City, because fire and police protection services are provided by the City. Considering that the proposed project would result in a nominal, if any, increase in calls, the proposed project would not significantly contribute to a cumulatively considerable impact associated with fire protection and emergency medical services. Cumulative development projects could result in cumulatively considerable impacts to the Fullerton Fire Department and Fullerton Police Department. However, all development plans would be required to comply with all applicable fire code and ordinance requirements for construction access, water mains, fire flow, and hydrants. In addition, the City reviews budget on an annual basis to plan for fire demand and police associated with future growth. Funding for fire and police services and facilities would be paid in part by developer fees. This would ensure that new development would not reduce the staffing, response times, or existing levels of service within the Fullerton Fire Department and Fullerton Police Department service area. Therefore, cumulative impacts to fire and police protection services would be less than significant.

The proposed project does not involve the development of campus housing, and thus, would not generate a demand for additional park and other public facilities. The proposed project is not anticipated to have a significant impact with regard to schools. Therefore, the proposed project would not contribute to a significant cumulative impact to public services.

Finding

The District finds that, based upon substantial evidence in the record, the proposed project would have a less than significant impact on public services; therefore, no mitigation is required.

4.3.15 Recreation

Increase the Use of an Existing Neighborhood, Regional Park, or Recreational Facility

The project would involve improvements to Sherbeck Field, the Fullerton College campus recreational facility, so athletic activities and games could remain on campus. Therefore, off-site recreational facilities would not experience physical deterioration due to an increase of use. No impacts to recreational facilities would occur.

Finding

The District finds that, based upon substantial evidence in the record, the proposed project would have a less than significant impact on recreation; therefore, no mitigation is required.

4.3.16 Transportation

Design Hazards

The proposed project would not involve construction of any transportation-related elements, nor would operations involve incompatible uses to the transportation system. The project site would continue to be used as an athletic field. No impacts related to hazardous design features or incompatible uses would occur.

Inadequate Emergency Access

Vehicular access to the parking lots adjacent to Sherbeck Field (i.e., student parking lots 4, 5, and 6) would continue to be provided from the existing unsignalized driveways located along Berkeley Avenue (i.e., Centennial Way/Berkeley Avenue (key study intersection no. 26), Berkeley Avenue/College Driveway No. 1 (key study intersection no. 28), and Berkeley Avenue/College Driveway No. 2 (key study intersection no. 29)); key study intersection no. 29 (i.e., Berkeley Avenue/College Driveway No. 2) was assumed to only provide egress movements from the campus in the Year 2030, consistent with the Fullerton College Master Plan Traffic Study. As such, the proposed project would not adversely affect emergency access. In addition, consistent with state and local fire codes, adequate turning radius and vertical clearance would be maintained on internal driveways, roads, drive aisles, and parking lots. Therefore, impacts associated with emergency access would be less than significant.

Finding

The District finds that, based upon substantial evidence in the record, the proposed project would have a less than significant impact on traffic and circulation as it relates to design hazards and inadequate emergency access. Therefore, no mitigation is required.

4.3.17 Tribal Cultural Resources

Register of Historical Resources

As part of the Cultural Resources Report prepared for the Fullerton College Facilities Master Plan, all buildings and structures were photographed, researched, and evaluated for historical significance in consideration of the California Register of Historical Resources (CRHR) and City designation criteria. No listed, or eligible for listing, tribal cultural resources were identified on the project site as a result of the CHRIS records search, Native American Heritage Commission Sacred Lands File search, or Native American consultation. Therefore, no impacts associated with historical resources listed or eligible for listing in the CRHR or a local register would occur pertaining to the Sherbeck Field site.

Cumulative Tribal Cultural Resources Impacts

An evaluation of the potential for cumulative impacts on tribal cultural resources considers whether impacts of the proposed project and related projects, when taken as a whole, substantially diminish the tribal cultural resources within the same or similar context or property type. The project site is located in a predominantly developed part of the City of Fullerton, consisting of residential, commercial, and educational uses. Ongoing development and growth in the broader project area may result in a cumulatively significant impact to cultural resources due to the continuing disturbance of undeveloped areas, which could contain significant buried archaeological, paleontological, or tribal cultural resources. However, the proposed project would be constructed on a developed campus on a developed site, and that campus has been subject to previous ground-disturbing activities, which greatly limits the potential for buried, unrecorded cultural resources to underlie the project site. It is anticipated that any tribal cultural resources potentially affected by related projects would also be subject to the same requirements of CEQA as the proposed project, and that the proponents of such projects would mitigate for impacts resulting from their projects, if applicable. The determinations of significance would be made on a case-by-case basis, and the effects of cumulative development on tribal cultural resources would be mitigated to the extent feasible in accordance with CEQA and other applicable legal requirements. In this instance, the proposed project would not contribute to a cumulatively considerable impact associated with tribal cultural resources, and impacts would be less than significant.

Finding

The District finds that, based upon substantial evidence in the record, the proposed project would have a less than significant impact on tribal cultural as it relates to being listed or eligible for listing in the CRHR or a local register. Therefore, no mitigation is required.

4.3.18 Utilities and Service Systems

Require Construction of New Water, Wastewater Treatment, Stormwater Drainage, Electric Power, Natural Gas, or Telecommunications Facilities

Water

Water service for the proposed project is and would continue to be obtained through purchase of municipal water from the City. The field house is the only water-using feature on the project site. Based on the monthly water bills provided by Fullerton College for January 2009 through January 2016, the average annual water use for the Fullerton College campus is estimated to be 102,000 gallons per day (gpd). The estimated annual indoor water use

for the field house is estimated to be 1,361 gpd. The proposed installations would include bleachers, lighting, a sound system, a press box, and a storage building. The proposed installations would allow for additional evening physical education classes, and five regular and up to two playoff football games per year. The evening classes would allow up to 32 additional students to patronize the water-using features in the field house, while the football games could allow up to 2,000 students/attendees.⁹ As such, the greatest water demand resulting from the proposed project would likely be during up to seven football games. This increase in use at Sherbeck Field could increase the annual indoor water use for the field house.

The field house is currently the only water-using feature on the project site. The water-using devices at the field house include 29 toilets (1.6 gallons per flush), 4 urinals (1.5 gallons per flush), 25 sinks, and 6 water fountains (Moscol, pers. comm. 2018). The proposed project would generate a water demand of 15,360 gallons per year for academic instruction and 136,740 gallons per year for field events, for a total of 152,100 gallons per year.

According to the City of Fullerton's 2015 Urban Water Management Plan, institutional/governmental uses accounted for 605 acre-feet (or 197,140,114 gallons per year) in fiscal year 2014–15. The projected 2020, 2025, 2030, 2035, and 2040 water demand by institutional/government uses is estimated to be 593 acre-feet, 636 acre-feet, 641 acre-feet, 641 acre-feet, and 642 acre-feet, respectively (City of Fullerton 2017b). Using the actual water demand from fiscal year 2014–15, the project's projected increase in water demand would be 0.08% of the total water use for institutional/governmental use. Thus, the proposed project's contribution to water demand is considered nominal. Additionally, the 2015 Urban Water Management Plan determined that due to the diversified supply and conservation measures, the water supply would meet demand for projected years between 2020 and 2040 under the multiple dry years' scenario (City of Fullerton 2017b).

Because the City's water demand can be met under multiple dry years, and because supply would meet projected demand due to diversified supply and conservation measures, the proposed project's water demands would be served by the City's projected current and future supplies, especially since the proposed project would use a relatively nominal percentage of the projected supplies available to the City moving forward. Therefore, the proposed project would not result in the relocation or construction of any new or expanded water facilities, and impacts associated with water facilities and supplies would be less than significant.

Wastewater

City sewer lines operating on the Fullerton College campus are connected to Orange County Sanitation District (OCSD) trunk lines, and effluent is treated by the OCSD treatment plants in Huntington Beach and Fountain Valley.

The OCSD treatment plants have a combined primary treatment capacity of 372 million gallons per day (MGD) and are currently processing approximately 187 MGD (OCSD 2009, 2016). Reclamation Plant No. 1, located in Fountain Valley, has a primary capacity of 204 MGD and treats water to be reclaimed by Orange County Water District for landscape irrigation use and groundwater replenishment. To avoid overloading Reclamation Plant No. 1, wastewater can also be diverted to Treatment Plant No. 2, in Huntington Beach, where effluents are mixed, dechlorinated with sodium bisulfite, and disposed of in the ocean (OCSD 2011).

⁹ This conservatively assumes the maximum attendance for games based on additional 4,417 seats. However, based on attendance at off-site games, there have been approximately 1,600 attendees for a regular season football game and approximately 3,000 attendees for a playoff game (Saghieh, pers. comm. 2017).

As discussed in Section 4.10.1 of the Draft EIR, the average sewer flow for the Fullerton College campus, calculated based on annual water use, was determined to be 65 gpd per thousand square feet. The existing field house is approximately 20,940 GSF and thus generates approximately 1,361 gpd of sewer flow (Psomas 2017).

The proposed project would not result in the construction of new buildings, which would generate new indoor water uses and subsequently sewer flows. However, the additional academic instruction and field events resulting from the proposed project would result in additional water demand of 152,100 gallons per year, which would subsequently enter the City's sewer lines, then OCSD's trunk lines. The existing trunk lines at Sherbeck Field includes a 6-inch sewer line located just east of the existing field house, which gravity flows into an 8-inch pipe that runs along North Berkeley Avenue (Psomas 2017).

Given that the OCSD treatment plants have a remaining capacity of 185 MGD, the proposed project's maximum peak daily flow of 13,674 gallons per day represents 0.007% of the remaining capacity, and thus, would not exceed treatment capacity of the OCSD treatment plants. In addition, the proposed project would generate the same types of municipal wastewater that are currently generated throughout the City. Therefore, the proposed project would not result in the relocation or construction of any new or expanded wastewater facilities, and impacts associated with wastewater treatment facilities would thus be less than significant.

Electric Power

The proposed project's operational phase would require electricity for building operation (appliances, lighting, etc.). The project is estimated to have a total electrical demand 10,010 kilowatt-hours per year (or 0.01 gigawatt-hours (GWh) per year. The non-residential electricity demand in 2017 13,285 GWh for Orange County (County) (CEC 2018). The project would be built in accordance with the current Title 24 standards at the time of construction and CalGreen. The energy-using fixtures within the proposed project would likely be newer technologies, utilizing less electricity power. Therefore, the proposed project would not result in increased energy demand that would necessitate the relocation or construction of new or expanded off-site distribution systems, local or regional energy supplies, or power generating capacity, and no significant impacts would result from the proposed project.

Natural Gas

Natural gas consumption during operation would be required for various purposes, including, but not limited to, building heating and cooling of the field house. The proposed project involves the installation of bleachers, lighting, a sound system, a press box, and a storage building. As such, the proposed improvements would not generate a substantial increase in natural gas use, such that construction or relocation of new or expanded facilities is required. Additionally, the applicant would ensure that the project would meet Title 24 requirements applicable at that time, as required by state regulations through their plan review process. Therefore, no significant impacts associated with natural gas facilities would result from the proposed project.

Telecommunications

The proposed project involves the installation of bleachers, lighting, a sound system, a press box, and a storage building. Since the project site is in an urbanized area and within the existing Fullerton College campus, there are existing telecommunication facilities that would be able to serve the project site. The proposed installations requiring telecommunication services (e.g., the press box) would be able to connect to existing telecommunication services without the need for expansion or construction on new facilities. Therefore, impacts would be less than significant.

Solid Waste

The Orange County Solid Waste Management System is composed of three landfills: Olinda Alpha Landfill, Frank R. Bowerman Landfill, and Prima Deshecha Landfill. Collected waste from the project site would be transported to Madison Resource Recovery Facility in Santa Ana, which recovers upward of 75% of materials transported to this facility (Ware Disposal Company 2017). The residual solid waste stream recovered from the Madison Resource Recovery Facility is then transported to the Frank R. Bowerman Landfill in Irvine and Olinda Alpha Landfill in Brea (Ware, pers. comm. 2016). The Frank R. Bowerman Landfill permits a maximum of 11,500 tons of waste per day, and does not accept public dumping. Olinda Alpha accepts public dumping and permits a maximum of 8,000 tons per day (County of Orange 2017).

All collection, transportation, and disposal of solid waste generated by the proposed project would comply with all applicable federal, state, and local statutes and regulations. In particular, AB 341 requires that at least 75% of solid waste generated by a jurisdiction be diverted from landfill disposal through source reduction, recycling, or composting by 2020. Regional agencies, counties, and cities are required to develop a waste management plan that would achieve a 75% diversion from landfills (California Public Resources Code, Section 40000 et seq.).

The proposed project would not involve demolition of any existing structures. In addition, given the maximum tons of waste accepted per day at the landfill, any waste generated by the proposed project would represent a nominal percentage of the maximum waste accepted. Therefore, the project could be served by a landfill with sufficient permitted capacity, and impacts would be less than significant.

Cumulative Utilities and Service Systems Impact

As analyzed above, the proposed project would experience less than significant impacts related to water, wastewater, electric power, natural, telecommunications, and solid waste. Considering the proposed project would not be located within the vicinity of farmland or forestland, the proposed project would not combine with cumulative projects resulting in a significant impact to an agricultural or forestry resource. Therefore, impacts to agricultural and forestry resources would not be cumulatively considerable.

Finding

The District finds that, based upon substantial evidence in the record, the proposed project would have a less than significant impact on utility and service systems, as it relates to water, wastewater, electric power, natural, telecommunications, and solid waste; therefore, no mitigation is required.

4.3.19 Energy

Wasteful, Inefficient, or Unnecessary Consumption of Energy

Implementation of the project would increase the demand for electricity and natural gas at the project site and gasoline consumption in the region during construction and operation.

Electricity

The proposed project would utilize electricity during temporary construction activities and the operational phase of the proposed project. The amount of electricity used during construction would be minimal; typical demand would stem from the use of electrically powered hand tools and several construction trailers by managerial staff during the hours of construction activities. The operational phase would require electricity for multiple purposes including, but not

limited to, building heating and cooling, lighting, appliances, and electronics. The project would be built in accordance with the current Title 24 standards at the time of construction and CALGreen. Therefore, due to the limited amount of electricity use compared to that generated by the project, and the inherent increase in efficiency of building code regulations, the project would not result in a wasteful use of energy. Impacts associated with electricity use would be less than significant.

Natural Gas

Natural gas is not anticipated to be required during construction of the proposed project. Natural gas consumption during operation would be required for various purposes, including, but not limited to, building heating and cooling. The proposed project is subject to statewide mandatory energy requirements as outlined in Title 24, Part 6, of the California Code of Regulations. Title 24, Part 11, contains additional energy measures that are applicable to project under CALGreen. Prior to project approval, the applicant would ensure that the project would meet Title 24 requirements applicable at that time, as required by state regulations through their plan review process. Thus, the natural gas consumption of the project would not be considered inefficient or wasteful. Impacts associated with natural gas use would be less than significant.

Petroleum

Petroleum would be consumed throughout construction of the project. Fuel consumed by construction equipment would be the primary energy resource expended over the course of construction, and VMT associated with the transportation of construction materials and construction worker commutes would also result in petroleum consumption. The project analyzed in the Draft EIR was estimated to consume 294,825 gallons of petroleum during the construction phase. The proposed project is anticipated to result in similar if not reduced VMT and use of construction equipment. By comparison, approximately 6.14 billion gallons of petroleum would be consumed in California over the course of the project's construction phase based on the California daily petroleum consumption estimate of approximately 52.9 million gallons per day (CEC 2016). By comparison, Countywide total petroleum use by vehicles is expected to be 1.4 billion gallons per year by 2020 (CARB 2018). The project would be required to comply with CARB's Airborne Toxics Control Measure, which restricts heavy-duty diesel vehicle idling time to 5 minutes. Therefore, because petroleum use during construction would be temporary and relatively minimal, and would not be wasteful or inefficient.

The fuel consumption resulting from the project's operational phase would be attributable to employees and visitors traveling to and from the project site. Mobile sources from the project analyzed in the Draft EIR were estimated to result in approximately 1.08 million gallons of gasoline per year beginning in 2020. As discussed in section 2.2, the proposed project would reduce the total spectator seating by 55% which is anticipated to result in an overall reduction in vehicle trips and gasoline demand associated with the proposed project compared to what was analyzed in the Draft EIR. By comparison, California as a whole consumes approximately 19.3 billion gallons of petroleum per year (CEC 2016). Countywide total petroleum use by vehicles is expected to be 1.4 billion gallons per year by 2020 (CARB 2018). Over the lifetime of the proposed project, the fuel efficiency of the vehicles being used by the employees and visitors is expected to increase. As such, the amount of petroleum consumed as a result of vehicular trips to and from the project site during operation would decrease over time. There are numerous regulations in place that require and encourage increased fuel efficiency. For example, CARB has adopted an approach to passenger vehicles by combining the control of smog-causing pollutants and GHG emissions into a single, coordinated package of standards. The approach also includes efforts to support and accelerate the number of plug-in hybrids and zero-emissions vehicles in California (CARB 2013). Additionally, in response to SB 375, CARB adopted the goal of reducing per-capita GHG emissions from 2005 levels by 8% by 2020, and 13% by 2035 for light-duty passenger vehicles in the planning area for the Southern California Association of Governments. As such, operation of the project is expected to use decreasing

amounts of petroleum over time due to advances in fuel economy. Impacts related to petroleum use would be less than significant.

Conflict with Plan for Renewable Energy or Energy Efficiency

Title 24 of the California Code of Regulations contains energy efficiency standards for residential and non-residential buildings based on a state mandate to reduce California's energy demand. Specifically, Title 24 addresses a number of energy efficiency measures that impact energy used for lighting, water heating, heating, and air conditioning, including the energy impact of the building envelope such as windows, doors, wall/floor/ceiling assemblies, and roofs.

Part 6 of Title 24 specifically establishes energy efficiency standards for residential and non-residential buildings constructed in the State of California in order to reduce energy demand and consumption. The project would comply with Title 24, Part 6, per state regulations. Based on the foregoing, the proposed project would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency; therefore, impacts during construction and operation of the proposed project would be less than significant.

Cumulative Energy Impacts

Cumulative projects that could exacerbate the proposed project's impacts include any projects that could result in wasteful, inefficient, or unnecessary use of energy. However, the proposed project would not result in wasteful, inefficient, or unnecessary use of energy, in large part due to the short-term and temporary nature of the construction period, and because there is no alternative location to obtain the necessary construction materials that would result in the use of less petroleum. Additionally, the operational activity would be minimized through energy reduction strategies pursuant to Title 24. Therefore, cumulative impacts to energy use would be less than significant.

Finding

The District finds that, based upon substantial evidence in the record, the proposed project would have a less than significant impact on energy as it relates to inefficient or wasteful energy use, and conflict with a state or local plan for renewable energy or energy efficiency; therefore, no mitigation is required.

4.3.20 Wildfire

Impair an Adopted Emergency Response Plan

According to CAL FIRE's Fire Hazard Severity Zone Map, the project site is not located within a Very High Fire Hazard Severity Zone (VFHSZ) (CAL FIRE 2019). The project site is located approximately 2 miles from lands classified as VHFHSZ. As such, the project site is not located in a VHFHSZ area. In addition, the areas between the project site and the nearest VHFHSZ are built-out and connected via local roads. Further, mandated fire department and Division of the State Architect fire and life safety review on the project plans would ensure implementation of the proposed project would not interfere with an adopted emergency response or evacuation plan. Therefore, emergency access would be ensured and the proposed project would not interfere with an adopted emergency response or evacuation plan. Impacts would be less than significant.

Exacerbate Wildfire Risk Due to Slope, Prevailing Winds, and Other Factors

The project site is not located in a VHFHSZ area. In addition, the project site and surrounding area is urbanized and relatively flat. Therefore, the proposed project would not due to slope, prevailing winds, and other factors, exacerbate wildfire risks. Impacts would be less than significant.

Exacerbate Fire Risk from Installation or Maintenance of Associated Infrastructure

The project site is located approximately 2 miles from lands classified as VHFHSZ. As such, the project site is not located in a VHFHSZ area. The proposed project involves the installation of bleachers, lighting, a sound system, a press box, and a storage building within the existing Sherbeck Field at the Fullerton College campus. Since the project site is within a developed portion of the City, the proposed project would not require the installation or maintenance of infrastructure that may exacerbate fire risk. Impacts would be less than significant.

Expose People or Structure to Significant Risks

The project site and surrounding area is urbanized and relatively flat. The project site is not within a VHFHSZ and is located two miles away from a VHFHSZ. There are no existing drainage features located on the project site that would be subject to downstream flooding. Additionally, the project site is already developed and would not experience runoff, post-fire slope instability, or drainage changes as a result of being located in or near a VHFHSZ. Impacts would be less than significant.

Cumulative Wildfire Impacts

The project site is not susceptible to wildland fires. The proposed project and cumulative projects are located within an urbanized portion of the City surrounded by other developed uses; therefore, impacts related to wildfires are small. In addition, the proposed project and cumulative project plans would be reviewed by the Fullerton Fire Department, and comply with fire codes and regulations. Through the proposed project's and cumulative projects' compliance with the numerous fire-related regulations, and incorporation of fire protection features, the potential cumulative impacts from wildland fires would be less than significant.

Finding

The District finds that, based upon substantial evidence in the record, the proposed project would have a less than significant impact on wildfire as it relates to impairing an adopted emergency response plan; exacerbating fire risk due to slope, prevailing winds, and other factors; exacerbating fire risk from installation or maintenance of associated infrastructure; and exposing people or structure to significant risks. Therefore, no mitigation is required.

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5 Findings on Project Alternatives

Section 15126.6(a) of the CEQA Guidelines requires the discussion of “a reasonable range of alternatives to a project, or the location of a project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project and evaluate the comparative merits of the alternatives.” As previously discussed, in Section 1.1, Purpose, based on the potential for the Reduced Project Alternative to lessen significant and unavoidable impacts of the proposed Sherbeck Field Improvements Project, the District has selected the Reduced Project Alternative as the proposed project. Since the Reduced Project Alternative is now the proposed project, it is not addressed below as a Project Alternative.. In addition to the Reduced Project Alternative, which is now addressed herein as the Proposed Project, Chapter 6 of the Draft EIR identified and considered the following reasonable range of feasible alternatives to the proposed project, which would be capable, to varying degrees, of reducing identified impacts:

- No Project Alternative: No Development/Continued Use of Yorba Linda High School
- Alternative Site Location at California State University, Fullerton
- Alternative Site Location at Fullerton Union High School

These alternatives are evaluated for their ability to avoid or substantially lessen the impacts of the proposed project identified in the EIR, as well as consideration of their ability to meet the basic objectives of the proposed project as described in the Final EIR.

5.1 No Project Alternative: No Development/Continued Use of Yorba Linda High School

Description

Section 15126.6(e) of the CEQA Guidelines requires that an EIR evaluate and analyze the impacts of a no project alternative. The “purpose of describing and analyzing a no project alternative is to allow decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project” (14 CCR 15126.6(e)(1)). When defining the no project alternative, the analysis shall be informed by “what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services” (14 CCR 15126.6(e)(2)).

Here, the No Project Alternative: No Development/Continued Use of Yorba Linda High School (No Project Alternative) consists of no changes to the existing Sherbeck Field and the continued use of Yorba Linda High School for certain campus-related functions (e.g., football). Under the No Project Alternative, the bleachers, PA sound system, and press box associated with the proposed project would *not* be added to the existing field. Rather, the field would remain as it is today: class offerings would be capped at sunset; temporary bleacher seating would be rented each year for commencement ceremonies; regular football games would not be played at Fullerton College (but rather would be hosted at Yorba Linda High School’s field for as long as the SCFA allows it); and Fullerton College would continue to find a non-high school field in compliance with Rule 1, Section 2 of the NCAA Football Rulebook for playoff games.¹⁰ Football practice, soccer practice and Friday evening soccer games, and track and field practice and events would occur at Sherbeck Field under the No Project Alternative, as a continuation of the existing operations. In addition, with

¹⁰ There are approximately five regular and up to two playoff football games per year (Saghieh, pers. comm. 2017).

the No Project Alternative, Fullerton College would continue to rent out Sherbeck Field to private schools and organizations to host athletic competitions and practices, and the Fullerton College annual commencement ceremony would continue to take place at Sherbeck Field.

Finding

The District rejects the No Project Alternative as undesirable as it fails to satisfy the project's underlying purpose and to meet most project objectives, and because specific economic, legal, social, technological or other considerations make the alternative infeasible.

Rationale

The No Project Alternative would be environmentally superior to the proposed project in almost all resource areas. It would be environmentally neutral compared to the proposed project with regard to public services and tribal cultural resources. Although it is part of the existing condition, Yorba Linda High School is approximately 7 miles from the campus, and it is not environmentally efficient from a mobile emissions standpoint or time standpoint, to have an entire team, support staff, and spectators drive to Yorba Linda for Fullerton College football games.

The adoption of the No Project Alternative would not meet the project objectives identified by the District for providing field lighting to allow for more evening class options for the physical education program to meet student demand at Fullerton College; it would not provide a football field for the Fullerton College football program that meets the sizing requirements of the California Community College Athletic Association Regulations, Bylaw 4.2.6A; it is not certain that the California Community College Athletic Association would continue to permit waivers for regular and non-playoff games at high school fields; and it would not install permanent bleachers so that Fullerton College can host regular season and playoff football games at the College and reduce the costs associated with renting bleachers for the annual Fullerton College commencement ceremony. Additionally, the No Project Alternative would not include construction of a storage building to address the inadequacy of the current storage of football equipment and track and field equipment at the field house. Although the No Project Alternative would be environmentally superior to the proposed project, it would not meet the District's project objectives.

5.2 Alternative Site Location at California State University, Fullerton

Description

The Alternative Site Location at California State University, Fullerton (CSUF Site Alternative), considers relocating the proposed football games that would result from the new improvements at Sherbeck Field to the CSUF Titan Stadium. Titan Stadium is located approximately 1.7 miles northeast of Fullerton College, or 2.2 miles via local roads. The CSUF Titan Stadium can accommodate collegiate play and 10,000 spectators.

The proposed project would allow Fullerton College to add more evening class options at Sherbeck Field. Under the CSUF Site Alternative, it is not anticipated that the proposed academic instruction would be relocated onto the CSUF campus due to the distance and scheduling conflicts with CSUF evening activities. With regard to other athletic activities, football practice, soccer practice and Friday evening soccer games, and track and field practice and events would continue to occur at Sherbeck Field under the CSUF Site Alternative. In addition, Fullerton College would continue to rent out Sherbeck Field to private schools and organizations to host athletic courses and practice,

and the Fullerton College annual commencement ceremony would continue to take place at Sherbeck Field. However, regular season football games would no longer be held at the Yorba Linda High School field, and playoff and state champion games would no longer have to be secured at another non-high school field in compliance with Rule 1, Section 2 of the NCAA Football Rulebook. Instead both regular and playoff games would be relocated to Titan Stadium.

Of note, CSUF does not encourage football at its stadium, which is rented out to soccer teams for practice and games. CSUF also has communicated to Fullerton College that it would charge a substantial fee to rent the field in order to provide sufficient funds for repair of the turf should damage occur during football games. These factors adversely influence the feasibility of the CSUF Site Alternative.

Finding

The District rejects the CSUF Site Alternative as undesirable as it fails to satisfy the proposed project's underlying purpose and to meet most project objectives, and because specific economic, legal, social, technological or other considerations make the alternative infeasible.

Rationale

The CSUF Site Alternative would be considered environmentally superior in almost all resources areas. It would be environmentally neutral compared to the proposed project for air quality, greenhouse gas emissions, public services impacts and tribal cultural resources impacts.

The adoption of the CSUF Site Alternative would not meet the project objectives identified by the District because it would not provide field lighting to allow for more evening class options for the physical education program to meet student demand at Fullerton College; and, it would not include the installation of permanent bleachers so that Fullerton College can host regular season and playoff football games at the College or reduce the costs associated with renting bleachers for the annual Fullerton College commencement ceremony. Additionally, the CSUF Site Alternative would not include the construction of a storage building to address the inadequacy of the current storage of football equipment and track and field equipment at the field house. Although the CSUF Site Alternative would be environmentally superior to the proposed project, it would not meet the District's project objectives.

5.3 Alternative Site Location at Fullerton Union High School

Description

The Alternative Site Location at Fullerton Union High School (FUHS Site Alternative) considers relocating the proposed football games that would result from the new improvements at Sherbeck Field to Fullerton Union High School Stadium. The Fullerton Union High School Stadium is located approximately 0.27 miles from the Fullerton College campus.

The proposed project would not allow Fullerton College to add more evening class options at Sherbeck Field. Under the FUHS Site Alternative, it is not anticipated that the proposed academic instruction would be relocated onto the Fullerton Union High School campus; therefore, academic instruction at Sherbeck Field would be capped at sunset.

With regard to other athletic activities, football practice, soccer practice and Friday evening soccer games, and track and field practice and events would continue to occur at Sherbeck Field under the FUHS Site Alternative. In addition, Fullerton College would continue to rent out Sherbeck Field to private schools and organizations to host athletic courses and practice, and the Fullerton College annual commencement ceremony would continue to take place at Sherbeck Field. However, regular season Fullerton College football games would no longer be held at the Yorba Linda High School field, and would instead be relocated to the Fullerton Union High School Stadium. Fullerton College would need to continue to find a non-high school field in compliance with Rule 1, Section 2 of the NCAA Football Rulebook for playoff games.

Finding

The District rejects the FUHS Site Alternative as undesirable as it fails to satisfy the proposed project's underlying purpose and to meet most project objectives, and because specific economic, legal, social, technological or other considerations make the alternative infeasible.

Rationale

The FUHS Site Alternative would be considered environmentally superior in almost all resource areas. It would be environmentally neutral in noise, public services, transportation, and tribal cultural resources.

The adoption of the FUHS Site Alternative would not meet the project objectives identified by the District for providing a football field at Fullerton College for regular season and playoff games that would meet the sizing requirements of the California Community College Athletic Association Regulations, Bylaw 4.2.6A; it would not provide lighting to allow for more evening classes for the physical education program; and it would not include the installation of permanent bleachers so that Fullerton College can host regular season and playoff football games at the college or reduce the costs associated with renting bleachers for the annual Fullerton College commencement ceremony. Additionally, the FUHS Site Alternative would not construct a storage building to address the inadequacy of the current storage of football equipment and track and field equipment at the field house. In addition, the locker rooms at FUHS would need to be modified to accommodate the larger-sized football teams for collegiate play, along with separation of opposing teams, and it would require the approval of these improvements by Fullerton Union High School, which is not under the jurisdictional control of the Board of Trustees. The logistics of having two teams practice and play at the same field would be challenging from a scheduling perspective. Lastly, the SCFA may not continue to grant waivers for Fullerton College to play on high school fields. Although the FUHS Site Alternative would be environmentally superior to the proposed project, it would not meet the District's project objectives.

6 General CEQA Findings

6.1 Mitigation Monitoring and Reporting Program

Based on the entire record before the District and having considered the significant and unavoidable impacts of the proposed project, the District hereby determines that all feasible mitigation within the responsibility and jurisdiction of the District has been adopted to reduce or avoid the potentially significant impacts identified in the Final EIR, and that no additional feasible mitigation is available to further reduce significant impacts. The feasible mitigation measures are discussed in Section 4, above, and are set forth in the Mitigation Monitoring, and Reporting Program.

Section 21081.6 of the California Public Resources Code requires the District to adopt a monitoring or compliance program regarding the changes in the proposed project and mitigation measures imposed to lessen or avoid significant effects on the environment. The Mitigation Monitoring and Reporting Program for the Sherbeck Field Improvements Project is hereby adopted by the District because it fulfills the CEQA mitigation monitoring requirements:

- The Mitigation Monitoring and Reporting Program is designed to ensure compliance with the changes in the proposed project and mitigation measures imposed on the project during project implementation; and
- Measures to mitigate or avoid significant effects on the environment

6.2 CEQA Guidelines Sections 15091 And 15092 Findings

Based on the foregoing findings and the information contained in the administrative record, the District has made one or more of the following findings with respect to each of the significant effects of the proposed project:

1. Changes or alterations have been required in, or incorporated into, the project which mitigate or avoid the significant effects on the environment.
2. Those changes or alterations are within the responsibility and jurisdiction of another public agency and such changes can and should be adopted by such other agency.

Based on the foregoing findings and the information contained in the administrative record, and as conditioned by the foregoing:

1. All significant effects on the environment due to the project have been eliminated or substantially lessened where feasible.
2. Any remaining significant effects that have been found to be unavoidable are acceptable due to the overriding considerations set forth herein.

6.3 Findings Regarding Recirculation

The District finds that the Draft EIR does not require recirculation under CEQA (CEQA Section 21092.1, CEQA Guidelines Section 15088.5). CEQA Guidelines Section 15088.5 requires recirculation of an EIR prior to certification

of the Final EIR when “significant new information is added to the EIR after public notice is given of the availability of the draft EIR for public review.” As described in CEQA Guidelines Section 15088.5:

New information added to an EIR is not “significant” unless the EIR is changed in a way that deprives the public of a meaningful opportunity to comment upon a substantial adverse environmental effect of the project or a feasible way to mitigate or avoid such an effect (including a feasible project alternative) that the project’s proponents have declined to implement. “Significant new information” requiring recirculation includes, for example, a disclosure showing that:

1. A new significant environmental impact would result from the project or from a new mitigation measure proposed to be implemented;
2. A substantial increase in the severity of an environmental impact would result unless mitigation measures are adopted that reduce the impact to a level of insignificance;
3. A feasible project alternative or mitigation measure considerably different from others previously analyzed would clearly lessen the significant environmental impacts of the project, but the project’s proponents decline to adopt it;
4. The draft EIR was so fundamentally and basically inadequate and conclusory in nature that meaningful public review and comment were precluded.

In addition, CEQA Guidelines Section 15088.5(b) provides that “recirculation is not required where the new information added to the EIR merely clarifies and amplifies or makes insignificant modifications in an adequate EIR.” Recirculation also is not required simply because new information is added to the EIR — indeed, new information is oftentimes added given CEQA’s public/agency comment and response process and CEQA’s post-Draft EIR circulation requirement of proposed responses to comments submitted by public agencies. In short, recirculation is “intended to be an exception rather than the general rule.” (*Laurel Heights Improvement Assn. v. Regents of University of California* (1993) 6 Cal.4th 1112, 1132.)

As such, the District makes the following findings:

1. None of the public comments submitted to the District regarding the Draft EIR present any significant new information that would require the Draft EIR to be recirculated for public review.
2. No new or modified mitigation measures are proposed that would have the potential to create new significant environmental impacts.
3. The Draft EIR adequately analyzed project alternatives and based on the Reduced Project Alternative’s ability to lessen significant and unavoidable impacts, the District has selected the Reduced Project Alternative as the proposed project. As such, there are no additional feasible project alternatives or mitigation measures considerably different from others previously analyzed that would clearly lessen the significant environmental impacts of the project.
4. The Draft EIR was not fundamentally and basically inadequate and conclusory in nature and did not preclude meaningful public review and comment.

In this legal context, the District finds that recirculation of the Draft EIR prior to certification is not required. In addition to providing responses to comments, the Final EIR includes revisions to expand upon information presented in the Draft EIR; explain or enhance the evidentiary basis for the Draft EIR’s findings; update information; and to make clarifications, amplifications, updates, or helpful revisions to the Draft EIR. The Final EIR’s revisions,

clarifications and/or updates do not result in any new significant impacts or increase the severity of a previously identified significant impact.

In sum, the Final EIR demonstrates that the proposed project would not result in any new significant impacts or increase the severity of a significant impact, as compared to the analysis presented in the Draft EIR. The changes reflected in the Final EIR also do not indicate that meaningful public review of the Draft EIR was precluded in the first instance. Accordingly, recirculation of the EIR is not required as revisions to the EIR are not significant as defined in Section 15088.5 of the CEQA Guidelines.

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7 Statement of Overriding Considerations

Pursuant to California Public Resources Code, Section 21081(b), and CEQA Guidelines Section 15093(a) and (b), the decision-making agency is required to balance, as applicable, the economic, legal, social, technological, or other benefits of the project against its unavoidable environmental risks when determining whether to approve a project. If the specific economic, legal, social, technological, or other benefits of the project outweigh the unavoidable adverse environmental effects, those effects may be considered “acceptable” (14 CCR 15093 (a)). CEQA requires the agency to support, in writing, the specific reasons for considering a project acceptable when significant impacts are not avoided or substantially lessened. Those reasons must be based on substantial evidence in the Final EIR or elsewhere in the administrative record (14 CCR 15093(b)).

Courts have upheld overriding considerations that were based on a variety of policy considerations including, but not limited to, new jobs, stronger tax base, and implementation of an agency’s economic development goals, growth management policies, redevelopment plans, the need for housing and employment, conformity to community plan, and provision of construction jobs, See *Towards Responsibility in Planning v. City Council* (1988) 200 Cal App. 3d 671; *Dusek v. Redevelopment Agency* (1985) 173 Cal App. 3d 1029; *City of Poway v City of San Diego* (1984) 155 Cal App. 3d 1037; *Markley v. City Council* (1982) 131 Cal App.3d 656. In accordance with the requirements of CEQA and the CEQA Guidelines, the District finds that the mitigation measures identified in the Final EIR and the MMRP, as well as selecting the Reduced Project Alternative, when implemented, will avoid or substantially lessen virtually all of the significant effects identified in the Final EIR for the Sherbeck Fields Improvements Project. However, certain significant impacts of the proposed project are unavoidable even after incorporation of all feasible mitigation measures and selection of the Reduced Project Alternative which further reduces impacts. These significant unavoidable impacts result from noise impacts due to periodic operations of the proposed project and cumulative noise impacts; construction of recreational facilities and cumulative recreation impacts; and operational impacts to City of Fullerton and Caltrans intersections, along with cumulative transportation impacts (see Section 4.1, Impacts Determined to Be Significant and Unavoidable).

The District finds that all feasible mitigation measures identified in the Final EIR that are within the purview of the District would be implemented with the proposed project, and that the remaining significant unavoidable effects are outweighed and are found to be acceptable due to the following specific overriding economic, legal, social, technological, or other benefits, based upon the facts set forth above, the Final EIR, and the record, as follows:

- a. The proposed project would allow Fullerton College to provide a facility for the Fullerton College football program to meet the college field and goalpost sizing requirements of the California Community College Athletic Association Regulations, Bylaw 4.6A, and so that Fullerton College does not have to request a waiver from Southern California Football association for full-season play.
- b. The proposed project would provide an on-campus facility with field lighting to allow for more evening class options for the physical education program to meet student demand, and to allow for evening soccer games, athletic team practices, and occasional evening football games.
- c. The proposed project would provide a facility with permanent bleachers so that Fullerton College can host regular season and playoff football games at Fullerton College, and can reduce costs associated with renting bleachers for the annual Fullerton College commencement ceremony.

- d. The proposed project would provide a facility for the Fullerton College football program that includes a press box, which is required for football games in order to house football coaching staff, media, and statisticians.
- e. The proposed project would provide a facility address the inadequacy of the current storage of football equipment and track and field equipment at the field house.

On balance, the District finds that there are specific economic, legal, social, technological, and other considerations associated with the proposed project that serve to override and outweigh the significant unavoidable effects of the proposed project and, thus, the adverse effects are considered acceptable. Therefore, the District hereby adopts this Statement of Overriding Considerations.

8 Certification of the EIR

The District finds that it has been presented with the Final EIR, which it has reviewed and considered, and further finds that the Final EIR is an accurate and objective statement that has been completed in full compliance with CEQA, and that the Final EIR reflects the independent judgment and analysis of the District.

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Appendix A

MMRP

Revised Mitigation Monitoring and Reporting Program

California Public Resources Code Section 21081.6 requires that, upon certification of an Environmental Impact Report, “the public agency shall adopt a reporting or monitoring program for the changes made to the project or conditions of project approval, adopted in order to mitigate or avoid significant effects on the environment. The reporting or monitoring program shall be designed to ensure compliance during project implementation.”¹

This Mitigation Monitoring and Reporting Program has been developed in compliance with Section 21081.6 of the California Public Resources Code, and Section 15097 of the California Environmental Quality Act Guidelines,² and includes the following information:

- A list of mitigation measures
- The party responsible for implementing or monitoring the mitigation measures
- The timing for implementation of the mitigation measures
- The date of completion of monitoring

The North Orange County Community College District must adopt this Mitigation Monitoring and Reporting Program, or an equally effective program, if it approves the proposed Sherbeck Field Improvements Project (project) with the mitigation measures that were adopted or made conditions of project approval.

¹ California Public Resources Code, Section 21000–21177. California Environmental Quality Act, as amended.

² 14 CCR 15000–15387 and Appendices A–L. Guidelines for Implementation of the California Environmental Quality Act, as amended.

Table 4-1. Mitigation Monitoring and Reporting Program

Mitigation Measure	Implementation Timing	Agency Responsible for Monitoring	Date of Completion
<i>Aesthetics</i>			
<p>PDF-AES-1 During operation of field lighting at Sherbeck Field, the football/soccer field shall be lit to a maximum of 50 horizontal footcandles, with a uniformity ratio of 2:1, which is consistent with the on-field lighting levels at the nearby Fullerton Union High School stadium. The track shall be lit to a maximum of 30 horizontal footcandles with a uniformity ratio of 3:1, and bleachers shall be lit to a maximum of approximately 10 footcandles with a 1-footcandle minimum for egress. The light levels for the field and track shall be consistent with the NCAA Best Lighting Practices for Intercollegiate Play, and conform to the Engineering Society of North America recommended practices for Class II facilities (defined as college, semi-professional, sports clubs, amateur leagues, and high schools for facilities with spectator capacity of fewer than 5,000).</p>	During operations	North Orange County Community College District (District)	
<p>PDF-AES-2 All light fixtures installed on stanchions at Sherbeck Field shall be hooded and directed downward onto their targeted areas (i.e., football/soccer field, track, and bleachers).</p>			
<p>PDF-AES-3 Fullerton College will implement a lighting curfew similar to other parks and public facilities in the City of Fullerton. The only exceptions would be during the week when classes are in session on the field until 9:15 p.m., for graduation in the event that it is held in the evening, or a Saturday football game that has to be held at night due to extenuating circumstances (e.g., hot weather, opposing team schedule).</p>			

Table 4-1. Mitigation Monitoring and Reporting Program

Mitigation Measure	Implementation Timing	Agency Responsible for Monitoring	Date of Completion
<i>Hazards and Hazardous Materials</i>			
MM-HAZ-1 The North Orange County Community College District is responsible for ensuring the proposed Sherbeck Field project complies with applicable procedures set forth in the Hazardous Materials Contingency Plan for Fullerton College, 321 East Chapman Avenue Fullerton, California 92832, and dated February 2018. The Hazardous Materials Contingency Plan, as it applies to the Sherbeck Field project, shall be followed during construction activities.	During construction	District	
<i>Noise</i>			
MM-NOI-1 Prior to initiation of construction on the Fullerton College campus, the North Orange County Community College District shall approve a construction noise mitigation program to include the following: <ul style="list-style-type: none"> • The Construction equipment shall be properly outfitted and maintained with feasible noise-reduction devices to minimize construction-generated noise. • Stationary noise sources such as generators shall be located away from noise-sensitive land uses if feasible. • Laydown and construction vehicle staging areas shall be located away from noise-sensitive land uses if feasible. • A temporary construction noise barrier shall be constructed at the eastern boundary of the project site. The noise barrier shall be a minimum of 8 feet in height, must have a surface density of at least 4 pounds per square foot, and be free of openings and cracks. • Whenever possible, academic, administrative, and residential areas that will be subject to construction 	Pre-construction	District	

Table 4-1. Mitigation Monitoring and Reporting Program

Mitigation Measure	Implementation Timing	Agency Responsible for Monitoring	Date of Completion
<p>noise shall be informed 1 week before the start of construction.</p> <ul style="list-style-type: none"> • Compliance with the City's Noise Control Ordinance regarding normal hours for construction activities (Monday through Saturday, 7:00 a.m. to 8:00 p.m.). No construction activities would occur on Sundays or on City-recognized holidays. • All construction pursuant to the proposed project shall be required to implement the above measures for control of construction noise. North Orange County Community College District shall be responsible for making sure the construction contractor implements this measure. Compliance shall be tracked through weekly inspections during construction and reported in a Mitigation Monitoring and Reporting Program document. 			
<p>MM-NOI-2 The Fullerton College Athletic Department shall require the Facilities Department and any rental agreements to restrict field events at Sherbeck Field to occur only during the following times:</p> <ul style="list-style-type: none"> • Spring Semester: Monday through Thursday between 6:00 a.m. to 9:15 p.m.; Friday between 6:00 a.m. to 8:00 p.m.; Saturday and Sunday between 8:00 a.m. to 8:00 p.m. • Summer Semester: Monday through Thursday between 6:00 a.m. to 9:15 p.m.; Friday between 6:00 a.m. to 8:00 p.m.; Saturday and Sunday between 8:00 a.m. to 8:00 p.m. • Fall Semester: Monday through Thursday between 6:00 a.m. to 9:15 p.m.; Friday between 6:00 a.m. to 8:00 p.m.; Saturday and Sunday between 8:00 a.m. to 8:00 p.m. (with the exception of up to two Fullerton College football games per year from 7:00 p.m. to 10:00 p.m.). 	Post-construction	District	

Table 4-1. Mitigation Monitoring and Reporting Program

Mitigation Measure	Implementation Timing	Agency Responsible for Monitoring	Date of Completion
<ul style="list-style-type: none"> • Outside groups using the field are prohibited from using any public address or sound amplification systems. • North Orange County Community College District will be responsible for making sure the rental parties comply with their rental agreements in which these timelines will be stipulated and also through compliance with the project's MMRP. 			
<p>MM-NOI-3 The speaker system used at Sherbeck Field will not exceed 86 A-weighted decibels sound pressure level in the bleachers at any events. North Orange County Community College District will be responsible for making sure the speaker system does not exceed 86 A-weighted decibels sound pressure level. This will be accomplished either by limiting the levels during final speaker system design and installation, or by periodic testing of the system prior to large games.</p>	During operations	District	
<p>MM-NOI-4 Programming for each of the uses on Sherbeck Field is required to comply with the North Orange County Community College District's Administrative Procedures Chapter 6, Business and Fiscal Affairs, 5.0 Sherbeck Field Usage. Regulations governing Sherbeck Field usage are as follows:</p> <ul style="list-style-type: none"> • No Fullerton College football games shall be played on Friday evening. • No high school football games shall be played at Sherbeck Field. <ul style="list-style-type: none"> o Exceptions may be made for temporary use during extenuating circumstances. • Field lighting shall not be used for any outside groups at any time on Saturday and Sunday. • No field rentals for the purpose of musical performances or concerts by outside groups or individuals will be permitted. 	During operations	District	

Table 4-1. Mitigation Monitoring and Reporting Program

Mitigation Measure	Implementation Timing	Agency Responsible for Monitoring	Date of Completion
<ul style="list-style-type: none"> The public address system is only for use by Fullerton College. Outside groups using the field are prohibited from using any public address or sound amplification systems. 			
Transportation			
PDF-TRA-1 Parking on campus shall be provided free of charge for football and soccer game attendees.	During operations	District	
MM-TRA-1 Construction Management Plan Criteria: To ensure impacts to the surrounding street system are less than significant, the North Orange County Community College District, in coordination with the City of Fullerton, shall, prior to the commencement of construction activities, develop a Construction Management Plan to be implemented during project construction. The Construction Management Plan shall include the following components: <ul style="list-style-type: none"> Implement traffic control for any street closure, detour, or other disruption to traffic circulation. Identify the routes that construction vehicles will utilize to access the site for the delivery of construction materials to minimize to the extent feasible traffic-related impacts, traffic controls and detours, and proposed construction phasing plan for the project. Specify the hours during which transport activities can occur and methods to minimize construction-related impacts to adjacent streets. Require that the hauling or transport of oversize loads be limited to the non-peak hours of 9:00 a.m. to 4:00 p.m. only, Monday through Friday, unless approved otherwise by the City Engineer. 	Pre-construction	N/A	N/A

Table 4-1. Mitigation Monitoring and Reporting Program

Mitigation Measure	Implementation Timing	Agency Responsible for Monitoring	Date of Completion
<ul style="list-style-type: none"> • Use of local collector street (as defined by Exhibit 6 of The Fullerton Built Environment) by construction vehicles shall be prohibited. • Haul trucks entering or exiting public streets shall at all times yield to public traffic. • All construction-related parking and staging of vehicles shall be kept out of the adjacent public roadways and occur on site. • The Construction Management Plan shall meet standards established in the current California Manual on Uniform Traffic Control Devices as well as City of Fullerton requirements, and requires approval by the City Traffic Engineer and Public Works Department. 			
<p>MM-TRA-2 The North Orange County Community College District shall implement a Traffic Management Plan (TMP) during the Friday field event arrival and departure periods, as applicable, at the intersection of Lemon Street/Fullerton College Drive, . The TMP shall be implemented in coordination with the City of Fullerton and requires approval by the City Traffic Engineer and shall include, as necessary: the placement of police department staff or staff with equivalent training at the affected intersections to manage traffic flow; intersection signal timing adjustments to further improve traffic flow; routing of traffic via traffic cones/delineators; and/or the implementation of programmable changeable message signs. If Fullerton police officers are employed for traffic control purposes it requires a request be made to the Police Department and is dependent on the availability of off-duty officers. The District will be responsible for the cost of services received.</p>	<p>During Friday and Saturday field event arrivals</p>	<p>District</p>	

Table 4-1. Mitigation Monitoring and Reporting Program

Mitigation Measure	Implementation Timing	Agency Responsible for Monitoring	Date of Completion
MM-TRA-3 Prior to 2030, the North Orange County Community College District shall pay its proportional “fair share” (13.0%) of the costs to implement the following improvements at the intersection of State College Boulevard/Chapman Avenue: Widen and/or restripe the westbound approach of Chapman Avenue to provide a second westbound left-turn lane; And modify the existing traffic signal as necessary	Post-construction and prior to 2030	District	
MM-TRA-4 Prior to 2030, the North Orange County Community College District shall pay its proportional “fair share” (0.6%) of the costs to implement the following improvements at the intersection of the State Route (SR) 57 Northbound (NB) Ramps and Chapman Avenue: widen and/or restripe the westbound approach of Chapman Avenue to provide a third westbound through lane; and, modify the existing traffic signal as necessary.	Post-construction and prior to 2030	District	
<i>Tribal Cultural Resources</i>			
MM-TRC-1 In the event that archaeological resources (sites, features, or artifacts) are exposed during construction activities for the proposed project, all construction work occurring within 100 feet of the find shall immediately stop until a qualified archaeologist, meeting the Secretary of the Interior’s Professional Qualification Standards, can evaluate the significance of the find and determine whether additional study is warranted. Depending on the significance of the find under the California Environmental Quality Act (CEQA), the archaeologist may simply record the find and allow work to continue. If the discovery proves significant under CEQA, additional work, such as preparation of an	During construction	District	

Table 4-1. Mitigation Monitoring and Reporting Program

Mitigation Measure	Implementation Timing	Agency Responsible for Monitoring	Date of Completion
archaeological treatment plan, testing, or data recovery, may be warranted.			
Utilities and Service Systems			
MM-UTL-1 Based on the Orange County Technical Guidance Document and site characteristics, the proposed project would ensure that the site runoff is captured and directed into bioswales on the northern and southern sides of the site. Each swale shall be designed as a trapezoid with side slopes of no more than 2:1, with a 3-foot base width, as shown in the preliminary drainage analysis prepared for the proposed project. All overflow drainage in excess of the water quality treatment flow requirements will be directed into the existing curb and gutter system around the site.	Post-construction	District	

N/A = not applicable

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Appendix B

Acoustical Report

November 19, 2019

DLR Group
1650 Spruce Street, Suite 300
Riverside, CA 92507

Attention: Leigh Anne Jones | Senior Architect

Subject: **Fullerton College Sherbeck Field; Fullerton, California**
Exterior Acoustical Study Report
VA Project No. 2663-071

Dear Ms. Jones,

Veneklasen Associates (VA) was contracted to conduct an acoustical study for proposed changes to the Sherbeck Field athletic facility at Fullerton College in Fullerton, California. Fullerton College is located at 321 E Chapman Avenue, Fullerton, CA 92832. The location of the project site is shown in Figure 1.

A list of acoustical terms and their definitions is presented in *Appendix A*.

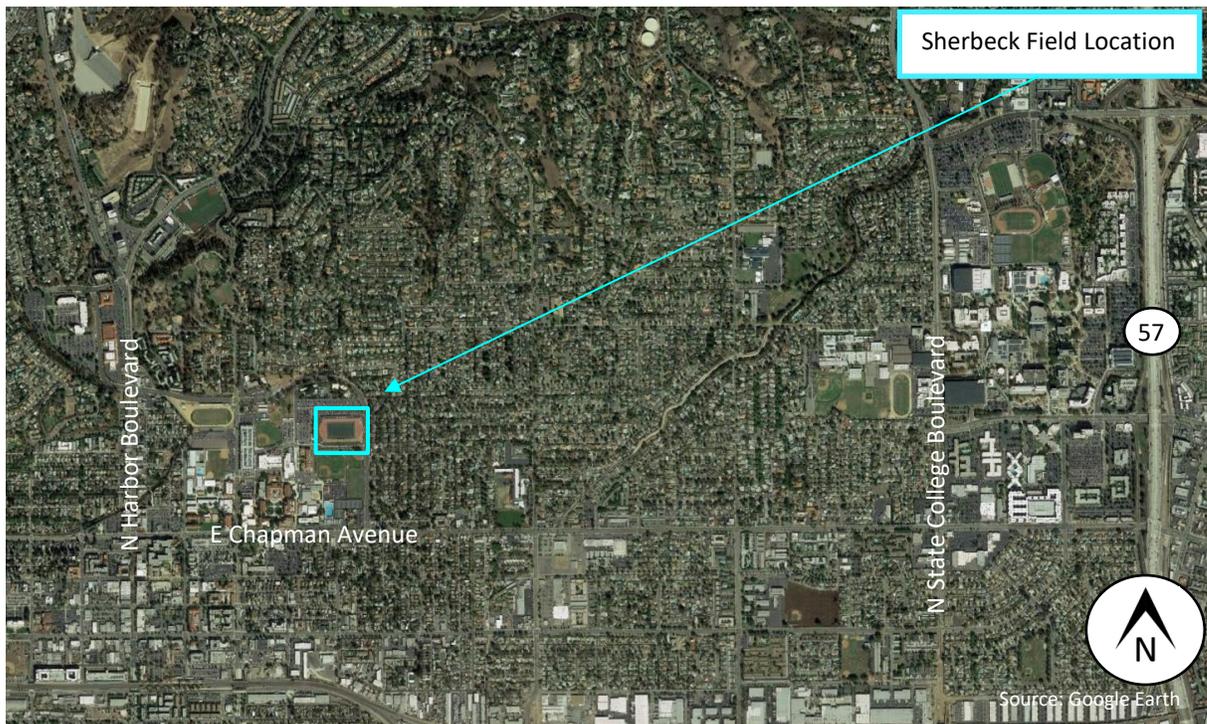


Figure 1. Project Site Location

PROJECT DESCRIPTION

Sherbeck Field at Fullerton College is an existing athletic facility including a turf field and surrounding track for various athletic activities at the college. The purpose of this project is for the addition of additional bleacher sitting on the south (home) and north (visitor) sidelines, the installation of a press box, and the design and installation of a public address (PA) system for the facility.

The proposed home sideline bleacher is proposed on the existing grass area to the south of the existing field and track. The proposed bleacher is approximately 43'2" in the north-south direction, and the top row of seats is approximately 19'6" above grade elevation. The press box is located at the center of the bleacher with a base elevation at 19'6" above grade, and a top height of approximately 8'9" above the highest row of seats at the front of the press box. The press box is approximately 9'0" in the north-south direction. The home sideline bleacher is designed for a maximum capacity of 2861 people.

The proposed visitor sideline bleacher is proposed on the existing paved area to the north of the existing field and track. The proposed bleacher is approximately 34'0" in the north-south direction, and the top row of seats is approximately 15'8" above grade elevation. The visitor sideline bleacher is designed for a maximum capacity of 1556 people.

The proposed public address (PA) speaker system was designed by PlanNet, and utilizes speaker arrays designed by L-Acoustics. There are seven speaker arrays (including the press box) specified for the home sideline, and five speaker arrays specified for the visitor sideline. Speakers are proposed at approximately 36 feet above grade elevation on the home sideline (33 feet above grade for the press box speaker array) and 33 feet above grade elevation on the visitor sideline.

Several single-family residences are located along N Berkeley Avenue to the east and north of the project area. These residences have been considered receptors for the purposes of this acoustical study.

The total capacity of the proposed project is 4417 people on both sidelines, in addition to personnel on the field. The locations of various project elements and receptor locations are shown in Figure 2.

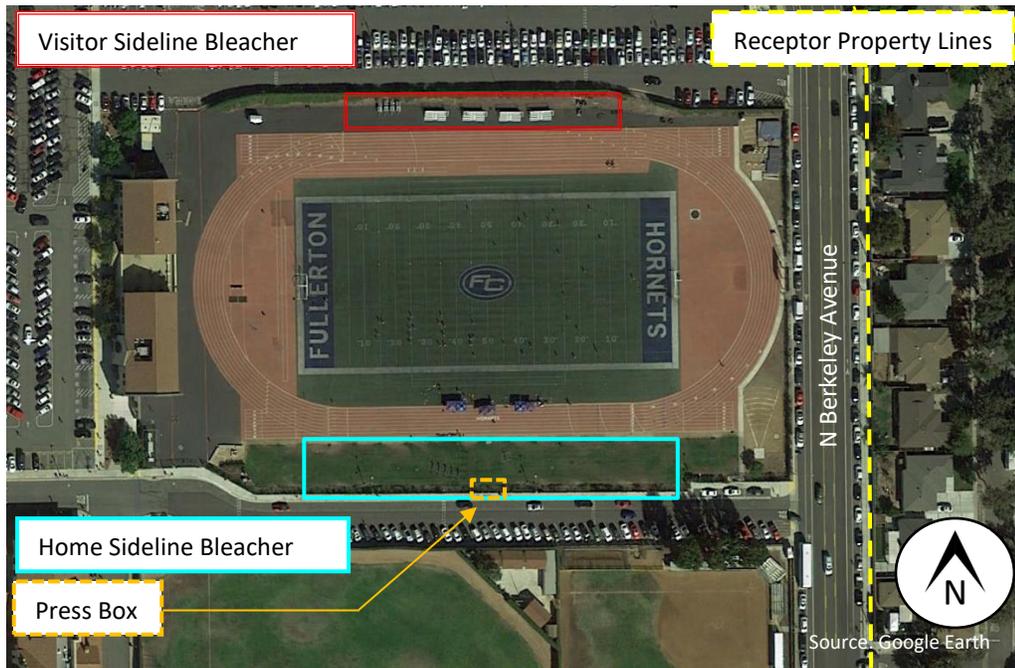


Figure 2. Project Elements and Receptor Locations

CRITERIA

The City of Fullerton Municipal Code (FMC) specifies sound level limits in Title 15, *Zoning*. In Chapter 15.90, *Noise Standards and Regulations*, various acoustical terms and specific sound level limits for various zones are defined.

In Section 15.90.030.A, *Noise Standards*, the FMC defines sound level limits for residential noise zones. Sound level limits specified in the FMC are shown in Table 1.

Table 1. Sound Level Limits for Residential Noise Zones

Receptor Location	Time Period	Allowable Noise Level (dB(A))
Interior	Day (07:00 – 22:00)	55
	Night (22:00 – 07:00)	45
Exterior	Day (07:00 – 22:00)	55
	Night (22:00 – 07:00)	50

As interior sound levels are variable based on the design of the exterior façade of the residence, glazing assemblies, etc., prediction is not possible without significant additional measurements. Therefore, only exterior sound levels are considered in this acoustical study.

Section 15.90.030.B defines additional sound level standards for sensitive land uses. This section defines “sensitive uses” as “any private or public school, hospital, residential care facility for the elderly, and religious institution”. Although Fullerton College is an educational facility, each of the receptors surrounding this project are single-family residential properties, and therefore are not considered “sensitive uses” according to this chapter of the FMC.

Section 15.90.040, *Activities exempt from standards*, specifies activities that are exempt from sound level standards discussed in this chapter of the FMC. Item A-1 in this section specifies “[s]chool bands, school athletic and school entertainment events” as exempt activities. Item A-2 in this section specifies “[o]utdoor gatherings, public dances, shows and sporting and entertainment events provided the events are conducted pursuant to a permit and/or license issued by the city” as exempt activities. Item A-3 in this section specifies “[a]ctivities conducted on public parks, public playgrounds and public or private school grounds” as exempt activities.

VA interprets the above sections of the FMC such that the proposed Sherbeck Field project shall be exempt from strict interpretation of FMC sound level limits due to the exemption in Section 15.90.040.A.1. However, sound levels from the proposed project have been analyzed to quantify the predicted sound levels at residential receptor locations near the project with respect to the existing “ambient” sound levels at these receptors.

ACOUSTICAL MEASUREMENTS

Measurements were conducted by VA in and around the project site to quantify existing sound levels at nearby residential receptor property lines. Measurements were conducted on 12/15/2017 through 12/18/2017 at four discrete measurement sites for various durations. Measurement locations are shown in Figure 3 and described in Table 2 below. The primary sound source in the project area is automobile traffic on N Berkeley Avenue.



Figure 3. Acoustical Measurement Locations

Table 2. Acoustical Measurement Locations

Measurement Site	Approximate Duration	Description
LT-1	3 Days	East property line of existing Sherbeck Field on Fullerton College property on west side of N Berkeley Avenue.
ST-1	1 Hour	Public R.O.W. on east of N Berkeley Avenue west of single-family residential property at 621 Princeton Circle W, Fullerton, CA 92831
ST-2	20 Minutes	Public R.O.W. east of N Berkeley Avenue west of single-family residential property at 601 Princeton Circle W, Fullerton, CA 92831
ST-2	20 Minutes	Public R.O.W. east of N Berkeley Avenue west of empty lot to the south of 600 E Glenwood Avenue, Fullerton, CA 92831

One long-term acoustical measurement (denoted Site LT-1) was conducted on the east side of the existing Sherbeck Field property to quantify long-term sound levels generated by automobile traffic on N Berkeley Avenue. This sound level meter was installed on 12/15/2017 at approximately 10:00 a.m. and measured continuously until 12/18/2017 at approximately 08:00 a.m.

Three additional short-term acoustical measurements (denoted Sites ST-1, ST-2, and ST-3) were conducted while the long-term measurement was simultaneously measuring at public right-of-way (R.O.W.) adjacent to nearby residential receptors. By comparing measured short-term sound levels at these locations to the simultaneously measured sound levels at location LT-1, sound levels could be correlated by calculating an “offset” difference in sound levels. Utilizing that offset and the hourly measured sound levels at Site LT-1 (averaged across the three-day measurement period), sound levels at any period of the day at each of the ST sites can be accurately calculated.

Simultaneously measured sound levels at each of the measurement sites, as well as calculated sound level offset values, are shown in Table 3. Calculated hourly sound levels at each of the measurement locations using this offset are shown in Table 4 on the following page. The complete set of measured sound levels at Site LT-1 are shown in *Appendix B. Site LT-1 Measured Sound Levels*.

Table 3. Simultaneously Measured Existing Sound Levels and Offset Values

Measurement Site	Measured Sound Level, L_{eq} (dB(A) re: 20 μ Pa)		Offset (dB)
	Site LT-1	ST Sites	
ST-1	68	70	2
ST-2	65	67	2
ST-3	65	69	4

Acoustical measurements for this project were conducted with Brüel & Kjær Type 2270 sound level meters which conform to ANSI S.14-1961 for Type 1 precision sound level meters. Measurements were conducted utilizing Brüel and Kjær Type 4189 microphones. All equipment was field-calibrated before use utilizing a Larson Davis CAL200 acoustical calibrator.

ACOUSTICAL MODELING PROCEDURES AND RESULTS

An acoustical model of the project area has been generated to evaluate and quantify sound levels generated by the proposed project and their impact on nearby residential receptors. Sound exposure was modeled using the Brüel & Kjær Predictor acoustical modeling software, Version 12.00. The selected calculation method for this project was LimA – International Organization for Standardization (ISO) 9613.1/2.

Acoustical models were generated for projected crowd noise, projected noise levels from the proposed speaker system, and for existing traffic noise in the project area. Acoustical modeling procedures for all scenarios are discussed in this section of the report.

The acoustical model includes shielding and reflections generated by buildings, walls and other structures in the area with elevations obtained utilizing Google Earth. The noise model also includes terrain elevation data from the United States Geological Survey (USGS) NAD83 data set.

This section is continued on page 7 of this report.

Table 4. Residential Receptor Existing Sound Levels

Time of Day (hh:mm)	Hourly Existing Sound Level at Corresponding Residential Receptor, L_{eq} (dB(A) re: 20 μ Pa)		
	ST-1	ST-2	ST-3
00:00	57	57	59
01:00	55	55	58
02:00	55	55	57
03:00	53	53	55
04:00	55	55	57
05:00	59	59	61
06:00	61	61	63
07:00	65	65	67
08:00	64	64	66
09:00	65	65	67
10:00	66	67	69
11:00	66	66	68
12:00	66	66	68
13:00	66	66	68
14:00	68	68	70
15:00	68	68	70
16:00	67	67	69
17:00	66	66	68
18:00	65	65	67
19:00	64	64	66
20:00	63 ^a	63 ^a	65 ^a
21:00	65	65	67
22:00	62	62	64
23:00	60	60	62

^a Denotes minimum existing sound level between 07:00 a.m. and 22:00 (10:00 p.m.), which are the expected potential operating hours of the proposed project.

ACOUSTICAL MODELING PROCEDURES AND RESULTS (CONTINUED)

Utilizing the Brüel & Kjær Predictor acoustical modeling software, VA utilized the following data sets and assumptions to model sound levels due to the proposed project.

Crowd and On-Field Source Modeling:

VA utilized various data sources to determine the average sound levels generated by crowds at sporting events. VA utilized data measured for previous projects for both softball and soccer activities, and normalized all data for both measured distance and crowd size.

VA also utilized measurement data presented in the Harvard-Westlake Middle School (located in Los Angeles, California) Campus Modernization Project Draft Noise Assessment Technical Report, prepared by PCR Services Corporation in January 2004. This report presents data measured both near the source at nearby residential receptors during a football games. This data was used to corroborate previously measured data by VA.

The above data sets were normalized to obtain the sound power (source sound level) characteristics of a crowd of a given size. The reference sound pressure level spectrum per person utilized for this report, normalized to a 50-foot setback distance, is shown in Figure 4.

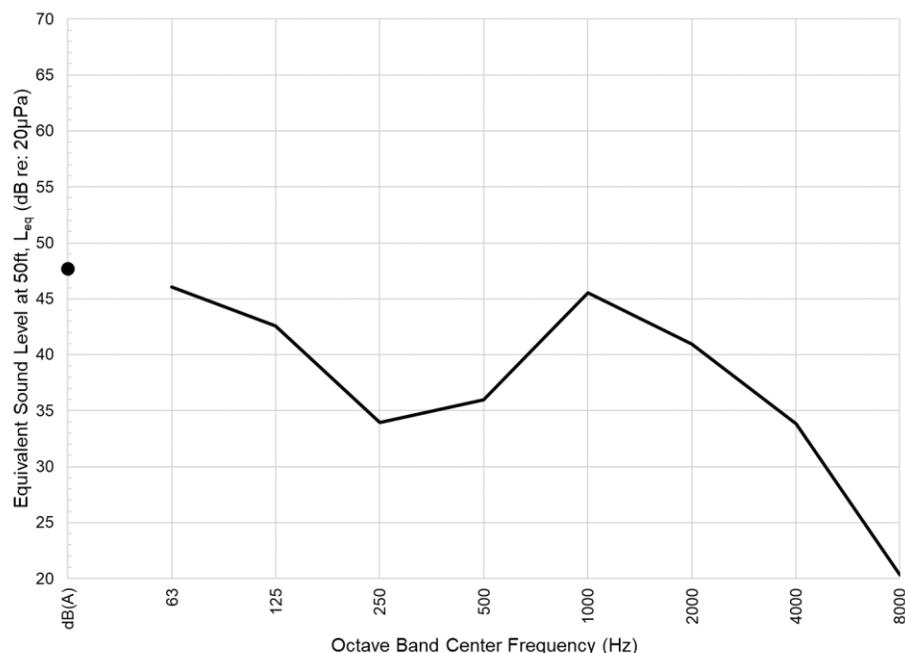


Figure 4. Crowd Reference Sound Pressure Level per Person, Normalized to 50 feet Setback Distance

The noise model was generated using a crowd of 2725 people on the home sideline bleacher and 1475 people on the visitor sideline bleacher (95% maximum capacity on both sidelines). The crowd was assumed to be dispersed evenly about both bleachers. Crowd sources were modeled as omnidirectional point sources.

The acoustical model additionally includes 300 total people (150 home and 150 visitor) at grade elevation on the field sidelines, to evaluate noise exposure from players, coaches, and referees. These results are included in the acoustical crowd noise model.

A sound level contour map for crowd and on-field sources is shown in Figure 8 on page 11.

Speaker System Source Modeling:

The speaker / public address (PA) system for the Sherbeck Field project was designed by PlanNet, and utilized speaker arrays designed by L-Acoustics, Inc. Speaker design models and other associated information were provided to VA in a Soundvision audio/visual model. VA incorporated speaker locations and orientations into the Predictor acoustical model for evaluation of sound level exposure.

Two types of L-Acoustics speaker arrays were specified for this project. Seven speaker arrays were specified on the home sideline to the south (including the press box), at a height of approximately 36 feet above grade elevation (33 feet above grade for the press box speaker array). The speaker array specified is a combination of the Arcs Focus speaker on top, with the Arcs Wide speaker on the bottom.

Five speaker arrays were specified on the visitor sideline to the north, at a height of approximately 33 feet above grade elevation. The speaker array specified is a dual configuration of Arcs Focus speakers.

The directivities of both speaker arrays were determined using the EASE audio/visual model, utilizing inputs on each speaker type provided by L-Acoustics. The directivities of each associated speaker array utilized in VA's acoustical model is shown as *Appendix C. L-Acoustics, Inc. Speaker Array Directivity Diagrams*. The directivities shown are conservatively utilized for both the horizontal and vertical directions, utilizing the speaker orientations specified in the Soundvision audio/visual model.

VA utilized reference sound levels from various sources to evaluate sound level exposure. A sound level spectrum for rock music was utilized from *Architectural Acoustics* by M. David Egan. A sound level spectrum for human speech through the PA system was utilized from the textbook *Acoustics* by Leo L. Beranek. Both spectra were normalized to a sound level (L_p) of 91 dB(A) in the bleacher, which is 10 dB above the level generated by the crowd at an identical location. The reference sound power levels of each source spectrum for each speaker are shown in Figure 5.

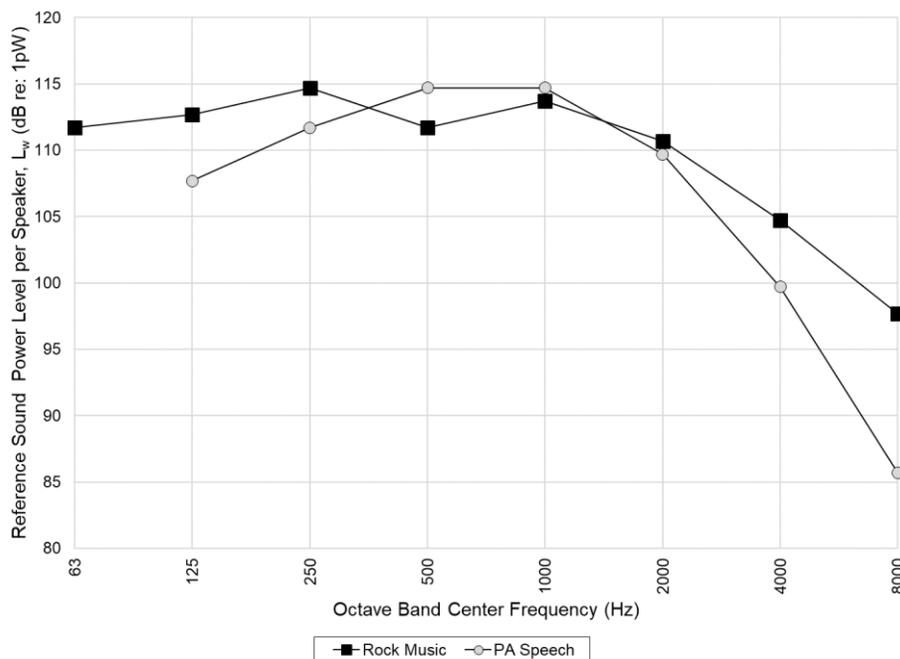


Figure 5. Speaker System Reference Sound Power Levels; Each Array

Utilizing the reference sound levels for both music and speech over the PA system, a composite time-weighted sound power level for the PA system was determined.

It was assumed for this assessment that rock music was utilized at the reference sound power level shown in Figure 5 for 15 minutes out of every hour (25% utilization). This assumption was based on VA's qualitative observations of sporting events.

It was assumed for this assessment that PA speech was utilized at the reference sound power level shown in Figure 5 for 20 minutes out of every hour (33% utilization). This assumption was based on VA's qualitative observations of sporting events.

Utilizing the above assumptions, the reference sound power level spectra for both PA music and speech were weighted with respect to time, to determine the maximum average hourly contribution of each noise source. The two time-weighted spectra were combined to determine the composite time-weighted maximum average hourly noise level contribution of each array of the PA system.

The time-weighted spectrum for PA music and speech, as well as the total composite time-weighted average sound power level of each speaker array, are shown in Figure 6.

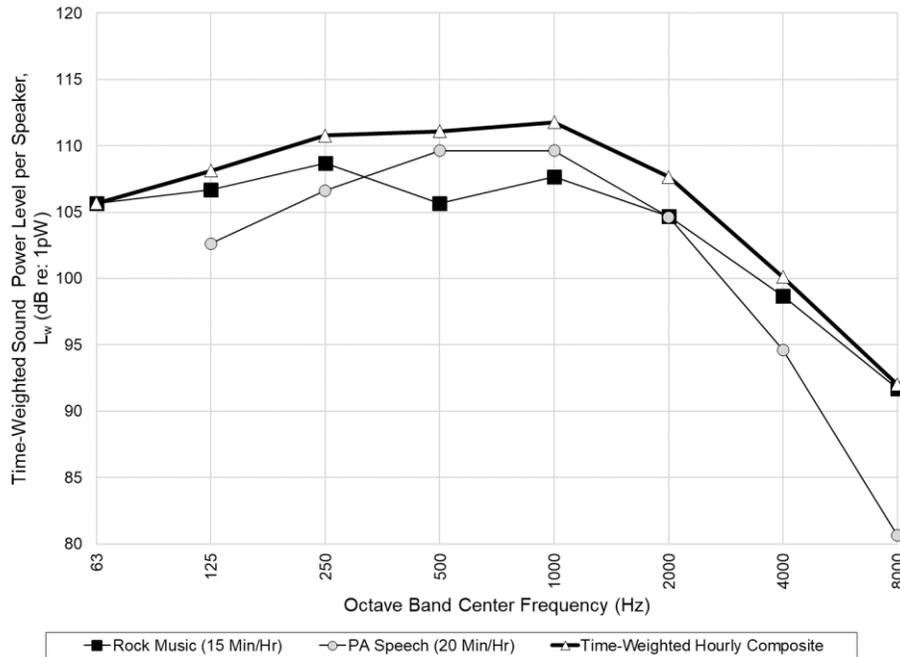


Figure 6. Speaker System Time-Weighted Sound Power Levels, Each Array

Spectral sound level contour maps for the proposed PA speaker system utilizing the above assumptions are shown in *Appendix D. I-acoustics, inc. Speaker (PA) System Sound Level Contour Figures*. The Predictor acoustical model is limited in that it cannot incorporate spectral directivities for a source, therefore each octave band was modeled separately. Note that all spectral sound levels are modeled as A-weighted sound levels, for visual comparison to overall A-weighted sound levels presented quantitatively.

Existing Sound Level Traffic Modeling:

Utilizing the measured sound levels described in the *Acoustical Measurements* section of this report, an acoustical model was generated to evaluate the existing sound level at each residential receptor in the project area.

To evaluate existing traffic noise at each receptor, the measured sound level spectrum measured at Site ST-1 (nearest to N Berkeley Avenue, along the residential property line) was normalized to the quietest measured hour at site LT-1. Utilizing this procedure, the existing quietest hour due to traffic noise can be evaluated.

The modeled sound pressure level of N Berkeley Avenue, normalized to a 50-foot setback distance, is shown in Figure 7.

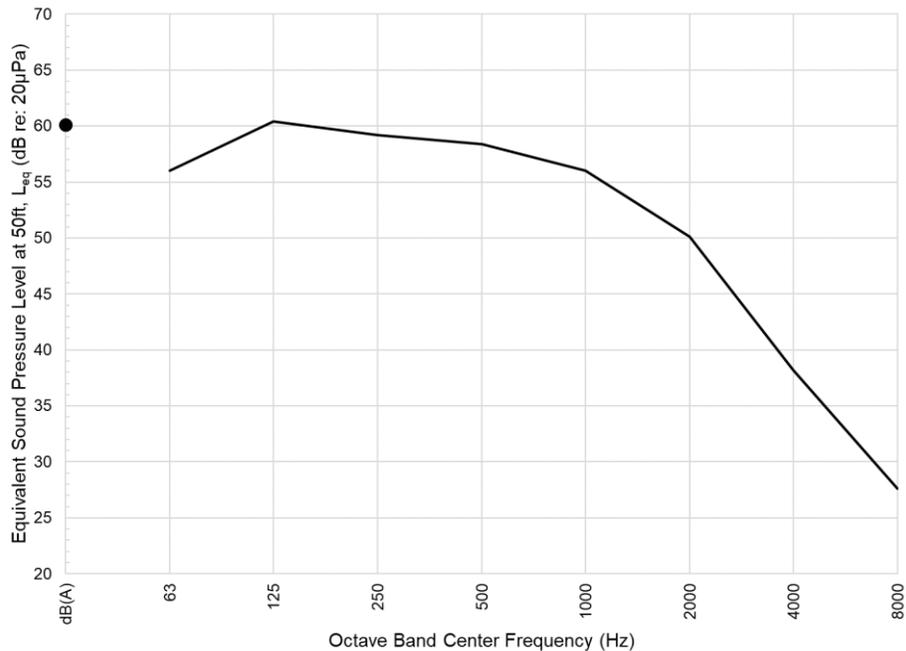


Figure 7. Modeled Existing Traffic Sound Levels

Cumulative Sound Levels:

Each of these acoustical models was combined to generate the cumulative predicted maximum hourly sound levels generated by the proposed project. Existing quietest hourly sound levels, predicted sound levels due to the crowd, predicted sound levels due to the proposed speaker system, cumulative sound levels, and maximum future sound level increase are shown in Table 5 on page 12.

Quantitative sound level results are at the property line location closest to the project site at a height of five feet above grade elevation. For the majority of residential receptors in the study area, there is a four-foot high property line wall between the residential property and the public right-of-way. Each receptor location is therefore approximately one-foot above the top of this property line wall.



Figure 8. Modeled Maximum Hourly Sound Level Results – Crowd of 4,200 and On-Field Sources Only

Table 5. Property Line Maximum Hourly Sound Exposure Level Results with Crowd of 4,200

Receptor	Existing Sound Level, Leq (dB(A)) ^a	Predicted Sound Levels, Leq (dB(A))			Cumulative Future Sound Level, Leq (dB(A))	Existing to Future Sound Level Increase (dB)
		Crowd	PA System	Total		
601 E Glenwood Avenue	62	62	67	69	69	7
600 E Glenwood Avenue	62	63	67	68	69	7
637 Princeton Circle W	62	65	71	72	72	10
633 Princeton Circle W	63	66	74	74	75	12
629 Princeton Circle W	63	66	73	74	74	11
625 Princeton Circle W	63	67	74	75	75	12
621 Princeton Circle W	63	67	75	75	76	13
617 Princeton Circle W	63	68	75	76	76	13
613 Princeton Circle W	63	68	74	75	75	12
609 Princeton Circle W	63	68	74	75	75	12
605 Princeton Circle W	63	66	71	73	73	10
601 Princeton Circle W	63	67	71	72	73	10
545 Princeton Circle W	63	64	67	69	70	7

^a Existing sound level on receptor property was calculated using an acoustical model for N Berkeley Avenue, calibrated to minimum hourly sound level, as measured on-site.

Note – Sound levels are rounded to the nearest whole decibel.

MITIGATION OPTIONS

The analysis predicts an increase in overall sound level during evening athletic events on Sherbeck Field of 7 to 13 dBA. The following mitigation options are reviewed to evaluate feasibility and benefits.

Noise Barrier Walls

Due to the height of speakers and bleachers proposed for this project, traditional sound level mitigation measures are predicted to be ineffective or infeasible for the reduction of sound levels due to the proposed project. Property line noise barrier walls would need to be constructed to a very high elevation to provide acoustic shielding to residential receptors, as speaker arrays and the top row of the crowd are located at elevations of 30 feet above grade. Noise barrier walls on the bleachers would likely add significant structural weight for little acoustic benefit, and are therefore also not considered feasible.

Sound System

Two initial public-address system strategies were considered, and the design analyzed above was the most optimum design to reduce impact to areas outside of Sherbeck Field. Other, more traditional approaches, resulted in unacceptable levels of sound transmission to Fullerton College neighbors.

Reduced Seating Capacity of 2,000

VA investigated the reduced scope with a stadium seating capacity of 2,000. A reduction in the crowd size decreases the noise generated by the crowd, which in turn decreases the required sound level of the public-address system. This analysis assumes a public-address system sound level of 10 decibels above the crowd noise level, or a sound level (L_p) of 86 dB(A). Existing quietest hourly sound levels, predicted sound levels due to the crowd, predicted sound levels due to the proposed speaker system, cumulative sound levels, and maximum future sound level increase are shown in Table 6.

A review of the table indicates the predicted increase in overall sound level during evening athletic events on Sherbeck Field to be 4 to 8 dBA.

Table 6. Property Line Maximum Hourly Sound Exposure Level for 1,500 Home Spectators and 500 Visitor Spectators

Receptor	Existing Sound Level, L_{eq} (dB(A)) ^a	Predicted Sound Levels, L_{eq} (dB(A))			Cumulative Future Sound Level, L_{eq} (dB(A))	Existing to Future Sound Level Increase (dB)
		Crowd	PA System	Total		
601 E Glenwood Avenue	62	58	63	64	66	4
600 E Glenwood Avenue	62	59	63	65	66	4
637 Princeton Circle W	62	58	66	67	68	6
633 Princeton Circle W	63	61	68	69	70	7
629 Princeton Circle W	63	60	68	69	70	7
625 Princeton Circle W	63	62	69	70	71	8
621 Princeton Circle W	63	63	70	71	71	8
617 Princeton Circle W	63	63	70	71	71	8
613 Princeton Circle W	63	63	70	71	71	8
609 Princeton Circle W	63	63	69	70	71	8
605 Princeton Circle W	63	63	67	69	70	7
601 Princeton Circle W	63	63	67	69	70	7
545 Princeton Circle W	63	62	64	66	68	5

^a Existing sound level on receptor property was calculated using an acoustical model for N Berkeley Avenue, calibrated to minimum hourly sound level, as measured on-site.

Note – Sound levels are rounded to the nearest whole decibel.

CONCLUSIONS AND DISCUSSION

VA has been contracted to conduct an acoustical study of the proposed Sherbeck Field renovation at Fullerton College in Fullerton, California and to evaluate the potential for sound exposure from the proposed project. VA has utilized a variety of modeling techniques as well as on-site acoustical measurements to determine the predicted sound exposure with respect to existing sound levels.

The Fullerton Municipal Code (FMC) specifies sound level limits from various sources at noise-sensitive receptor locations. However, the FMC exempts educational facilities, including athletic activities, from these sound level limits.

For receptors close to the project site, there is predicted to be an increase in overall sound level during athletic activities on Sherbeck Field. The increase of sound level is primarily due to the conservatively predicted sound levels generated by the speaker / PA system proposed for the project.

Regardless of reduction of sound level from the speaker system or crowd or a reduced project to limit crowd size, it is very unlikely that athletic events could be held at close proximity to the nearby residential receptors without events being audible or measurable above existing sound levels. However, this study represents periods of maximum hourly sound level exposure (i.e. high crowd capacity, relatively loud speaker sound levels). Therefore, sound exposure at these nearby residences would likely be limited to high capacity athletic events such as evening games.

Given the infeasibility of traditional sound level mitigation measures and the exemption of educational facility projects in the FMC, VA recommends utilizing the directional loudspeakers, similar to the JBL AW266-LS loudspeakers, for a focused public-address system. VA recommends that sound levels from both speech and music be continuously normalized while in use to ensure that they are not excessively loud, and the PA system is utilized at the lowest possible sound level while preserving the intended use of the facility.

Please do not hesitate to contact us if you have any questions regarding the materials presented in this report.

Sincerely,

Veneklasen Associates, Inc.



Stephen A. Martin, Ph.D., P.E.
Associate Principal

APPENDIX A. DEFINITIONS OF ACOUSTICAL TERMS

Term	Definition
Decibel (dB)	A unit describing the amplitude of sound in a logarithmic ratio to a reference value.
A-weighted Decibels (dBA)	A filter applied to sound pressure levels in decibel to simulate the response of the human ear at the threshold of hearing. A-weighting de-emphasizes the low frequency components of a sound similar to the human ear at these levels. This metric has been closely tied to subjective reactions of annoyance to noise, and is used as a noise metric in this and in many other environmental acoustics reports. In this report, all dBA levels reported refer to the sound pressure level, referenced to 20μPa
Sound Pressure Level (L_p)	The amplitude of sound compared to the reference value of 20μPa. Sound Pressure Level is what we perceive as audible sound. Sound Pressure Level decreases as distance from the source to the receiver increases. All sound values discussed in this report refer to Sound Pressure Levels.
Equivalent Sound Level (L_{eq})	The time-weighted average sound level for a given period of time. Use of this metric allows the observation of the overall sound level for the measurement period.
Sound Power Level (L_w)	The amplitude of sound compared to the reference value of 1pW. Sound Power Level does not vary with distance, and represents the level of sound emitted by a given source. The sound power level is generally used to model the sound pressure level of a source at a given distance or location.
Ambient Noise Level	As defined in the Fullerton Municipal Code, the ambient noise level is “the all-encompassing noise level associated with a given environment... at the location and approximate time at which a comparison with the alleged offensive noise is to be made”. This report defines the “ambient” noise level as the existing noise level at a residential receptor location prior to the proposed project installation.
Sound Level Percentile (L_n)	Also referred to as a “statistical sound level”, L _n refers to the noise level that is exceeded for nth percent of a given measurement period. For example, L ₅₀ refers to the noise level that is exceeded for 50% of a measurement period, i.e. 30 minutes out of an hour. These metrics can be used to evaluate noise levels that are apparent for a given period of time at a measurement location.

APPENDIX B. SITE LT-1 MEASURED SOUND LEVELS

Start Time (mm/dd/yyyy hh:mm)	Hourly Measured Sound Level (dB(A) re: 20µPa)						
	L _{eq}	L ₁₀	L ₂₅	L ₃₃	L ₅₀	L ₇₅	L ₉₀
12/15/2017 10:00	68	69	65	63	59	55	53
12/15/2017 11:00	65	69	66	64	60	56	55
12/15/2017 12:00	65	69	67	65	61	57	54
12/15/2017 13:00	65	69	66	64	61	56	53
12/15/2017 14:00	66	70	67	65	62	57	55
12/15/2017 15:00	67	71	68	67	64	60	58
12/15/2017 16:00	67	71	68	67	64	60	58
12/15/2017 17:00	66	70	68	66	63	60	58
12/15/2017 18:00	65	69	66	64	60	57	55
12/15/2017 19:00	63	67	63	61	57	54	52
12/15/2017 20:00	63	67	62	60	56	54	53
12/15/2017 21:00	70	67	62	59	55	52	51
12/15/2017 22:00	61	66	60	57	53	51	50
12/15/2017 23:00	60	63	57	54	51	50	49
12/16/2017 00:00	57	58	53	51	49	47	46
12/16/2017 01:00	55	56	50	48	46	46	45
12/16/2017 02:00	54	52	46	46	45	45	44
12/16/2017 03:00	53	52	47	46	45	45	45
12/16/2017 04:00	55	56	51	48	46	45	45
12/16/2017 05:00	58	60	54	52	48	46	46
12/16/2017 06:00	59	61	52	50	49	47	46
12/16/2017 07:00	63	66	60	58	53	51	50
12/16/2017 08:00	63	67	63	61	58	55	54
12/16/2017 09:00	63	68	64	62	58	54	53
12/16/2017 10:00	64	68	65	63	59	54	52
12/16/2017 11:00	64	68	65	63	59	55	53
12/16/2017 12:00	65	69	66	64	61	56	55
12/16/2017 13:00	65	69	66	64	60	56	54
12/16/2017 14:00	71	69	65	63	59	55	54

Site LT-1 Measured Sound Levels (Continued, Page 2)

Start Time (mm/dd/yyyy hh:mm)	Hourly Measured Sound Level (dB(A) re: 20µPa)						
	L _{eq}	L ₁₀	L ₂₅	L ₃₃	L ₅₀	L ₇₅	L ₉₀
12/16/2017 15:00	69	69	66	64	60	56	55
12/16/2017 16:00	65	69	66	64	59	55	53
12/16/2017 17:00	65	69	65	63	59	54	52
12/16/2017 18:00	63	67	63	60	56	52	51
12/16/2017 19:00	62	67	62	60	55	52	50
12/16/2017 20:00	62	66	61	58	53	50	48
12/16/2017 21:00	61	65	60	57	53	49	48
12/16/2017 22:00	61	65	58	55	50	48	47
12/16/2017 23:00	59	63	56	53	49	47	47
12/17/2017 00:00	56	58	51	50	49	49	48
12/17/2017 01:00	56	56	51	49	48	47	47
12/17/2017 02:00	55	52	47	46	45	44	43
12/17/2017 03:00	50	48	43	41	41	40	40
12/17/2017 04:00	51	48	43	42	41	40	40
12/17/2017 05:00	55	54	45	42	41	40	40
12/17/2017 06:00	56	56	47	45	42	41	41
12/17/2017 07:00	59	63	55	52	48	45	45
12/17/2017 08:00	61	66	59	56	51	48	46
12/17/2017 09:00	63	67	62	59	55	51	49
12/17/2017 10:00	62	67	62	60	57	53	51
12/17/2017 11:00	63	67	63	61	58	55	53
12/17/2017 12:00	63	68	64	61	57	53	52
12/17/2017 13:00	63	68	64	61	57	53	51
12/17/2017 14:00	63	68	64	61	56	51	49
12/17/2017 15:00	63	67	63	61	56	52	50
12/17/2017 16:00	63	68	64	61	56	51	49
12/17/2017 17:00	62	67	63	60	56	51	49
12/17/2017 18:00	61	66	61	58	54	49	47
12/17/2017 19:00	61	66	60	57	53	49	47

Site LT-1 Measured Sound Levels (Continued, Page 3)

Start Time (mm/dd/yyyy hh:mm)	Hourly Measured Sound Level (dB(A) re: 20μPa)						
	L _{eq}	L ₁₀	L ₂₅	L ₃₃	L ₅₀	L ₇₅	L ₉₀
12/17/2017 20:00	60	65	59	56	51	49	47
12/17/2017 21:00	59	63	56	53	49	48	47
12/17/2017 22:00	57	61	52	49	47	45	45
12/17/2017 23:00	55	57	49	46	44	43	43
12/18/2017 00:00	52	51	45	44	42	41	41
12/18/2017 01:00	50	47	43	42	40	40	39
12/18/2017 02:00	49	48	42	41	40	39	39
12/18/2017 03:00	49	48	44	43	42	41	41
12/18/2017 04:00	54	53	49	48	47	46	45
12/18/2017 05:00	59	62	54	52	50	49	48
12/18/2017 06:00	63	67	61	58	54	52	51
12/18/2017 07:00	67	71	68	67	63	59	57

APPENDIX C. L-ACOUSTICS, INC. SPEAKER ARRAY DIRECTIVITY DIAGRAMS

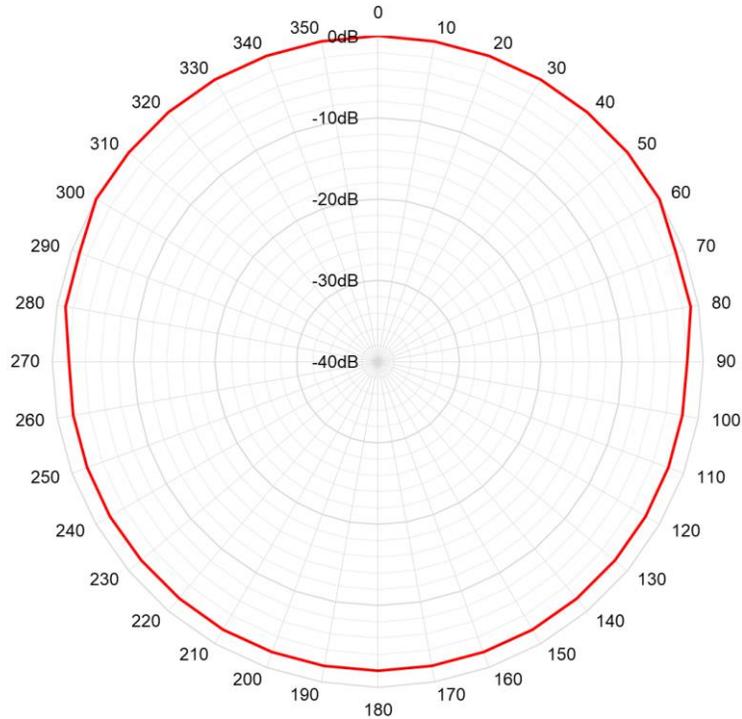


Figure 9. Arc Focus/Wide Array (Home Sideline) – 63 Hz Directivity (dB/°)

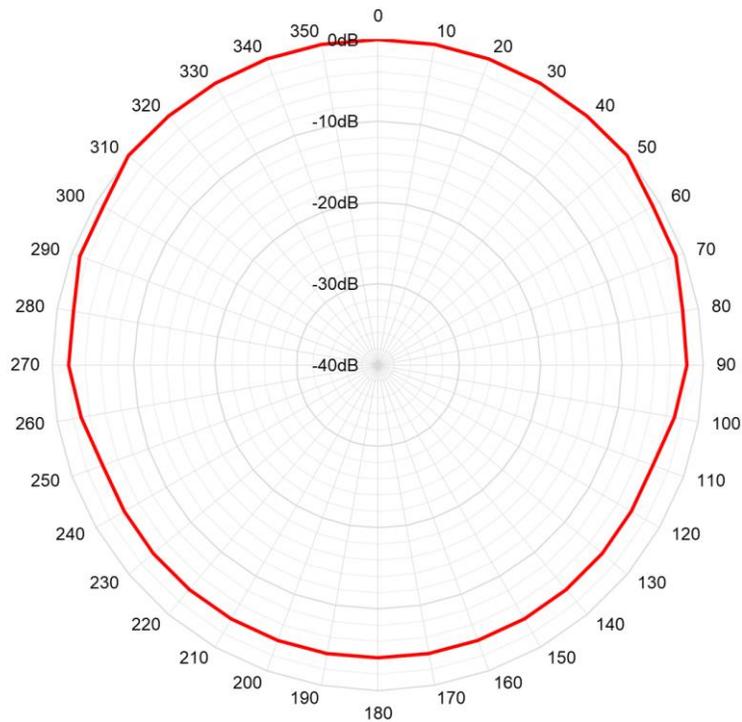


Figure 10. Arc Focus/Wide Array (Home Sideline) – 125 Hz Directivity (dB/°)

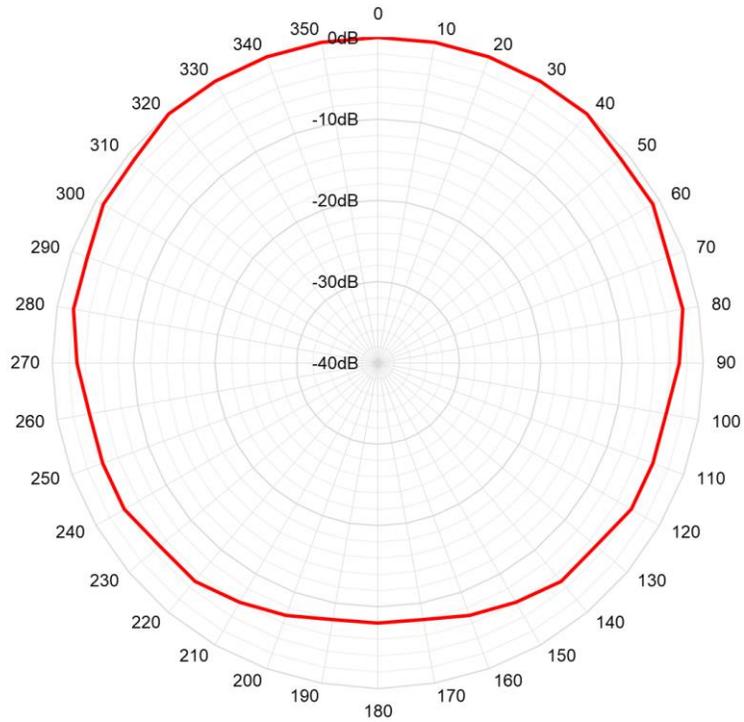


Figure 11. Arc Focus/Wide Array (Home Sideline) – 250 Hz Directivity (dB/°)

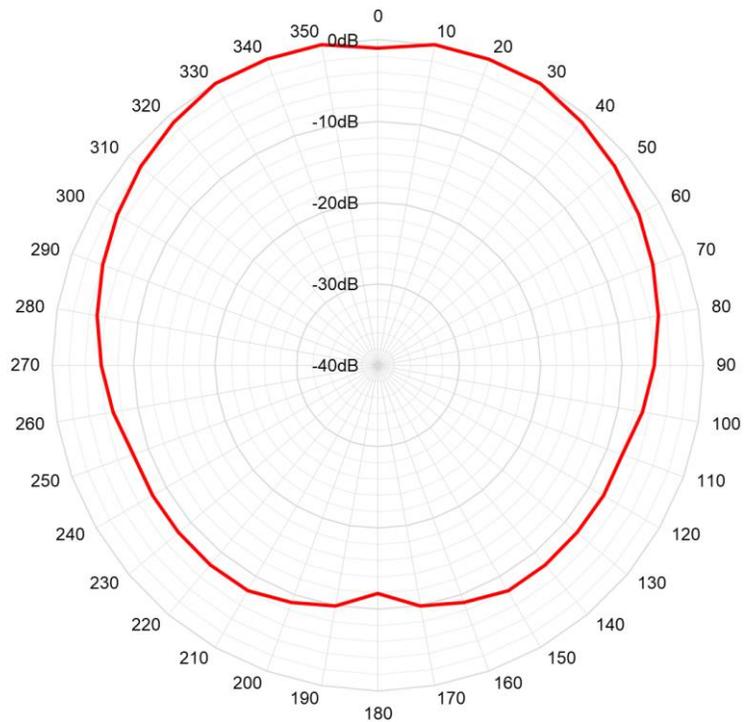


Figure 12. Arc Focus/Wide Array (Home Sideline) – 500 Hz Directivity (dB/°)

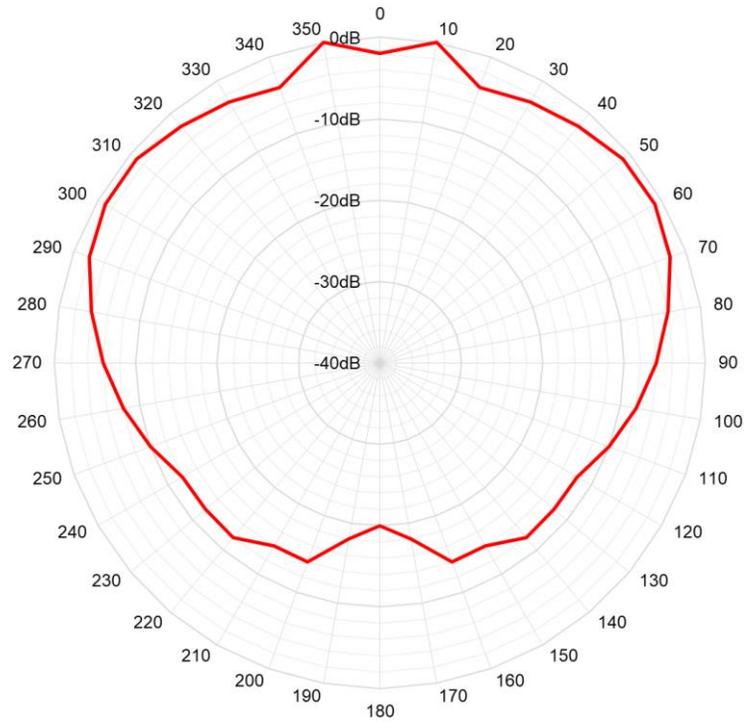


Figure 13. Arc Focus/Wide Array (Home Sideline) – 1000 Hz Directivity (dB/°)

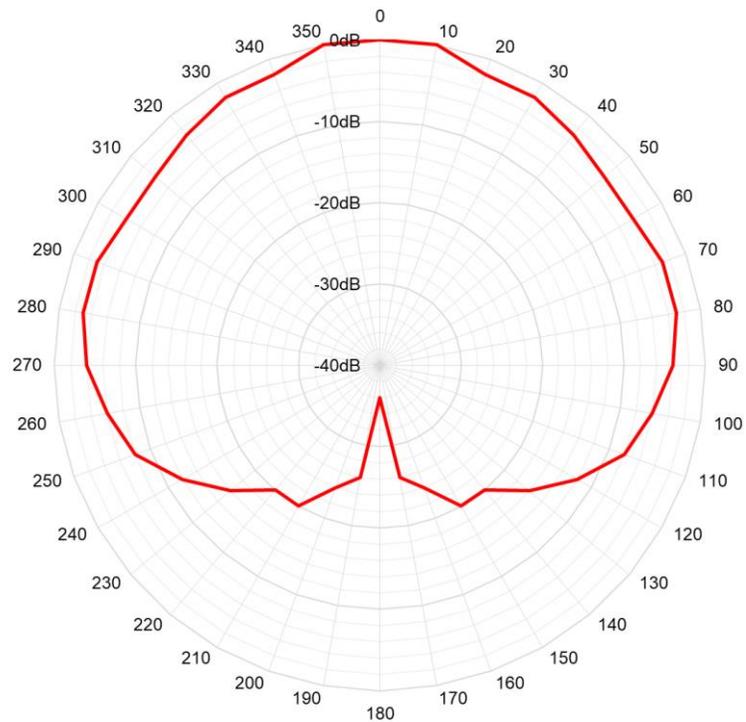


Figure 14. Arc Focus/Wide Array (Home Sideline) – 2000 Hz Directivity (dB/°)

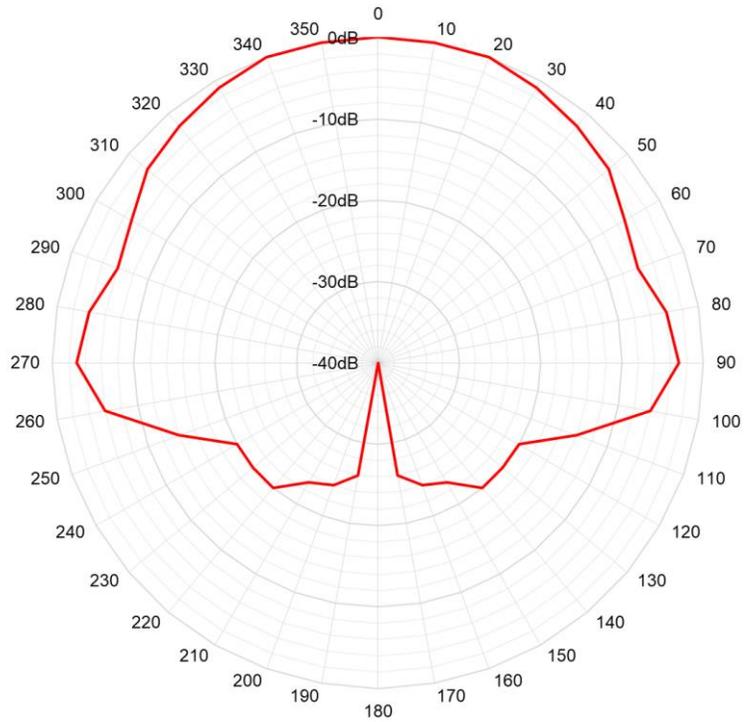


Figure 15. Arc Focus/Wide Array (Home Sideline) – 4000 Hz Directivity (dB/°)

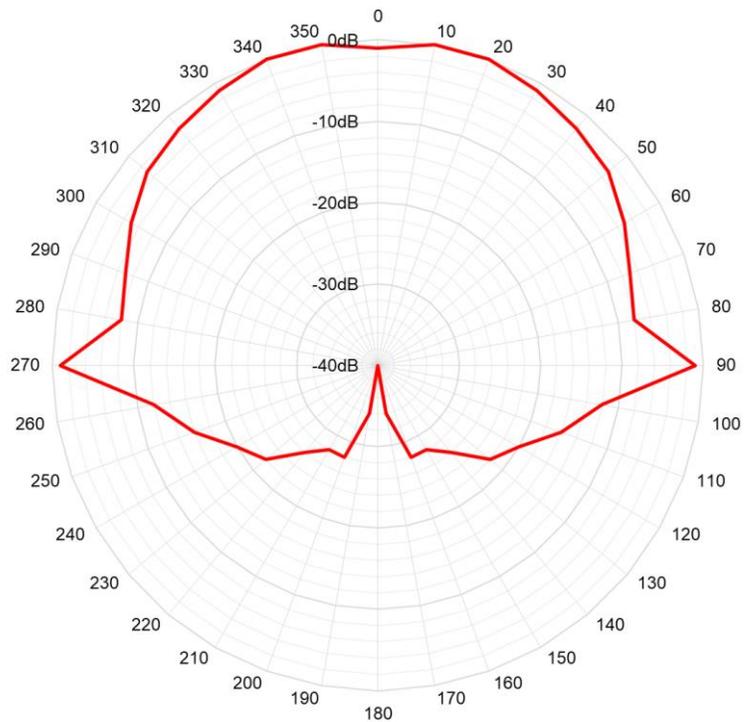


Figure 16. Arc Focus/Wide Array (Home Sideline) – 8000 Hz Directivity (dB/°)

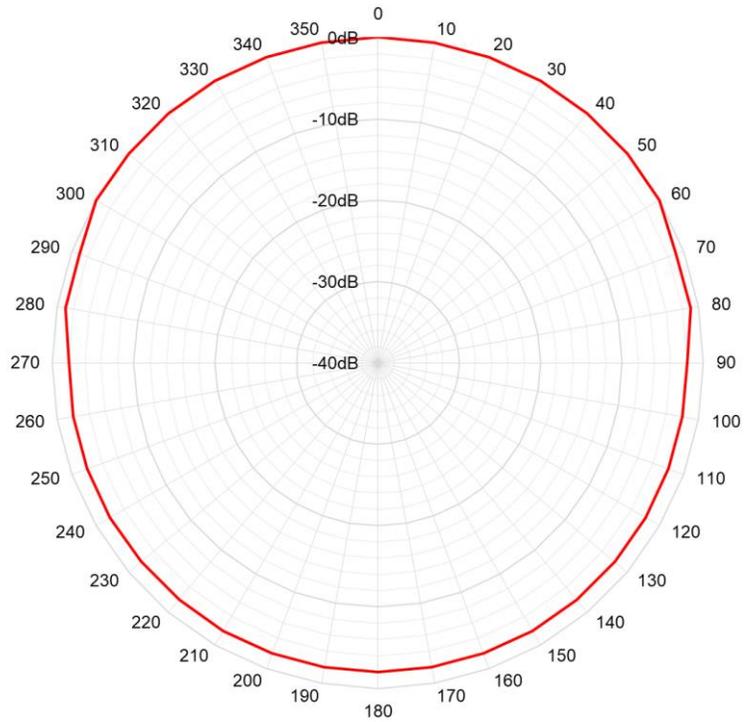


Figure 17. Arc Focus/Focus Array (Visitor Sideline) – 63 Hz Directivity (dB/°)

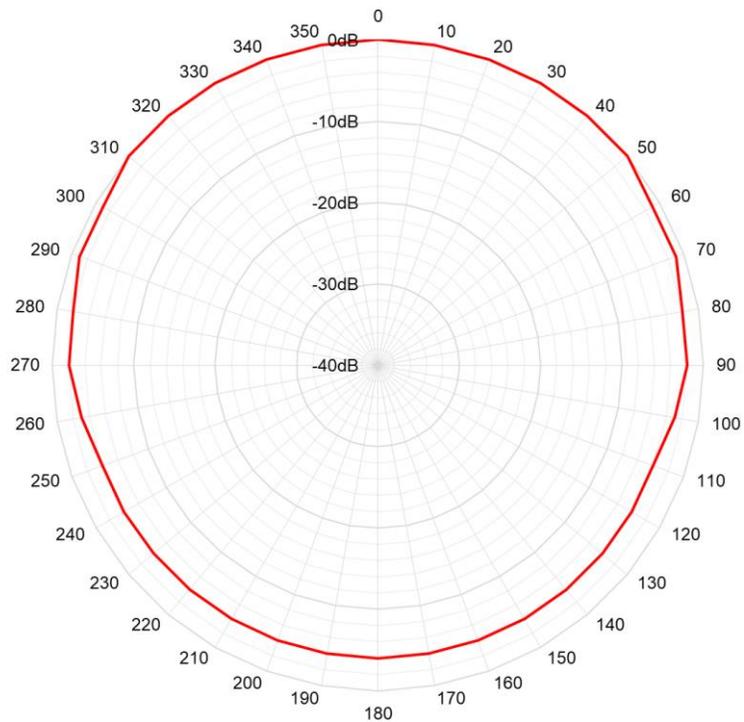


Figure 18. Arc Focus/Focus Array (Visitor Sideline) – 125 Hz Directivity (dB/°)

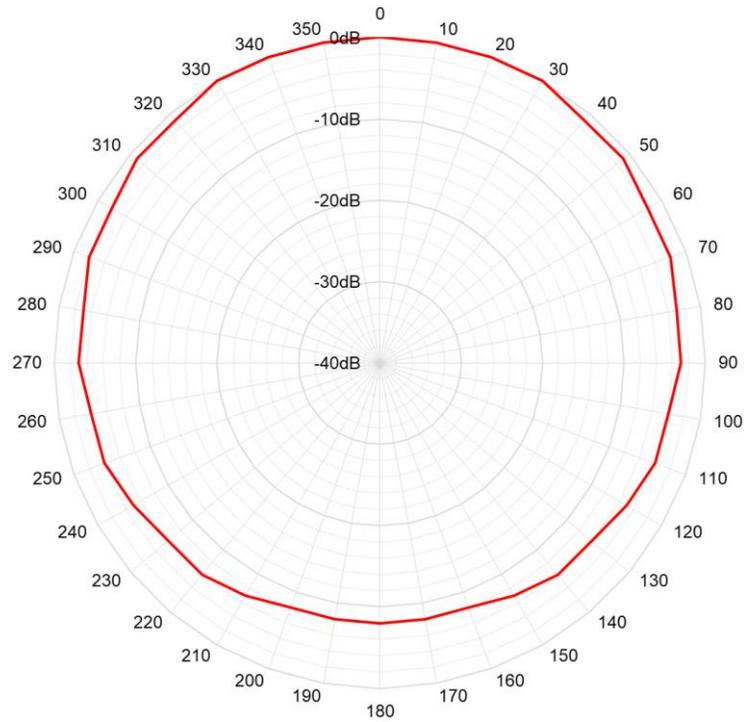


Figure 19. Arc Focus/Focus Array (Visitor Sideline) – 250 Hz Directivity (dB/°)

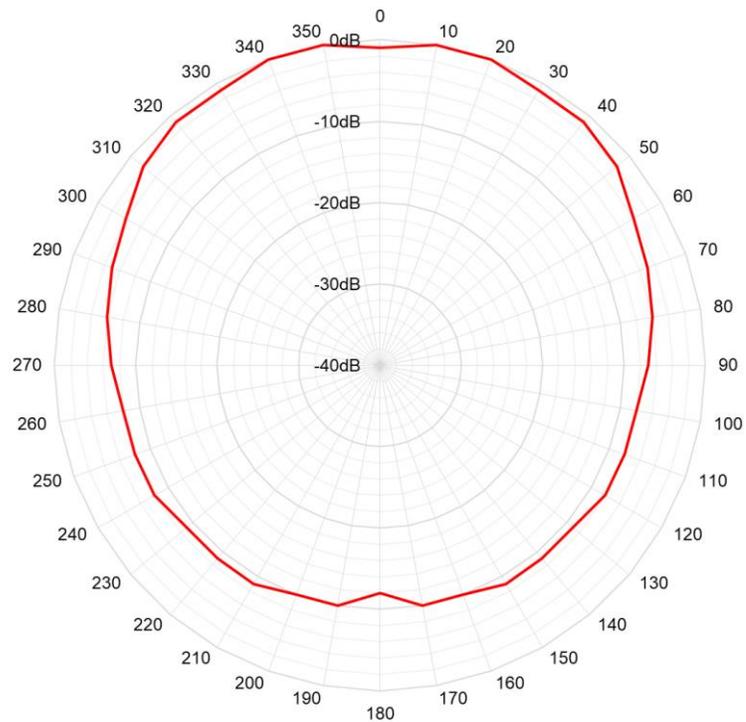


Figure 20. Arc Focus/Focus Array (Visitor Sideline) – 500 Hz Directivity (dB/°)

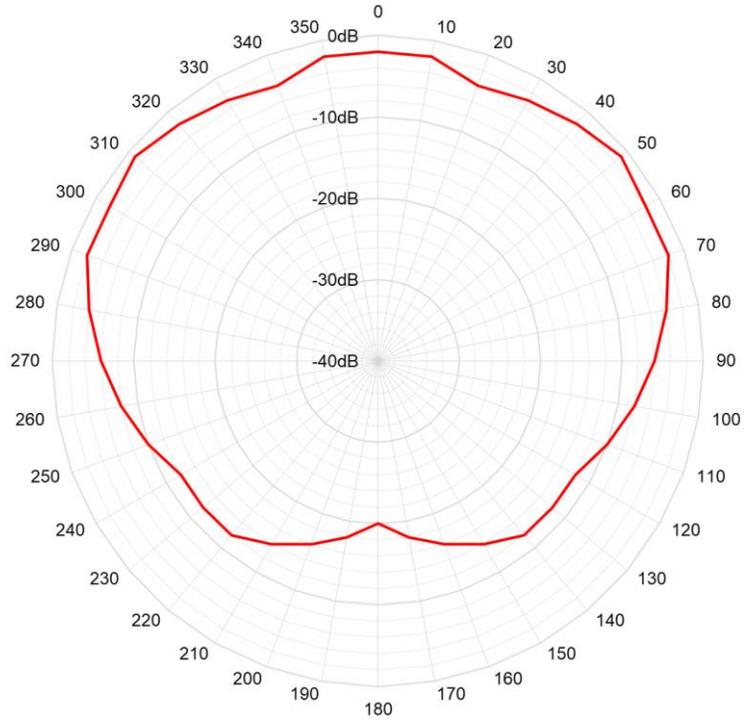


Figure 21. Arc Focus/Focus Array (Visitor Sideline) – 1000 Hz Directivity (dB/°)

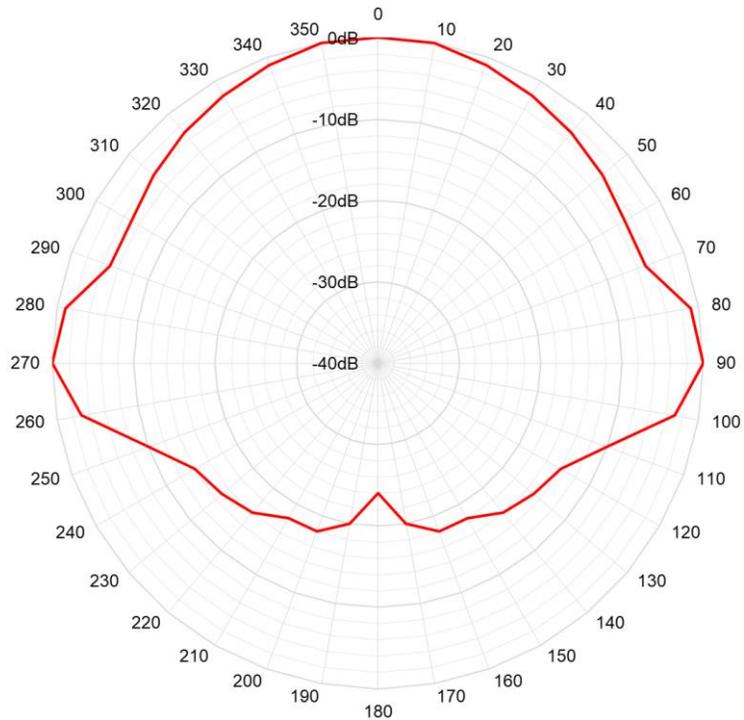


Figure 22. Arc Focus/Focus Array (Visitor Sideline) – 2000 Hz Directivity (dB/°)

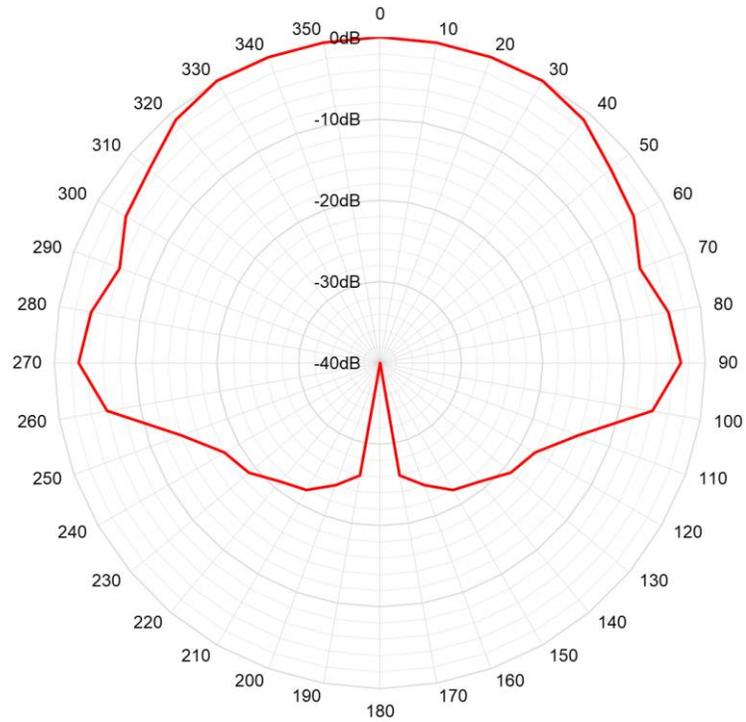


Figure 23. Arc Focus/Focus Array (Visitor Sideline) – 4000 Hz Directivity (dB/°)

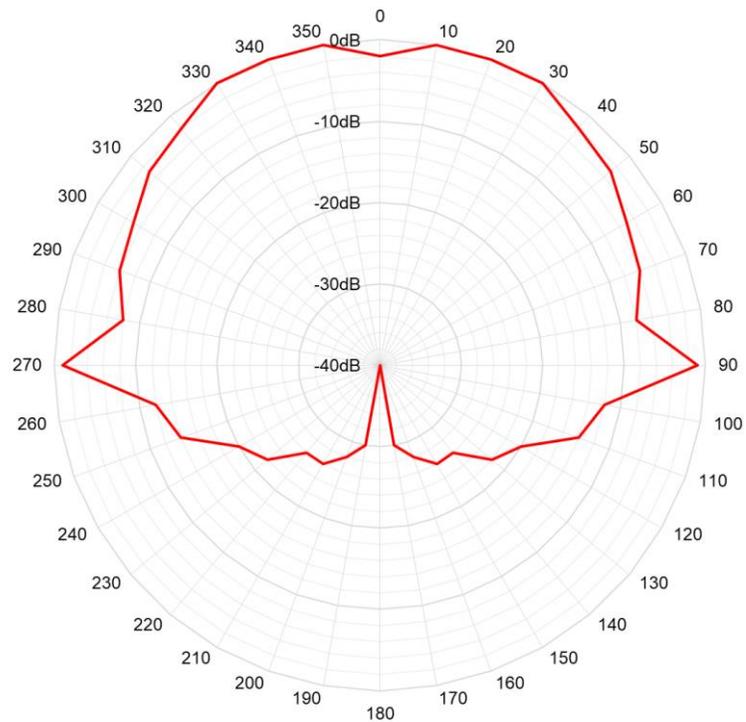


Figure 24. Arc Focus/Focus Array (Visitor Sideline) – 8000 Hz Directivity (dB/°)

APPENDIX D. L-ACOUSTICS, INC. SPEAKER (PA) SYSTEM SOUND LEVEL CONTOUR FIGURES

Note that all contour figures in this section show A-weighted octave band sound levels for direct comparison with overall levels.



Figure 25. A-Weighted Sound Exposure from PA System – 63 Hz

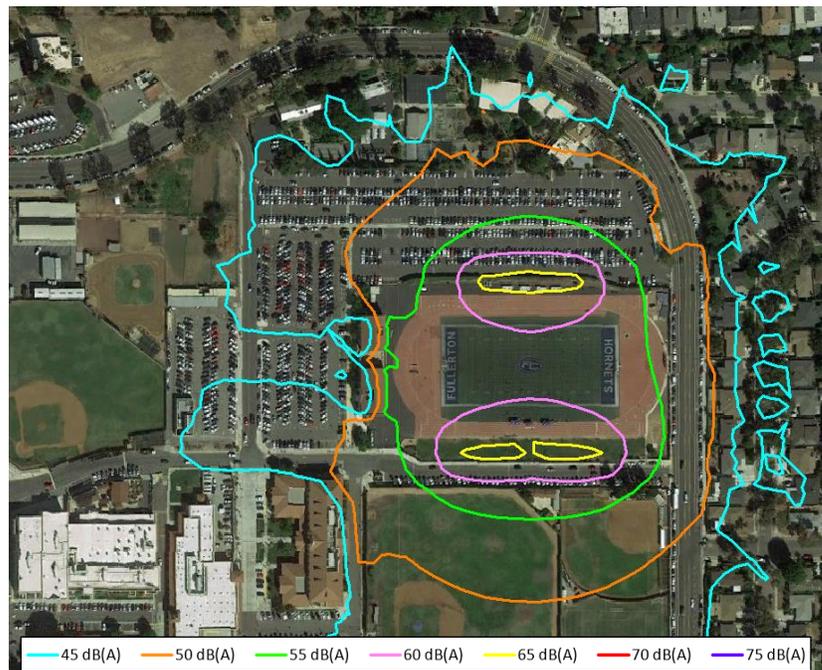


Figure 26. A-Weighted Sound Exposure from PA System – 125 Hz

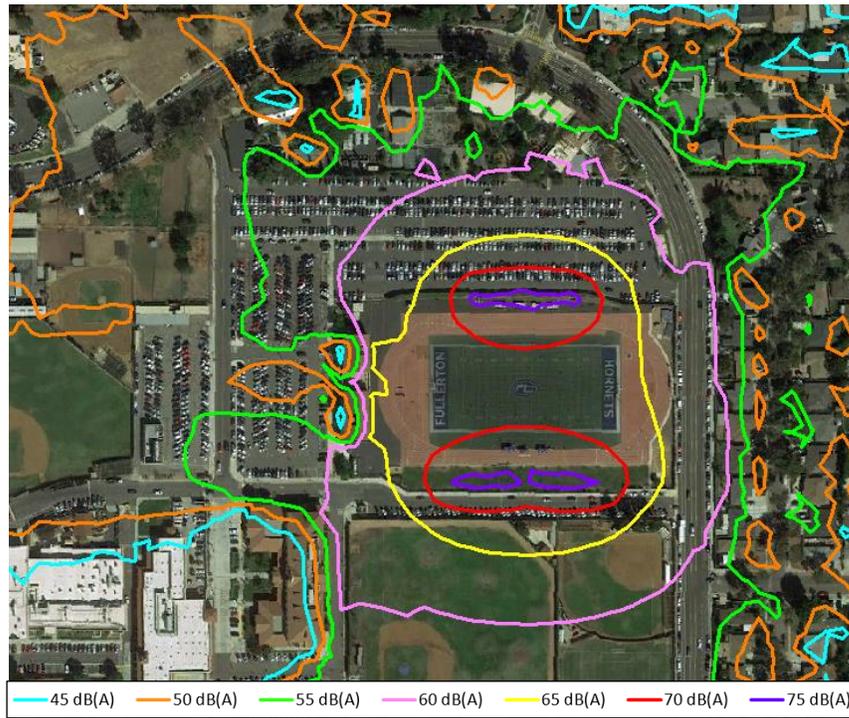


Figure 27. A-Weighted Sound Exposure from PA System – 250 Hz

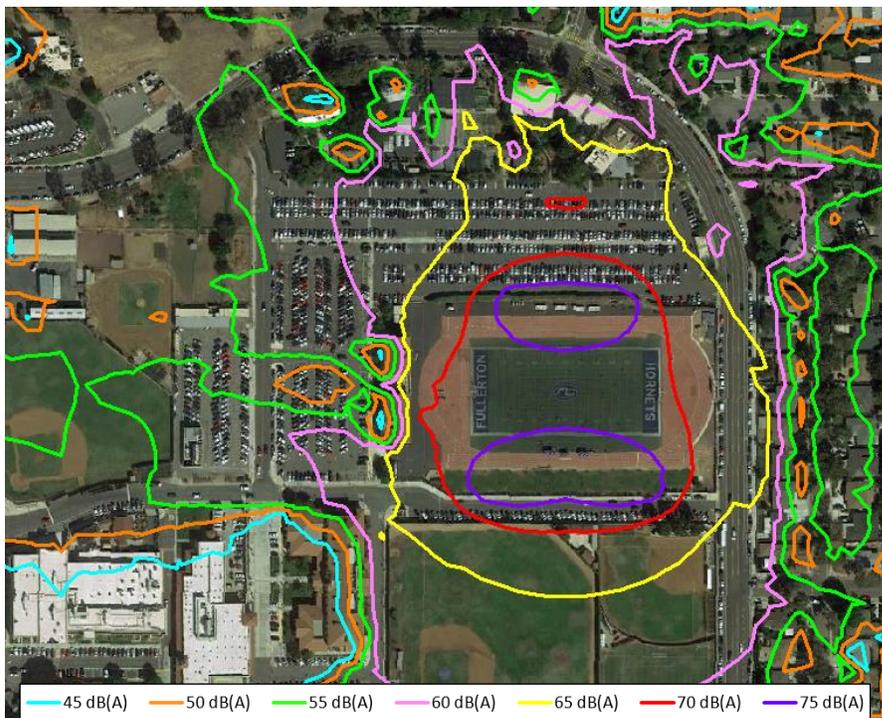


Figure 28. A-Weighted Sound Exposure from PA System – 500 Hz

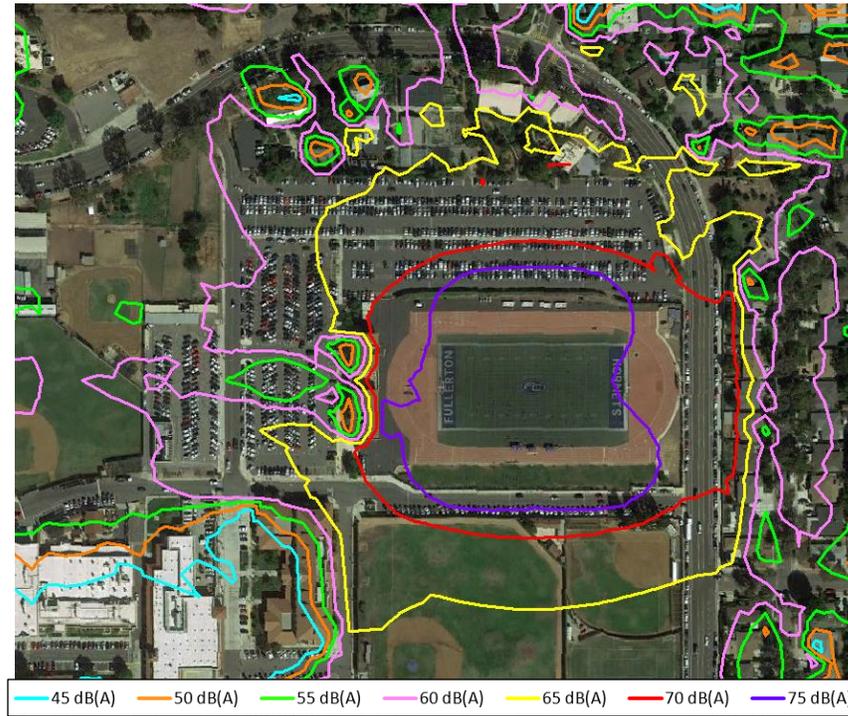


Figure 29. A-Weighted Sound Exposure from PA System – 1000 Hz

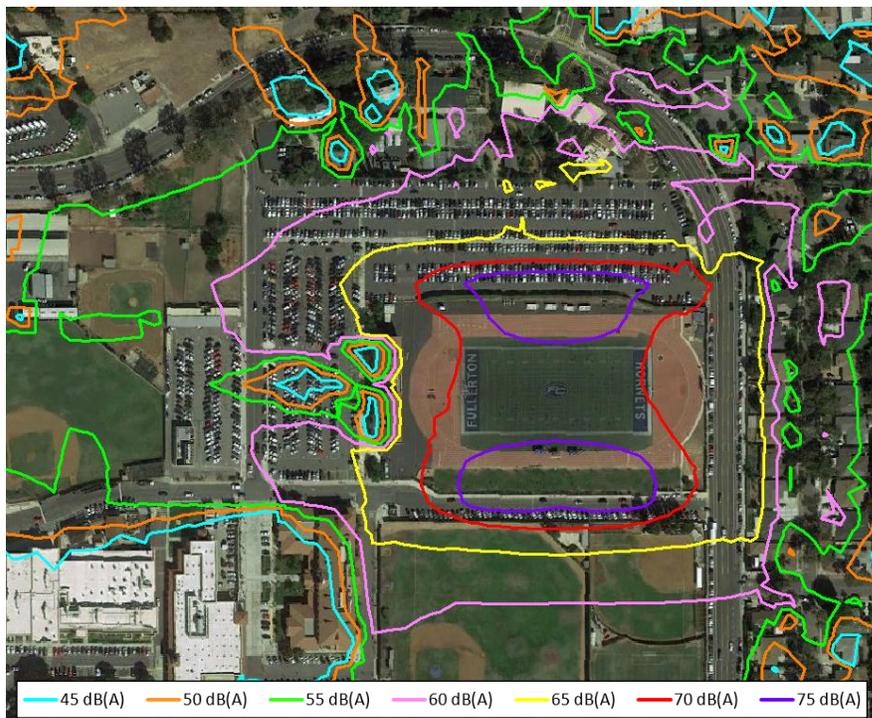


Figure 30. A-Weighted Sound Exposure from PA System – 2000 Hz

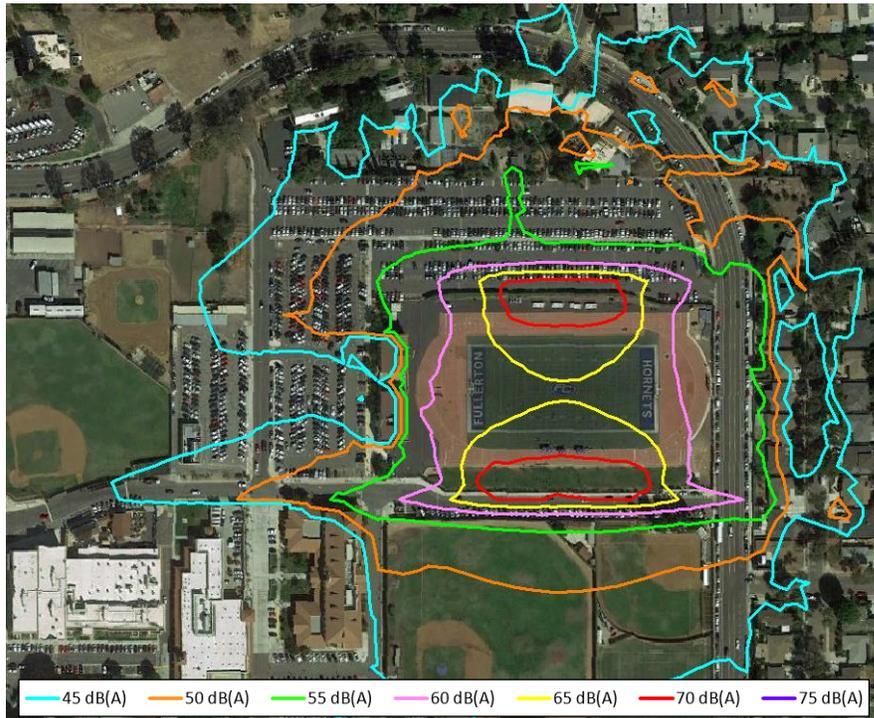


Figure 31. A-Weighted Sound Exposure from PA System – 4000 Hz

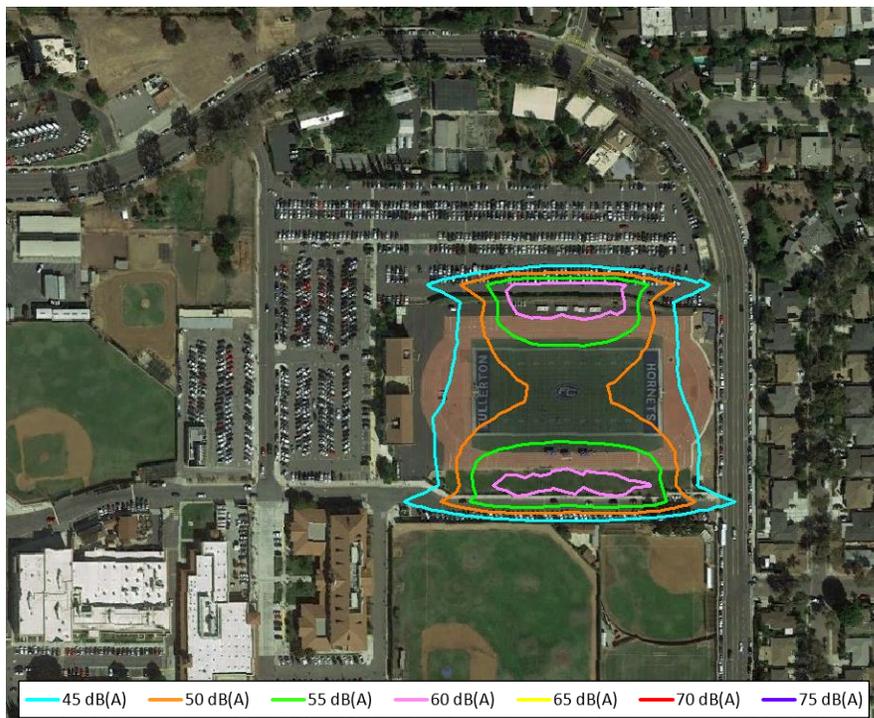


Figure 32. A-Weighted Sound Exposure from PA System – 8000 Hz

Appendix C

Traffic Memo

MEMORANDUM

To: Ms. Rachel Struglia
Dudek Date: November 21, 2019

From: Keil D. Maberry, P.E. *KDM*
Daniel A. Kloos, P.E. *DAK*
LLG Ref: 2.17.3897.1
Linscott, Law & Greenspan, Engineers

Subject: *Alternative Project Analysis – 2,000 Seats*
Fullerton College Sherbeck Field Improvements Project, Fullerton

Engineers & Planners
Traffic
Transportation
Parking

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Greenspan, Engineers
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Pasadena
Irvine
San Diego
Las Vegas

Linscott, Law & Greenspan, Engineers (LLG) is pleased to submit the following Alternative Project Analysis for the proposed Fullerton College Sherbeck Field Improvements Project, located in the City of Fullerton. The Alternative Project will consist of a field with permanent prefabricated aluminum bleachers with a seating capacity of 2,000 seats. The Alternative Project Analysis was prepared for Friday traffic conditions and Saturday traffic conditions and focused to the following five (5) key study intersections that were impacted by the proposed Project (i.e. field with a seating capacity of 4,417 seats).

- 4) Lemon Street at Berkeley Avenue
- 12) State College Boulevard at Chapman Avenue
- 27) Lemon Street at Fullerton College Drive
- 28) Berkeley Avenue at College Driveway No. 1
- 29) Berkeley Avenue at College Driveway No. 2

Consistent with the April 17, 2019 Traffic Impact Analysis (TIA) Report, the Saturday Alternative Project Analysis was prepared for existing plus project, Year 2020 plus project, and Year 2030 plus project traffic conditions and the Friday Alternative Project Analysis was prepared for existing plus project and Year 2020 plus project traffic conditions. The following summarizes the results of the Alternative Project Analysis.

Alternative Project Trip Generation

Table 5-2A summarizes the Alternative Project's (i.e. 2,000 seats) forecast daily, Event Arrival peak hour, and Event Departure peak hour traffic volumes. Review of *Table 5-2A* shows that the Alternative Project (i.e. field event with 2,000 occupied seats) is forecast to generate 1,950 daily trips, 706 Event Arrival peak hour trips (556 inbound and 150 outbound) and 756 Event Departure peak hour trips (64 inbound and 692 outbound). It should be noted that the aforementioned Alternative Project trips are utilized for both the Friday and Saturday alternative analysis.

Alternative Project Analysis – Saturday Field Event

Existing Plus Alternative Project Saturday Traffic Conditions

Table 8-2A summarizes the peak hour level of service results at key study intersections #4, #28 and #29 for Existing plus Alternative Project Saturday traffic conditions. Columns one (1) through four (4) present the Existing plus Project Saturday level of service results as presented in the April 17, 2019 TIA (i.e. Table 8-2) for comparison purposes. Columns five (5) through eight (8) present the Existing plus Alternative Project Saturday level of service results.

Review of Columns 6 and 7 of *Table 8-2A* indicates that traffic associated with the proposed Alternative Project ***will not*** significantly impact key study intersections #4, #28 and #29. These three (3) key study intersections are forecast to operate at an acceptable service level during the Saturday Event Arrival peak hour and Saturday Event Departure peak hour with the addition of Alternative Project generated traffic to existing traffic.

In conclusion, all existing plus project Saturday significant impacts are eliminated under the Alternative Project.

Appendix A presents the Existing plus Alternative Project HCM/LOS Saturday Event Arrival peak hour and Saturday Event Departure peak hour calculations for key study intersections #4, #28 and #29.

Year 2020 Plus Alternative Project Saturday Traffic Conditions

Table 8-4A summarizes the peak hour level of service results at key study intersections #4, #28 and #29 for Year 2020 plus Alternative Project Saturday traffic conditions. Columns one (1) through five (5) present the Year 2020 plus Project Saturday level of service results as presented in the April 17, 2019 TIA (i.e. Table 8-4) for comparison purposes. Columns six (6) through ten (10) present the Year 2020 plus Alternative Project Saturday level of service results.

Review of Columns 8 and 9 of *Table 8-4A* indicates that traffic associated with the proposed Alternative Project ***will not*** significantly impact key study intersections #4, #28 and #29. The three (3) key study intersections are forecast to operate at an acceptable service level during the Saturday Event Arrival peak hour and Saturday Event Departure peak hour with the addition of Alternative Project generated traffic under Year 2020 traffic conditions.

In conclusion, all Year 2020 Saturday significant impacts are eliminated under the Alternative Project.

Appendix B presents the Year 2020 plus Alternative Project HCM/LOS Saturday Event Arrival peak hour and Saturday Event Departure peak hour calculations for key study intersections #4, #28 and #29.

Year 2030 Buildout Plus Alternative Project Saturday Traffic Conditions

Table 8-6A summarizes the peak hour level of service results at key study intersections #4, #12, #28 and #29 for Year 2030 Buildout plus Alternative Project Saturday traffic conditions. Columns one (1) through five (5) present the Year 2030 Buildout plus Project Saturday level of service results as presented in the April 17, 2019 TIA (i.e. Table 8-6) for comparison purposes. Columns six (6) through ten (10) present the Year 2030 Buildout plus Alternative Project Saturday level of service results.

Review of Columns 8 and 9 of *Table 8-6A* indicates that traffic associated with the proposed Alternative Project will significantly impact key study intersection #12 (i.e. State College Boulevard at Chapman Avenue). The remaining three (3) key study intersections (i.e. #4, #28 and #29) are forecast to operate at an acceptable service level during the Saturday Event Arrival peak hour and Saturday Event Departure peak hour with the addition of Alternative Project generated traffic under Year 2030 Buildout traffic conditions. As shown in column 10, the implementation of improvements at impacted key study intersection #12 (i.e. State College Boulevard at Chapman Avenue) completely offsets the impact of project traffic and the intersection is forecast to operate at acceptable LOS D. The improvements consist of the following.

- **No. 12 – State College Boulevard at Chapman Avenue:** Widen and restripe the westbound approach of Chapman Avenue to provide a 2nd westbound left-turn lane. Modify the existing traffic signal as necessary. Right-of-way acquisition will be required. Source: *CollegeTown Draft Environmental Impact Report (DEIR)*. The installation of these improvements is subject to the approval of the City of Fullerton. Since the proposed Project cannot guarantee that these improvements that are located in the City of Fullerton will be implemented, the impact is significant and unavoidable. The alternative project's fair share contribution totals 13.0%.

In conclusion, all Year 2030 Buildout Saturday significant impacts are eliminated under the Alternative Project, except at key study intersection #12 (i.e. State College Boulevard at Chapman Avenue).

Appendix C presents the Year 2030 Buildout plus Alternative Project HCM/LOS Saturday Event Arrival peak hour and Saturday Event Departure peak hour calculations for key study intersections #4, #12, #28 and #29.

Alternative Project Analysis – Friday Field Event

Existing Plus Alternative Project Friday Traffic Conditions

Table 12-1A summarizes the peak hour level of service results at key study intersections #4, #27, #28 and #29 for Existing plus Alternative Project Friday traffic conditions. Columns one (1) through four (4) present the existing plus Project Friday level of service results as presented in the April 17, 2019 TIA (i.e. Table 12-1) for comparison purposes. Columns five (5) through eight (8) present the Existing plus Alternative Project Friday level of service results.

Review of Columns 6 and 7 of *Table 12-1A* indicates that traffic associated with the proposed Alternative Project will significantly impact key study intersection #27 (i.e. Lemon Street at Fullerton College Drive). The remaining three (3) key study intersections (i.e. #4, #28 and #29) are forecast to operate at an acceptable service level during the Friday Event Arrival peak hour and Friday Event Departure peak hour with the addition of Alternative Project generated traffic to existing traffic. As shown in column 8, the implementation of improvements at impacted key study intersection #27 (i.e. Lemon Street at Fullerton College Drive) completely offsets the impact of project traffic and the intersection is forecast to operate at acceptable LOS B. The improvements consist of the following.

- **No. 27 – Lemon Street at Fullerton College Drive:** Implement a Traffic Management Plan (TMP) during the event departure period to minimize traffic impacts at the intersection. The TMP will consist of providing police department staff at the location to manage traffic flow. The TMP is subject to the approval of the City of Fullerton. Other components of the event TMP may include intersection signal timing adjustments to improve traffic flow, routing of traffic via traffic cones/delineators and/or programmable changeable message signs (PCMS). The alternative project's contribution will be 100.0%.

In conclusion, all existing plus project Friday significant impacts are eliminated under the Alternative Project, except at key study intersection #27 (i.e. Lemon Street at Fullerton College Drive).

Appendix D presents the Existing plus Alternative Project HCM/LOS Friday Event Arrival peak hour and Friday Event Departure peak hour calculations for key study intersections #4, #27, #28 and #29.

Year 2020 Plus Alternative Project Friday Traffic Conditions

Table 12-2A summarizes the peak hour level of service results at key study intersections #4, #27, #28 and #29 for Year 2020 plus Alternative Project Friday traffic conditions. Columns one (1) through five (5) present the Year 2020 plus Project Friday level of service results as presented in the April 17, 2019 TIA (i.e. Table 12-2) for comparison purposes. Columns six (6) through ten (10) present the Year 2020 plus Alternative Project Friday level of service results.

Review of Columns 8 and 9 of *Table 12-2A* indicates that traffic associated with the proposed Alternative Project will significantly impact key study intersection #27 (i.e. Lemon Street at Fullerton College Drive). The remaining three (3) key study intersections (i.e. #4, #28 and #29) are forecast to operate at an acceptable service level during the Friday Event Arrival peak hour and Friday Event Departure peak hour with the addition of Alternative Project generated traffic under Year 2020 traffic conditions. As shown in column 10, the implementation of improvements at impacted key study intersection #27 (i.e. Lemon Street at Fullerton College Drive) completely offsets the impact of project traffic and the intersection is forecast to operate at acceptable LOS B. The improvements consist of the following.

- **No. 27 – Lemon Street at Fullerton College Drive:** Implement a Traffic Management Plan (TMP) during the event departure period to minimize traffic impacts at the intersection. The TMP will consist of providing police department staff at the location to manage traffic flow. The TMP is subject to the approval of the City of Fullerton. Other components of the event TMP may include intersection signal timing adjustments to improve traffic flow, routing of traffic via traffic cones/delineators and/or programmable changeable message signs (PCMS). The alternative project's contribution will be 100.0%.

In conclusion, all Year 2020 Friday significant impacts are eliminated under the Alternative Project, except at key study intersection #27 (i.e. Lemon Street at Fullerton College Drive).

Appendix E presents the Year 2020 plus Alternative Project HCM/LOS Friday Event Arrival peak hour and Friday Event Departure peak hour calculations for key study intersections #4, #27, #28 and #29.

Conclusion

Table A provides a comparison of the findings of this Alternative Project Analysis (i.e. 2,000 seats) and the April 17, 2019 Traffic Impact Analysis Report (i.e. 4,417 seats). This table compares the project description, the trip generation, the number of study intersections, the Existing plus Project Saturday impacts, the Year 2020 plus Project Saturday impacts, the Year 2030 plus Project Saturday impacts, the Existing plus Project Friday impacts and the Year 2020 plus Project Friday impacts of the proposed Project and the Alternative Project. Column one (1) presents the findings for the April 17, 2019 Traffic Impact Analysis Report (i.e. proposed Project – 4,417 seats) and column two (2) presents the findings for the Alternative Project (i.e. 2,000 seats). Column three (3) summarizes the difference between the proposed Project and the Alternative Project.

- **Project Description:** Review of row 1 and column 3 shows that the Alternative Project will have 2,417 fewer seats than the proposed Project.
- **Trip Generation:** Review of row 2 and column 3 shows that the Alternative Project will generate 2,357 fewer daily trips, 853 fewer event arrival peak hour trips and 913 fewer event departure peak hour trips than the proposed Project
- **Study Intersections:** Review of row 3 and column 3 shows that the proposed Project and Alternative Project analyzed the same number of key study intersections.
- **Existing Plus Project Saturday Impacts:** Review of row 4 and column 3 shows that the Alternative Project will have three (3) fewer impacts than the proposed Project under existing plus project Saturday traffic conditions. It should be noted that all existing plus project Saturday impacts are eliminated with the Alternative Project.
- **Year 2020 Plus Project Saturday Impacts:** Review of row 5 and column 3 shows that the Alternative Project will have three (3) fewer impacts than the proposed Project under Year 2020 plus project Saturday traffic conditions. It should be noted that all Year 2020 plus project Saturday impacts are eliminated with the Alternative Project.
- **Year 2030 Buildout Plus Project Saturday Impacts:** Review of row 6 and column 3 shows that the Alternative Project will have three (3) fewer impacts than the proposed Project under Year 2030 Buildout plus project Saturday traffic conditions. It should be noted that with implementation of the Alternative



Project, a significant impact remains at key study intersection #12 (i.e. State College Boulevard at Chapman Avenue) under Year 2030 Buildout plus project Saturday traffic conditions.

- **Existing Plus Project Friday Impacts:** Review of row 7 and column 3 shows that the Alternative Project will have three (3) fewer impacts than the proposed Project under existing plus project Friday traffic conditions. It should be noted that with implementation of the Alternative Project, a significant impact remains at key study intersection #27 (i.e. Lemon Street at Fullerton College Drive) under existing plus project Friday traffic conditions.
- **Year 2020 Plus Project Friday Impacts:** Review of row 8 and column 3 shows that the Alternative Project will have three (3) fewer impacts than the proposed Project under Year 2020 plus project Friday traffic conditions. It should be noted that with implementation of the Alternative Project, a significant impact remains at key study intersection #27 (i.e. Lemon Street at Fullerton College Drive) under Year 2020 plus project Friday traffic conditions.

* * * * *

We appreciate the opportunity to provide this Alternative Project Analysis. Should you have any questions, please call us at (949) 825-6175. Thank you.

TABLE 5-2A
ALTERNATIVE PROJECT TRAFFIC GENERATION FORECAST – FRIDAY AND SATURDAY FIELD EVENT
FULLERTON COLLEGE SHERBECK FIELD IMPROVEMENTS PROJECT, FULLERTON

Project Description	Daily 2-Way	Field Event Arrival Peak Hour			Field Event Departure Peak Hour		
		Enter	Exit	Total	Enter	Exit	Total
<u>Generation Factors:</u>							
▪ Sherbeck Field – Field Event (TE/Occupied Seat) ¹	0.975	0.278	0.075	0.353	0.032	0.346	0.378
<u>Generation Forecasts:</u>							
▪ Sherbeck Field – Field Event (2,000 Seats)	1,950	556	150	706	64	692	756

Notes:

- TE/Seat = Trip ends per seat

¹ Source: *Traffic Impact Analysis Report for the Fullerton College Sherbeck Field Improvements Project*, prepared by LLG Engineers (dated April 17, 2019).

TABLE 8-2A
EXISTING PLUS ALTERNATIVE PROJECT SATURDAY PEAK HOUR INTERSECTION CAPACITY ANALYSIS – FIELD EVENT
FULLERTON COLLEGE SHERBECK FIELD IMPROVEMENTS PROJECT, FULLERTON

Key Intersections	Min. Acc. LOS	Time Period	LLG TIA (April 17, 2019) – 4,417 Seats								Alternative Project – 2,000 Seats							
			(1) Existing Traffic Conditions		(2) Existing Plus Project Traffic Conditions		(3) Significant Impact		(4) Existing Plus Project With Improvements		(5) Existing Traffic Conditions		(6) Existing Plus Alternative Project Traffic Conditions		(7) Significant Impact		(8) Existing Plus Alternative Project With Improvements	
			HCM	LOS	HCM	LOS	Increase	Yes/No	HCM	LOS	HCM	LOS	HCM	LOS	HCM	LOS	Increase	Yes/No
4. Lemon Street at Berkeley Avenue	D	Sat. Arrival	34.8 s/v	C	36.4 s/v	D	1.6 s/v	No	--	--	34.8 s/v	C	35.3 s/v	D	0.5 s/v	No	--	--
		Sat. Departure	33.9 s/v	C	72.4 s/v	E	38.5 s/v	Yes	18.1 s/v	B	33.9 s/v	C	40.2 s/v	D	6.3 s/v	No	--	--
28. Berkeley Avenue at College Dwy No. 1	D	Sat. Arrival	11.2 s/v	B	27.6 s/v	D	16.4 s/v	No	--	--	11.2 s/v	B	14.2 s/v	B	3.0 s/v	No	--	--
		Sat. Departure	10.4 s/v	B	72.2 s/v	F	61.8 s/v	Yes	16.1 s/v	B	10.4 s/v	B	14.7 s/v	B	4.3 s/v	No	--	--
29. Berkeley Avenue at College Dwy No. 2	D	Sat. Arrival	10.7 s/v	B	14.7 s/v	B	4.0 s/v	No	--	--	10.7 s/v	B	12.0 s/v	B	1.3 s/v	No	--	--
		Sat. Departure	9.8 s/v	A	85.4 s/v	F	75.6 s/v	Yes	14.5 s/v	B	9.8 s/v	A	14.8 s/v	B	5.0 s/v	No	--	--

Notes:

- **Bold HCM/LOS** values indicate adverse service levels
- sec/veh = seconds per vehicle

TABLE 8-4A
YEAR 2020 ALTERNATIVE PROJECT SATURDAY PEAK HOUR INTERSECTION CAPACITY ANALYSIS – FIELD EVENT
FULLERTON COLLEGE SHERBECK FIELD IMPROVEMENTS PROJECT, FULLERTON

Key Intersections	Min. Acc. LOS	Time Period	LLG TIA (April 17, 2019) – 4,417 Seats										Alternative Project – 2,000 Seats									
			(1) Existing Traffic Conditions		(2) Year 2020 Cumulative Traffic Conditions		(3) Year 2020 Cumulative Plus Project Traffic Conditions		(4) Significant Impact		(5) Year 2020 Cumulative Plus Project With Improvements		(6) Existing Traffic Conditions		(7) Year 2020 Cumulative Traffic Conditions		(8) Year 2020 Cumulative Plus Alt. Project Traffic Conditions		(9) Significant Impact		(10) Year 2020 Cumulative Plus Alt. Project With Improvements	
			HCM	LOS	HCM	LOS	HCM	LOS	Increase	Yes/No	HCM	LOS	HCM	LOS	HCM	LOS	HCM	LOS	HCM	LOS	Increase	Yes/No
4. Lemon Street at Berkeley Avenue	D	Sat. Arrival	34.8 s/v	C	34.9 s/v	C	36.8 s/v	D	1.9 s/v	No	--	--	34.8 s/v	C	34.9 s/v	C	35.4 s/v	D	0.5 s/v	No	--	--
		Sat. Departure	33.9 s/v	C	34.0 s/v	C	73.6 s/v	E	39.6 s/v	Yes	21.5 s/v	C	33.9 s/v	C	34.0 s/v	C	40.8 s/v	D	6.8 s/v	No	--	--
28. Berkeley Avenue at College Dwy No. 1	D	Sat. Arrival	11.2 s/v	B	11.3 s/v	B	28.3 s/v	D	17.0 s/v	No	--	--	11.2 s/v	B	11.3 s/v	B	14.3 s/v	B	3.0 s/v	No	--	--
		Sat. Departure	10.4 s/v	B	10.5 s/v	B	76.1 s/v	F	65.6 s/v	Yes	16.1 s/v	B	10.4 s/v	B	10.5 s/v	B	14.9 s/v	B	4.4 s/v	No	--	--
29. Berkeley Avenue at College Dwy No. 2	D	Sat. Arrival	10.7 s/v	B	10.8 s/v	B	14.9 s/v	B	4.1 s/v	No	--	--	10.7 s/v	B	10.8 s/v	B	12.1 s/v	B	1.3 s/v	No	--	--
		Sat. Departure	9.8 s/v	A	9.8 s/v	A	89.8 s/v	F	80.0 s/v	Yes	14.6 s/v	B	9.8 s/v	A	9.8 s/v	A	15.0 s/v	B	5.2 s/v	No	--	--

Notes:

- **Bold HCM/LOS** values indicate adverse service levels
- sec/veh = seconds per vehicle

TABLE 8-6A
YEAR 2030 BUILDOUT ALTERNATIVE PROJECT SATURDAY PEAK HOUR INTERSECTION CAPACITY ANALYSIS – FIELD EVENT
FULLERTON COLLEGE SHERBECK FIELD IMPROVEMENTS PROJECT, FULLERTON

Key Intersections	Min. Acc. LOS	Time Period	LLG TIA (April 17, 2019) – 4,417 Seats										Alternative Project – 2,000 Seats									
			(1) Existing Traffic Conditions		(2) Year 2030 Buildout Traffic Conditions		(3) Year 2030 Buildout Plus Project Traffic Conditions		(4) Significant Impact		(5) Year 2030 Buildout Plus Project With Improvements		(6) Existing Traffic Conditions		(7) Year 2030 Buildout Traffic Conditions		(8) Year 2030 Buildout Plus Alt. Project Traffic Conditions		(9) Significant Impact		(10) Year 2030 Buildout Plus Alt. Project With Improvements	
			HCM	LOS	HCM	LOS	HCM	LOS	Increase	Yes/No	HCM	LOS	HCM	LOS	HCM	LOS	HCM	LOS	HCM	LOS	Increase	Yes/No
4. Lemon Street at Berkeley Avenue	D	Sat. Arrival	34.8 s/v	C	35.2 s/v	D	38.3 s/v	D	3.1 s/v	No	--	--	34.8 s/v	C	35.2 s/v	D	35.8 s/v	D	0.6 s/v	No	--	--
		Sat. Departure	33.9 s/v	C	33.9 s/v	C	72.9 s/v	E	39.0 s/v	Yes	19.7 s/v	B	33.9 s/v	C	33.9 s/v	C	41.7 s/v	D	7.8 s/v	No	--	--
12. State College Blvd at Chapman Avenue	D	Sat. Arrival	37.1 s/v	D	50.8 s/v	D	66.4 s/v	E	15.6 s/v	Yes	52.9 s/v	D	37.1 s/v	D	50.8 s/v	D	57.4 s/v	E	6.6 s/v	Yes	39.1 s/v	D
		Sat. Departure	36.9 s/v	D	47.9 s/v	D	89.4 s/v	F	41.5 s/v	Yes	52.8 s/v	D	36.9 s/v	D	47.9 s/v	D	60.2 s/v	E	12.3 s/v	Yes	37.4 s/v	D
28. Berkeley Avenue at College Dwy No. 1	D	Sat. Arrival	11.2 s/v	B	12.5 s/v	B	124.2 s/v	F	111.7 s/v	Yes	6.1 s/v	A	11.2 s/v	B	12.5 s/v	B	19.4 s/v	C	6.9 s/v	No	--	--
		Sat. Departure	10.4 s/v	B	11.3 s/v	B	114.1 s/v	F	102.8 s/v	Yes	15.9 s/v	B	10.4 s/v	B	11.3 s/v	B	16.9 s/v	C	5.6 s/v	No	--	--
29. Berkeley Avenue at College Dwy No. 2	D	Sat. Arrival	10.7 s/v	B	11.2 s/v	B	14.3 s/v	B	3.1 s/v	No	--	--	10.7 s/v	B	11.2 s/v	B	12.3 s/v	B	1.1 s/v	No	--	--
		Sat. Departure	9.8 s/v	A	10.1 s/v	B	113.6 s/v	F	103.5 s/v	Yes	14.5 s/v	B	9.8 s/v	A	10.1 s/v	B	15.9 s/v	C	5.8 s/v	No	--	--

Notes:

- **Bold HCM/LOS** values indicate adverse service levels
- sec/veh = seconds per vehicle

TABLE 12-1A
EXISTING PLUS ALTERNATIVE PROJECT FRIDAY PEAK HOUR INTERSECTION CAPACITY ANALYSIS – FIELD EVENT
FULLERTON COLLEGE SHERBECK FIELD IMPROVEMENTS PROJECT, FULLERTON

Key Intersections	Min. Acc. LOS	Time Period	LLG TIA (April 17, 2019) – 4,417 Seats								Alternative Project – 2,000 Seats							
			(1) Existing Traffic Conditions		(2) Existing Plus Project Traffic Conditions		(3) Significant Impact		(4) Existing Plus Project With Improvements		(5) Existing Traffic Conditions		(6) Existing Plus Alternative Project Traffic Conditions		(7) Significant Impact		(8) Existing Plus Alternative Project With Improvements	
			HCM	LOS	HCM	LOS	Increase	Yes/No	HCM	LOS	HCM	LOS	HCM	LOS	Increase	Yes/No	HCM	LOS
4. Lemon Street at Berkeley Avenue	D	Fri. Arrival	49.9 s/v	D	50.0 s/v	D	0.1 s/v	No	--	--	49.9 s/v	D	49.5 s/v	D	0.0 s/v	No	--	--
		Fri. Departure	31.8 s/v	C	93.5 s/v	F	61.7 s/v	Yes	15.2 s/v	B	31.8 s/v	C	46.2 s/v	D	14.4 s/v	No	--	--
27. Lemon Street at Fullerton College Dr	D	Fri. Arrival	12.7 s/v	B	24.9 s/v	C	12.2 s/v	No	--	--	12.7 s/v	B	13.6 s/v	B	0.9 s/v	No	--	--
		Fri. Departure	26.6 s/v	C	541.9 s/v	F	515.3 s/v	Yes	18.4 s/v	B	26.6 s/v	C	208.0 s/v	F	181.4 s/v	Yes	12.9 s/v	B
28. Berkeley Avenue at College Dwy No. 1	D	Fri. Arrival	9.9 s/v	A	19.1 s/v	C	9.2 s/v	No	--	--	9.9 s/v	A	11.9 s/v	B	2.0 s/v	No	--	--
		Fri. Departure	10.0 s/v	B	44.5 s/v	E	34.5 s/v	Yes	15.5 s/v	B	10.0 s/v	B	13.0 s/v	B	3.0 s/v	No	--	--
29. Berkeley Avenue at College Dwy No. 2	D	Fri. Arrival	10.1 s/v	B	12.8 s/v	B	2.7 s/v	No	--	--	10.1 s/v	B	11.0 s/v	B	0.9 s/v	No	--	--
		Fri. Departure	9.5 s/v	A	56.7 s/v	F	47.2 s/v	Yes	13.3 s/v	B	9.5 s/v	A	13.7 s/v	B	4.2 s/v	No	--	--

Notes:

- **Bold HCM/LOS** values indicate adverse service levels
- sec/veh = seconds per vehicle

TABLE 12-2A
YEAR 2020 ALTERNATIVE PROJECT FRIDAY PEAK HOUR INTERSECTION CAPACITY ANALYSIS – FIELD EVENT
FULLERTON COLLEGE SHERBECK FIELD IMPROVEMENTS PROJECT, FULLERTON

Key Intersections	Min. Acc. LOS	Time Period	LLG TIA (April 17, 2019) – 4,417 Seats										Alternative Project – 2,000 Seats									
			(1) Existing Traffic Conditions		(2) Year 2020 Cumulative Traffic Conditions		(3) Year 2020 Cumulative Plus Project Traffic Conditions		(4) Significant Impact		(5) Year 2020 Cumulative Plus Project With Improvements		(6) Existing Traffic Conditions		(7) Year 2020 Cumulative Traffic Conditions		(8) Year 2020 Cumulative Plus Alt. Project Traffic Conditions		(9) Significant Impact		(10) Year 2020 Cumulative Plus Alt. Project With Improvements	
			HCM	LOS	HCM	LOS	HCM	LOS	Increase	Yes/No	HCM	LOS	HCM	LOS	HCM	LOS	HCM	LOS	HCM	LOS	Increase	Yes/No
4. Lemon Street at Berkeley Avenue	D	Fri. Arrival	49.9 s/v	D	51.1 s/v	D	51.3 s/v	D	0.2 s/v	No	--	--	49.9 s/v	D	51.1 s/v	D	51.0 s/v	D	0.0 s/v	No	--	--
		Fri. Departure	31.8 s/v	C	32.1 s/v	C	98.1 s/v	F	66.0 s/v	Yes	15.5 s/v	B	31.8 s/v	C	32.1 s/v	C	47.6 s/v	D	15.5 s/v	No	--	--
27. Lemon Street at Fullerton College Dr	D	Fri. Arrival	12.7 s/v	B	12.9 s/v	B	29.5 s/v	C	16.6 s/v	No	--	--	12.7 s/v	B	12.9 s/v	B	15.0 s/v	B	2.1 s/v	No	--	--
		Fri. Departure	26.6 s/v	C	31.8 s/v	C	554.2 s/v	F	522.4 s/v	Yes	18.5 s/v	B	26.6 s/v	C	31.8 s/v	C	219.6 s/v	F	187.8 s/v	Yes	12.9 s/v	B
28. Berkeley Avenue at College Dwy No. 1	D	Fri. Arrival	9.9 s/v	A	10.0 s/v	A	19.8 s/v	C	9.8 s/v	No	--	--	9.9 s/v	A	10.0 s/v	A	12.1 s/v	B	2.1 s/v	No	--	--
		Fri. Departure	10.0 s/v	B	10.1 s/v	B	46.8 s/v	E	36.7 s/v	Yes	15.5 s/v	B	10.0 s/v	B	10.1 s/v	B	13.2 s/v	B	3.1 s/v	No	--	--
29. Berkeley Avenue at College Dwy No. 2	D	Fri. Arrival	10.1 s/v	B	10.2 s/v	B	12.9 s/v	B	2.7 s/v	No	--	--	10.1 s/v	B	10.2 s/v	B	11.1 s/v	B	0.9 s/v	No	--	--
		Fri. Departure	9.5 s/v	A	9.6 s/v	A	60.2 s/v	F	50.6 s/v	Yes	13.4 s/v	B	9.5 s/v	A	9.6 s/v	A	13.9 s/v	B	4.3 s/v	No	--	--

Notes:

- **Bold HCM/LOS** values indicate adverse service levels
- sec/veh = seconds per vehicle

TABLE A
IMPACTS COMPARISON SUMMARY – PROPOSED PROJECT VERSUS ALTERNATIVE PROJECT
FULLERTON COLLEGE SHERBECK FIELD IMPROVEMENTS PROJECT, FULLERTON

Description	(1) LLG TIA (April 17, 2019) – 4,417 Seats	(2) Alternative Project – 2,000 Seats	(3) Difference
1) Project Description	➤ 4,417 seats	➤ 2,000 seats	➤ -2,417 seats
2) Trip Generation	<ul style="list-style-type: none"> ➤ Daily = 4,307 ➤ Event Arrival Peak Hour = 1,559 ➤ Event Departure Peak Hour = 1,669 	<ul style="list-style-type: none"> ➤ Daily = 1,950 ➤ Event Arrival Peak Hour = 706 ➤ Event Departure Peak Hour = 756 	<ul style="list-style-type: none"> ➤ Daily = -2,357 ➤ Event Arrival Peak Hour = -853 ➤ Event Departure Peak Hour = -913
3) No. of Study Intersections	➤ 31 Intersections	➤ 31 Intersections	➤ Same No. of Study Intersections
4) Existing Plus Project Saturday Impacts	<ul style="list-style-type: none"> ➤ 3 of 31 intersections (#4, #28, #29) <ul style="list-style-type: none"> ▪ #4 = Lemon St at Berkeley Ave ▪ #28 = Berkeley Ave at College Dwy No. 1 ▪ #29 = Berkeley Ave at College Dwy No. 2 	<ul style="list-style-type: none"> ➤ 0 of 31 intersections <ul style="list-style-type: none"> ▪ Impacts at #4, #28, #29 eliminated 	➤ 3 less impacts
5) Year 2020 Plus Project Saturday Impacts	<ul style="list-style-type: none"> ➤ 3 of 31 intersections (#4, #28, #29) <ul style="list-style-type: none"> ▪ #4 = Lemon St at Berkeley Ave ▪ #28 = Berkeley Ave at College Dwy No. 1 ▪ #29 = Berkeley Ave at College Dwy No. 2 	<ul style="list-style-type: none"> ➤ 0 of 31 intersections <ul style="list-style-type: none"> ▪ Impacts at #4, #28, #29 eliminated 	➤ 3 less impacts
6) Year 2030 Plus Project Saturday Impacts	<ul style="list-style-type: none"> ➤ 4 of 31 intersections (#4, #12, #28, #29) <ul style="list-style-type: none"> ▪ #4 = Lemon St at Berkeley Ave ▪ #12 = State College Blvd at Chapman Ave ▪ #28 = Berkeley Ave at College Dwy No. 1 ▪ #29 = Berkeley Ave at College Dwy No. 2 	<ul style="list-style-type: none"> ➤ 1 of 31 intersections (#12) <ul style="list-style-type: none"> ▪ #12 = State College Blvd at Chapman Ave ▪ Impacts at #4, #28, #29 eliminated 	➤ 3 less impacts
7) Existing Plus Project Friday Impacts	<ul style="list-style-type: none"> ➤ 4 of 31 intersections (#4, #27, #28, #29) <ul style="list-style-type: none"> ▪ #4 = Lemon St at Berkeley Ave ▪ #27 = Lemon St at Fullerton College Dr ▪ #28 = Berkeley Ave at College Dwy No. 1 ▪ #29 = Berkeley Ave at College Dwy No. 2 	<ul style="list-style-type: none"> ➤ 1 of 31 intersections (#27) <ul style="list-style-type: none"> ▪ #27 = Lemon St at Fullerton College Dr ▪ Impacts at #4, #28, #29 eliminated 	➤ 3 less impacts
8) Year 2020 Plus Project Friday Impacts	<ul style="list-style-type: none"> ➤ 4 of 31 intersections (#4, #27, #28, #29) <ul style="list-style-type: none"> ▪ #4 = Lemon St at Berkeley Ave ▪ #27 = Lemon St at Fullerton College Dr ▪ #28 = Berkeley Ave at College Dwy No. 1 ▪ #29 = Berkeley Ave at College Dwy No. 2 	<ul style="list-style-type: none"> ➤ 1 of 31 intersections (#27) <ul style="list-style-type: none"> ▪ #27 = Lemon St at Fullerton College Dr ▪ Impacts at #4, #28, #29 eliminated 	➤ 3 less impacts

APPENDIX A

EXISTING PLUS ALTERNATIVE PROJECT TRAFFIC CONDITIONS INTERSECTION LEVEL OF SERVICE CALCULATION WORKSHEETS (SATURDAY FIELD EVENT ANALYSIS)

APPENDIX A-1

**EXISTING SATURDAY ARRIVAL PEAK HOUR
TRAFFIC CONDITIONS**

Intersection Level Of Service Report
Intersection 4: Lemon Street at Berkeley Avenue

Control Type:	Signalized	Delay (sec / veh):	34.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.419

Intersection Setup

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	⇌⇌⇌			⇌			⇌⇌⇌			⇌⇌		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Base Volume Input [veh/h]	212	260	60	88	180	21	16	209	131	76	280	136
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	212	260	60	88	180	21	16	209	131	76	280	136
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	53	65	15	22	45	5	4	52	33	19	70	34
Total Analysis Volume [veh/h]	212	260	60	88	180	21	16	209	131	76	280	136
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Permiss	Permiss	Overlap	Permiss	Permiss	Permiss
Signal group	0	2	0	0	6	0	0	8	8	0	4	0
Auxiliary Signal Groups									2,8			
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	6	0	6	0
Maximum Green [s]	0	30	0	0	30	0	0	30	30	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	35	0	0	30	0	0	45	45	0	45	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	20	0	0	19	0	0	16	16	0	12	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall		No			No			No	No		No	
Maximum Recall		No			No			No	No		No	
Pedestrian Recall		No			No			No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	41	41	41	41	41	16	16	61	16	16	16
g / C, Green / Cycle	0.37	0.37	0.37	0.37	0.37	0.14	0.14	0.55	0.14	0.14	0.14
(v / s)_i Volume / Saturation Flow Rate	0.12	0.14	0.03	0.05	0.11	0.01	0.11	0.07	0.04	0.12	0.11
s, saturation flow rate [veh/h]	1800	1800	1800	1800	1800	1800	1900	1800	1800	1900	1800
c, Capacity [veh/h]	673	673	673	673	673	113	272	996	126	272	258
d1, Uniform Delay [s]	24.40	25.16	22.26	22.63	24.23	40.65	45.26	11.81	42.06	45.64	45.13
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.50	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.23	1.68	0.26	0.40	1.14	0.56	4.54	0.27	4.54	6.04	4.34
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.32	0.39	0.09	0.13	0.30	0.14	0.77	0.13	0.60	0.82	0.75
d, Delay for Lane Group [s/veh]	25.62	26.83	22.53	23.03	25.36	41.21	49.81	12.08	46.61	51.68	49.46
Lane Group LOS	C	C	C	C	C	D	D	B	D	D	D
Critical Lane Group	No	Yes	No	No	Yes	No	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	4.13	5.24	1.06	1.58	3.88	0.39	5.81	1.60	2.01	6.34	5.35
50th-Percentile Queue Length [ft/ln]	103.15	131.03	26.39	39.39	97.04	9.84	145.31	39.89	50.18	158.47	133.68
95th-Percentile Queue Length [veh/ln]	7.43	9.00	1.90	2.84	6.99	0.71	9.77	2.87	3.61	10.47	9.14
95th-Percentile Queue Length [ft/ln]	185.67	224.89	47.50	70.90	174.67	17.72	244.15	71.80	90.33	261.69	228.49

Movement, Approach, & Intersection Results

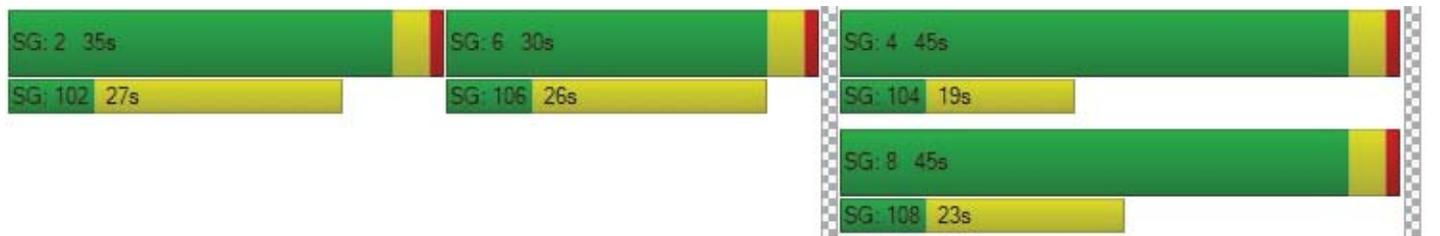
d_M, Delay for Movement [s/veh]	25.62	26.83	22.53	23.03	25.36	25.36	41.21	49.81	12.08	46.61	51.23	49.46
Movement LOS	C	C	C	C	C	C	D	D	B	D	D	D
d_A, Approach Delay [s/veh]	25.86			24.65			35.54			50.03		
Approach LOS	C			C			D			D		
d_I, Intersection Delay [s/veh]	34.84											
Intersection LOS	C											
Intersection V/C	0.419											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.55	44.55	44.55	44.55
I_p,int, Pedestrian LOS Score for Intersection	2.473	2.200	2.479	2.348
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	564	473	745	745
d_b, Bicycle Delay [s]	28.37	32.07	21.64	21.64
I_b,int, Bicycle LOS Score for Intersection	2.437	2.036	2.147	1.966
Bicycle LOS	B	B	B	A

Sequence

Ring 1	2	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 28: Berkeley Avenue at College Driveway No. 1

Control Type:	Two-way stop	Delay (sec / veh):	11.4
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.047

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Base Volume Input [veh/h]	0	384	271	1	28	4
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	384	271	1	28	4
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	96	68	0	7	1
Total Analysis Volume [veh/h]	0	384	271	1	28	4
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.05	0.01
d_M, Delay for Movement [s/veh]	7.79	0.00	0.00	0.00	11.39	10.02
Movement LOS	A	A	A	A	B	B
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.17	0.17
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	0.00	4.14	4.14
d_A, Approach Delay [s/veh]	0.00		0.00		11.22	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	0.52					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 29: Berkeley Avenue at College Driveway No. 2

Control Type:	Two-way stop	Delay (sec / veh):	12.5
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.015

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Base Volume Input [veh/h]	41	379	279	1	8	100
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	41	379	279	1	8	100
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	10	95	70	0	2	25
Total Analysis Volume [veh/h]	41	379	279	1	8	100
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.00	0.00	0.00	0.01	0.13
d_M, Delay for Movement [s/veh]	7.90	0.00	0.00	0.00	12.51	10.58
Movement LOS	A	A	A	A	B	B
95th-Percentile Queue Length [veh/ln]	0.10	0.00	0.00	0.00	0.51	0.51
95th-Percentile Queue Length [ft/ln]	2.48	0.00	0.00	0.00	12.79	12.79
d_A, Approach Delay [s/veh]	0.77		0.00		10.72	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	1.83					
Intersection LOS	B					

APPENDIX A-II

EXISTING SATURDAY DEPARTURE PEAK HOUR
TRAFFIC CONDITIONS

Intersection Level Of Service Report
Intersection 4: Lemon Street at Berkeley Avenue

Control Type:	Signalized	Delay (sec / veh):	33.9
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.371

Intersection Setup

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	↔↔↔			↔			↔↔↔			↔↔		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Base Volume Input [veh/h]	127	192	41	61	220	27	16	165	83	55	192	61
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	127	192	41	61	220	27	16	165	83	55	192	61
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	32	48	10	15	55	7	4	41	21	14	48	15
Total Analysis Volume [veh/h]	127	192	41	61	220	27	16	165	83	55	192	61
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Permiss	Permiss	Overlap	Permiss	Permiss	Permiss
Signal group	0	2	0	0	6	0	0	8	8	0	4	0
Auxiliary Signal Groups									2,8			
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	6	0	6	0
Maximum Green [s]	0	30	0	0	30	0	0	30	30	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	36	0	0	44	0	0	30	30	0	30	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	20	0	0	19	0	0	16	16	0	12	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall		No			No			No	No		No	
Maximum Recall		No			No			No	No		No	
Pedestrian Recall		No			No			No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	43	43	43	43	43	12	12	59	12	12	12
g / C, Green / Cycle	0.39	0.39	0.39	0.39	0.39	0.11	0.11	0.54	0.11	0.11	0.11
(v / s)_i Volume / Saturation Flow Rate	0.07	0.11	0.02	0.03	0.14	0.01	0.09	0.05	0.03	0.07	0.07
s, saturation flow rate [veh/h]	1800	1800	1800	1800	1800	1800	1900	1800	1800	1900	1800
c, Capacity [veh/h]	704	704	704	704	704	122	207	965	90	207	196
d1, Uniform Delay [s]	21.93	22.82	20.86	21.10	23.63	44.00	47.76	12.38	44.99	46.89	46.73
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.50	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.56	0.96	0.16	0.24	1.38	0.48	6.84	0.18	6.55	3.29	3.07
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.18	0.27	0.06	0.09	0.35	0.13	0.80	0.09	0.61	0.64	0.61
d, Delay for Lane Group [s/veh]	22.49	23.77	21.02	21.34	25.00	44.49	54.60	12.56	51.54	50.18	49.80
Lane Group LOS	C	C	C	C	C	D	D	B	D	D	D
Critical Lane Group	No	Yes	No	No	Yes	No	Yes	No	No	No	No
50th-Percentile Queue Length [veh/ln]	2.26	3.56	0.69	1.04	4.77	0.41	4.79	1.03	1.54	3.67	3.30
50th-Percentile Queue Length [ft/ln]	56.40	89.07	17.25	25.98	119.14	10.23	119.81	25.73	38.62	91.68	82.53
95th-Percentile Queue Length [veh/ln]	4.06	6.41	1.24	1.87	8.35	0.74	8.38	1.85	2.78	6.60	5.94
95th-Percentile Queue Length [ft/ln]	101.52	160.32	31.05	46.76	208.65	18.42	209.56	46.31	69.52	165.02	148.56

Movement, Approach, & Intersection Results

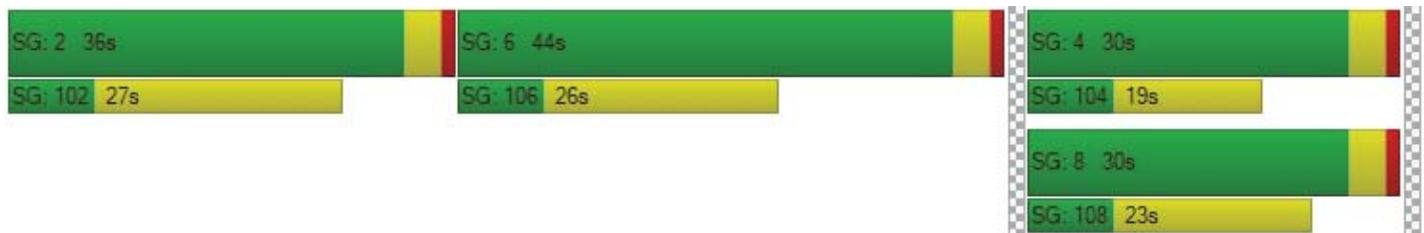
d_M, Delay for Movement [s/veh]	22.49	23.77	21.02	21.34	25.00	25.00	44.49	54.60	12.56	51.54	50.06	49.80
Movement LOS	C	C	C	C	C	C	D	D	B	D	D	D
d_A, Approach Delay [s/veh]	23.01			24.28			40.77			50.28		
Approach LOS	C			C			D			D		
d_I, Intersection Delay [s/veh]	33.88											
Intersection LOS	C											
Intersection V/C	0.371											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.55	44.55	44.55	44.55
I_p,int, Pedestrian LOS Score for Intersection	2.394	2.160	2.428	2.281
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	582	727	473	473
d_b, Bicycle Delay [s]	27.65	22.27	32.07	32.07
I_b,int, Bicycle LOS Score for Intersection	2.154	2.068	1.995	1.814
Bicycle LOS	B	B	A	A

Sequence

Ring 1	2	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 28: Berkeley Avenue at College Driveway No. 1

Control Type:	Two-way stop	Delay (sec / veh):	10.5
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.065

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Base Volume Input [veh/h]	1	175	236	0	46	14
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1	175	236	0	46	14
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	44	59	0	12	4
Total Analysis Volume [veh/h]	1	175	236	0	46	14
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.06	0.02
d_M, Delay for Movement [s/veh]	7.71	0.00	0.00	0.00	10.51	9.92
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.27	0.27
95th-Percentile Queue Length [ft/ln]	0.06	0.00	0.00	0.00	6.70	6.70
d_A, Approach Delay [s/veh]	0.04		0.00		10.38	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	1.34					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 29: Berkeley Avenue at College Driveway No. 2

Control Type:	Two-way stop	Delay (sec / veh):	10.8
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.000

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Base Volume Input [veh/h]	41	171	216	0	0	72
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	41	171	216	0	0	72
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	10	43	54	0	0	18
Total Analysis Volume [veh/h]	41	171	216	0	0	72
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.00	0.00	0.00	0.00	0.09
d_M, Delay for Movement [s/veh]	7.74	0.00	0.00	0.00	10.80	9.79
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh/ln]	0.09	0.00	0.00	0.00	0.29	0.29
95th-Percentile Queue Length [ft/ln]	2.34	0.00	0.00	0.00	7.16	7.16
d_A, Approach Delay [s/veh]	1.50		0.00		9.79	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	2.04					
Intersection LOS	B					

APPENDIX A-III

**EXISTING PLUS PROJECT SATURDAY
ARRIVAL PEAK HOUR TRAFFIC CONDITIONS**

Intersection Level Of Service Report
Intersection 4: Lemon Street at Berkeley Avenue

Control Type:	Signalized	Delay (sec / veh):	35.3
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.437

Intersection Setup

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	⇐⇐⇐			⇐⇐			⇐⇐⇐			⇐⇐		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Base Volume Input [veh/h]	220	260	99	88	180	21	16	253	131	87	285	136
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	220	260	99	88	180	21	16	253	131	87	285	136
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	55	65	25	22	45	5	4	63	33	22	71	34
Total Analysis Volume [veh/h]	220	260	99	88	180	21	16	253	131	87	285	136
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Permiss	Permiss	Overlap	Permiss	Permiss	Permiss
Signal group	0	2	0	0	6	0	0	8	8	0	4	0
Auxiliary Signal Groups									2,8			
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	6	0	6	0
Maximum Green [s]	0	30	0	0	30	0	0	30	30	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	31	0	0	30	0	0	49	49	0	49	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	20	0	0	19	0	0	16	16	0	12	0
Rest In Walk		No			No			No	No		No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall		No			No			No	No		No	
Maximum Recall		No			No			No	No		No	
Pedestrian Recall		No			No			No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	40	40	40	40	40	17	17	61	17	17	17
g / C, Green / Cycle	0.37	0.37	0.37	0.37	0.37	0.16	0.16	0.56	0.16	0.16	0.16
(v / s)_i Volume / Saturation Flow Rate	0.12	0.14	0.06	0.05	0.11	0.01	0.13	0.07	0.05	0.12	0.11
s, saturation flow rate [veh/h]	1800	1800	1800	1800	1800	1800	1900	1800	1800	1900	1800
c, Capacity [veh/h]	661	661	661	661	661	134	296	1007	107	296	281
d1, Uniform Delay [s]	25.02	25.67	23.24	23.09	24.72	39.45	45.11	11.47	41.09	44.37	43.86
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.50	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.35	1.75	0.48	0.42	1.18	0.39	6.96	0.27	13.50	4.05	3.10
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.33	0.39	0.15	0.13	0.30	0.12	0.85	0.13	0.81	0.76	0.70
d, Delay for Lane Group [s/veh]	26.37	27.42	23.72	23.51	25.90	39.85	52.07	11.74	54.58	48.43	46.97
Lane Group LOS	C	C	C	C	C	D	D	B	D	D	D
Critical Lane Group	No	Yes	No	No	Yes	No	Yes	No	No	No	No
50th-Percentile Queue Length [veh/ln]	4.36	5.31	1.81	1.60	3.93	0.38	7.25	1.57	2.49	6.20	5.26
50th-Percentile Queue Length [ft/ln]	109.05	132.75	45.19	39.88	98.29	9.61	181.36	39.17	62.37	154.93	131.43
95th-Percentile Queue Length [veh/ln]	7.79	9.09	3.25	2.87	7.08	0.69	11.67	2.82	4.49	10.28	9.02
95th-Percentile Queue Length [ft/ln]	194.69	227.23	81.34	71.79	176.92	17.29	291.79	70.50	112.26	256.99	225.44

Movement, Approach, & Intersection Results

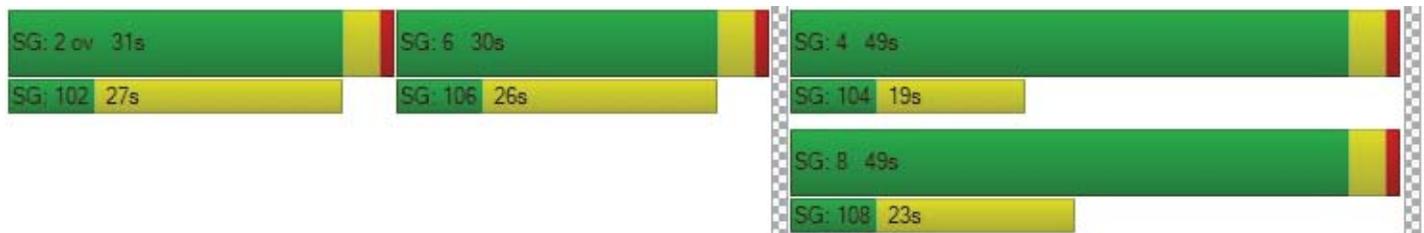
d_M, Delay for Movement [s/veh]	26.37	27.42	23.72	23.51	25.90	25.90	39.85	52.07	11.74	54.58	48.12	46.97
Movement LOS	C	C	C	C	C	C	D	D	B	D	D	D
d_A, Approach Delay [s/veh]	26.39			25.17			38.37			48.92		
Approach LOS	C			C			D			D		
d_I, Intersection Delay [s/veh]	35.33											
Intersection LOS	D											
Intersection V/C	0.437											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.55	44.55	44.55	44.55
I_p,int, Pedestrian LOS Score for Intersection	2.503	2.200	2.490	2.372
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	491	473	818	818
d_b, Bicycle Delay [s]	31.31	32.07	19.20	19.20
I_b,int, Bicycle LOS Score for Intersection	2.515	2.036	2.220	1.979
Bicycle LOS	B	B	B	A

Sequence

Ring 1	2	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 28: Berkeley Avenue at College Driveway No. 1

Control Type:	Two-way stop	Delay (sec / veh):	16.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.122

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Base Volume Input [veh/h]	195	384	294	1	43	42
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	195	384	294	1	43	42
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	49	96	74	0	11	11
Total Analysis Volume [veh/h]	195	384	294	1	43	42
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.15	0.00	0.00	0.00	0.12	0.06
d_M, Delay for Movement [s/veh]	8.36	0.00	0.00	0.00	16.83	11.46
Movement LOS	A	A	A	A	C	B
95th-Percentile Queue Length [veh/ln]	0.54	0.00	0.00	0.00	0.64	0.64
95th-Percentile Queue Length [ft/ln]	13.59	0.00	0.00	0.00	16.06	16.06
d_A, Approach Delay [s/veh]	2.82		0.00		14.18	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	2.96					
Intersection LOS	C					

Intersection Level Of Service Report
Intersection 29: Berkeley Avenue at College Driveway No. 2

Control Type:	Two-way stop	Delay (sec / veh):	18.5
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.027

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Base Volume Input [veh/h]	180	574	339	1	8	130
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	180	574	339	1	8	130
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	45	144	85	0	2	33
Total Analysis Volume [veh/h]	180	574	339	1	8	130
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.15	0.01	0.00	0.00	0.03	0.18
d_M, Delay for Movement [s/veh]	8.46	0.00	0.00	0.00	18.52	11.60
Movement LOS	A	A	A	A	C	B
95th-Percentile Queue Length [veh/ln]	0.52	0.00	0.00	0.00	0.80	0.80
95th-Percentile Queue Length [ft/ln]	12.94	0.00	0.00	0.00	19.90	19.90
d_A, Approach Delay [s/veh]	2.02		0.00		12.00	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	2.58					
Intersection LOS	C					

APPENDIX A-IV

**EXISTING PLUS PROJECT SATURDAY
DEPARTURE PEAK HOUR TRAFFIC CONDITIONS**

Intersection Level Of Service Report
Intersection 4: Lemon Street at Berkeley Avenue

Control Type:	Signalized	Delay (sec / veh):	40.2
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.374

Intersection Setup

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	⇐⇐⇐			⇐⇐			⇐⇐⇐			⇐⇐		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Base Volume Input [veh/h]	162	192	45	61	220	27	16	170	83	103	213	61
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	162	192	45	61	220	27	16	170	83	103	213	61
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	41	48	11	15	55	7	4	43	21	26	53	15
Total Analysis Volume [veh/h]	162	192	45	61	220	27	16	170	83	103	213	61
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Permiss	Permiss	Overlap	Permiss	Permiss	Permiss
Signal group	0	2	0	0	6	0	0	8	8	0	4	0
Auxiliary Signal Groups									2,8			
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	6	0	6	0
Maximum Green [s]	0	30	0	0	30	0	0	30	30	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	33	0	0	34	0	0	43	43	0	43	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	20	0	0	19	0	0	16	16	0	12	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall		No			No			No	No		No	
Maximum Recall		No			No			No	No		No	
Pedestrian Recall		No			No			No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	43	43	43	43	43	12	12	59	12	12	12
g / C, Green / Cycle	0.39	0.39	0.39	0.39	0.39	0.11	0.11	0.54	0.11	0.11	0.11
(v / s)_i Volume / Saturation Flow Rate	0.09	0.11	0.03	0.03	0.14	0.01	0.09	0.05	0.06	0.08	0.07
s, saturation flow rate [veh/h]	1800	1800	1800	1800	1800	1800	1900	1800	1800	1900	1800
c, Capacity [veh/h]	701	701	701	701	701	117	212	968	93	212	201
d1, Uniform Delay [s]	22.49	22.91	20.99	21.18	23.72	43.76	47.63	12.32	45.72	46.93	46.74
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.50	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.77	0.96	0.18	0.24	1.39	0.52	6.91	0.17	77.46	3.81	3.47
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.23	0.27	0.06	0.09	0.35	0.14	0.80	0.09	1.11	0.68	0.65
d, Delay for Lane Group [s/veh]	23.26	23.88	21.17	21.43	25.11	44.28	54.54	12.49	123.18	50.74	50.21
Lane Group LOS	C	C	C	C	C	D	D	B	F	D	D
Critical Lane Group	No	Yes	No	No	Yes	No	Yes	No	No	No	No
50th-Percentile Queue Length [veh/ln]	2.95	3.57	0.76	1.04	4.78	0.41	4.94	1.03	4.36	4.01	3.59
50th-Percentile Queue Length [ft/ln]	73.82	89.30	19.02	26.04	119.46	10.22	123.44	25.64	109.08	100.23	89.74
95th-Percentile Queue Length [veh/ln]	5.32	6.43	1.37	1.88	8.36	0.74	8.58	1.85	7.85	7.22	6.46
95th-Percentile Queue Length [ft/ln]	132.88	160.74	34.24	46.88	209.08	18.39	214.54	46.15	196.34	180.42	161.52

Movement, Approach, & Intersection Results

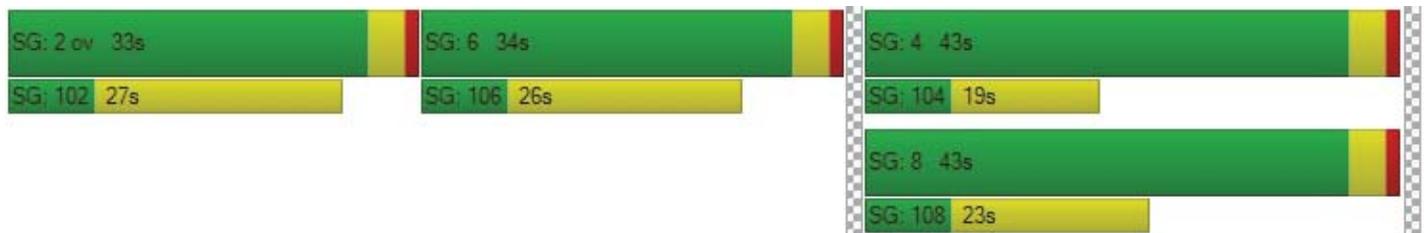
d_M, Delay for Movement [s/veh]	23.26	23.88	21.17	21.43	25.11	25.11	44.28	54.54	12.49	123.18	50.57	50.21
Movement LOS	C	C	C	C	C	C	D	D	B	F	D	D
d_A, Approach Delay [s/veh]	23.32			24.38			40.96			70.35		
Approach LOS	C			C			D			E		
d_I, Intersection Delay [s/veh]	40.17											
Intersection LOS	D											
Intersection V/C	0.374											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.55	44.55	44.55	44.55
I_p,int, Pedestrian LOS Score for Intersection	2.483	2.160	2.440	2.300
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	527	545	709	709
d_b, Bicycle Delay [s]	29.82	29.09	22.91	22.91
I_b,int, Bicycle LOS Score for Intersection	2.218	2.068	2.003	1.871
Bicycle LOS	B	B	B	A

Sequence

Ring 1	2	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 28: Berkeley Avenue at College Driveway No. 1

Control Type:	Two-way stop	Delay (sec / veh):	15.0
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.183

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Base Volume Input [veh/h]	23	175	340	0	115	187
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	23	175	340	0	115	187
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	44	85	0	29	47
Total Analysis Volume [veh/h]	23	175	340	0	115	187
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.00	0.00	0.00	0.18	0.27
d_M, Delay for Movement [s/veh]	8.01	0.00	0.00	0.00	15.02	14.42
Movement LOS	A	A	A	A	C	B
95th-Percentile Queue Length [veh/ln]	0.06	0.00	0.00	0.00	2.33	2.33
95th-Percentile Queue Length [ft/ln]	1.44	0.00	0.00	0.00	58.25	58.25
d_A, Approach Delay [s/veh]	0.93		0.00		14.65	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	5.49					
Intersection LOS	C					

Intersection Level Of Service Report
Intersection 29: Berkeley Avenue at College Driveway No. 2

Control Type:	Two-way stop	Delay (sec / veh):	14.8
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.365

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Base Volume Input [veh/h]	57	193	493	0	0	210
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	57	193	493	0	0	210
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	14	48	123	0	0	53
Total Analysis Volume [veh/h]	57	193	493	0	0	210
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.00	0.00	0.00	0.00	0.36
d_M, Delay for Movement [s/veh]	8.55	0.00	0.00	0.00	15.49	14.79
Movement LOS	A	A	A	A	C	B
95th-Percentile Queue Length [veh/ln]	0.17	0.00	0.00	0.00	1.66	1.66
95th-Percentile Queue Length [ft/ln]	4.21	0.00	0.00	0.00	41.52	41.52
d_A, Approach Delay [s/veh]	1.95		0.00		14.79	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	3.77					
Intersection LOS	B					

APPENDIX B

YEAR 2020 CUMULATIVE PLUS ALTERNATIVE PROJECT TRAFFIC CONDITIONS INTERSECTION LEVEL OF SERVICE CALCULATION WORKSHEETS (SATURDAY FIELD EVENT ANALYSIS)

APPENDIX B-1

**YEAR 2020 CUMULATIVE SATURDAY
ARRIVAL PEAK HOUR TRAFFIC CONDITIONS**

Intersection Level Of Service Report
Intersection 4: Lemon Street at Berkeley Avenue

Control Type:	Signalized	Delay (sec / veh):	34.9
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.426

Intersection Setup

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	TTT			TT			TTT			TTT		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Base Volume Input [veh/h]	215	264	62	89	183	21	16	214	133	78	285	138
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	215	264	62	89	183	21	16	214	133	78	285	138
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	54	66	16	22	46	5	4	54	33	20	71	35
Total Analysis Volume [veh/h]	215	264	62	89	183	21	16	214	133	78	285	138
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Permiss	Permiss	Overlap	Permiss	Permiss	Permiss
Signal group	0	2	0	0	6	0	0	8	8	0	4	0
Auxiliary Signal Groups									2,8			
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	6	0	6	0
Maximum Green [s]	0	30	0	0	30	0	0	30	30	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	35	0	0	30	0	0	45	45	0	45	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	20	0	0	19	0	0	16	16	0	12	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall		No			No			No	No		No	
Maximum Recall		No			No			No	No		No	
Pedestrian Recall		No			No			No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	41	41	41	41	41	16	16	61	16	16	16
g / C, Green / Cycle	0.37	0.37	0.37	0.37	0.37	0.14	0.14	0.55	0.14	0.14	0.14
(v / s)_i Volume / Saturation Flow Rate	0.12	0.15	0.03	0.05	0.11	0.01	0.11	0.07	0.04	0.12	0.11
s, saturation flow rate [veh/h]	1800	1800	1800	1800	1800	1800	1900	1800	1800	1900	1800
c, Capacity [veh/h]	671	671	671	671	671	113	276	998	125	276	261
d1, Uniform Delay [s]	24.52	25.30	22.36	22.72	24.35	40.45	45.18	11.77	41.91	45.53	45.00
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.50	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.26	1.73	0.27	0.41	1.17	0.56	4.65	0.28	5.01	6.04	4.31
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.32	0.39	0.09	0.13	0.30	0.14	0.78	0.13	0.62	0.82	0.75
d, Delay for Lane Group [s/veh]	25.78	27.03	22.64	23.13	25.52	41.02	49.83	12.04	46.92	51.57	49.31
Lane Group LOS	C	C	C	C	C	D	D	B	D	D	D
Critical Lane Group	No	Yes	No	No	Yes	No	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	4.20	5.35	1.09	1.60	3.96	0.39	5.96	1.62	2.07	6.44	5.43
50th-Percentile Queue Length [ft/ln]	105.05	133.73	27.36	39.94	98.90	9.82	148.95	40.43	51.69	161.11	135.70
95th-Percentile Queue Length [veh/ln]	7.56	9.14	1.97	2.88	7.12	0.71	9.96	2.91	3.72	10.61	9.25
95th-Percentile Queue Length [ft/ln]	189.09	228.56	49.24	71.90	178.02	17.67	249.02	72.78	93.05	265.19	231.22

Movement, Approach, & Intersection Results

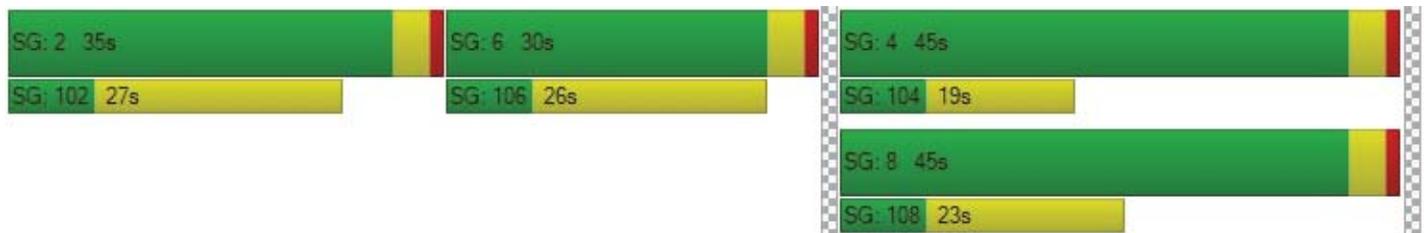
d_M, Delay for Movement [s/veh]	25.78	27.03	22.64	23.13	25.52	25.52	41.02	49.83	12.04	46.92	51.11	49.31
Movement LOS	C	C	C	C	C	C	D	D	B	D	D	D
d_A, Approach Delay [s/veh]	26.03			24.79			35.60			49.96		
Approach LOS	C			C			D			D		
d_I, Intersection Delay [s/veh]	34.92											
Intersection LOS	C											
Intersection V/C	0.426											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.55	44.55	44.55	44.55
I_p,int, Pedestrian LOS Score for Intersection	2.479	2.204	2.482	2.352
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	564	473	745	745
d_b, Bicycle Delay [s]	28.37	32.07	21.64	21.64
I_b,int, Bicycle LOS Score for Intersection	2.452	2.043	2.159	1.973
Bicycle LOS	B	B	B	A

Sequence

Ring 1	2	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 28: Berkeley Avenue at College Driveway No. 1

Control Type:	Two-way stop	Delay (sec / veh):	11.5
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.048

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Base Volume Input [veh/h]	2	392	277	1	28	5
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	392	277	1	28	5
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	98	69	0	7	1
Total Analysis Volume [veh/h]	2	392	277	1	28	5
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.05	0.01
d_M, Delay for Movement [s/veh]	7.81	0.00	0.00	0.00	11.49	10.07
Movement LOS	A	A	A	A	B	B
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.17	0.17
95th-Percentile Queue Length [ft/ln]	0.12	0.00	0.00	0.00	4.31	4.31
d_A, Approach Delay [s/veh]	0.04		0.00		11.28	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	0.55					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 29: Berkeley Avenue at College Driveway No. 2

Control Type:	Two-way stop	Delay (sec / veh):	12.7
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.015

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Base Volume Input [veh/h]	44	389	285	1	8	104
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	44	389	285	1	8	104
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	11	97	71	0	2	26
Total Analysis Volume [veh/h]	44	389	285	1	8	104
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.00	0.00	0.00	0.02	0.14
d_M, Delay for Movement [s/veh]	7.92	0.00	0.00	0.00	12.69	10.67
Movement LOS	A	A	A	A	B	B
95th-Percentile Queue Length [veh/ln]	0.11	0.00	0.00	0.00	0.54	0.54
95th-Percentile Queue Length [ft/ln]	2.68	0.00	0.00	0.00	13.47	13.47
d_A, Approach Delay [s/veh]	0.80		0.00		10.81	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	1.88					
Intersection LOS	B					

APPENDIX B-II

**YEAR 2020 CUMULATIVE SATURDAY
DEPARTURE PEAK HOUR TRAFFIC CONDITIONS**

Intersection Level Of Service Report
Intersection 4: Lemon Street at Berkeley Avenue

Control Type:	Signalized	Delay (sec / veh):	34.0
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.377

Intersection Setup

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	⇐⇐⇐			⇐⇐			⇐⇐⇐			⇐⇐		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Base Volume Input [veh/h]	129	195	43	62	223	27	16	169	84	57	196	62
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	129	195	43	62	223	27	16	169	84	57	196	62
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	32	49	11	16	56	7	4	42	21	14	49	16
Total Analysis Volume [veh/h]	129	195	43	62	223	27	16	169	84	57	196	62
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Permiss	Permiss	Overlap	Permiss	Permiss	Permiss
Signal group	0	2	0	0	6	0	0	8	8	0	4	0
Auxiliary Signal Groups									2,8			
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	6	0	6	0
Maximum Green [s]	0	30	0	0	30	0	0	30	30	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	36	0	0	44	0	0	30	30	0	30	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	20	0	0	19	0	0	16	16	0	12	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall		No			No			No	No		No	
Maximum Recall		No			No			No	No		No	
Pedestrian Recall		No			No			No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	43	43	43	43	43	12	12	59	12	12	12
g / C, Green / Cycle	0.39	0.39	0.39	0.39	0.39	0.11	0.11	0.54	0.11	0.11	0.11
(v / s)_i Volume / Saturation Flow Rate	0.07	0.11	0.02	0.03	0.14	0.01	0.09	0.05	0.03	0.07	0.07
s, saturation flow rate [veh/h]	1800	1800	1800	1800	1800	1800	1900	1800	1800	1900	1800
c, Capacity [veh/h]	702	702	702	702	702	123	211	967	90	211	200
d1, Uniform Delay [s]	22.03	22.94	20.95	21.18	23.75	43.80	47.64	12.33	44.83	46.74	46.57
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.50	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.58	0.98	0.17	0.25	1.41	0.47	6.86	0.18	7.19	3.24	3.02
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.18	0.28	0.06	0.09	0.36	0.13	0.80	0.09	0.63	0.64	0.61
d, Delay for Lane Group [s/veh]	22.61	23.92	21.12	21.43	25.17	44.27	54.51	12.51	52.01	49.98	49.59
Lane Group LOS	C	C	C	C	C	D	D	B	D	D	D
Critical Lane Group	No	Yes	No	No	Yes	No	Yes	No	No	No	No
50th-Percentile Queue Length [veh/ln]	2.30	3.63	0.73	1.06	4.84	0.41	4.91	1.04	1.61	3.73	3.36
50th-Percentile Queue Length [ft/ln]	57.49	90.84	18.15	26.48	121.12	10.20	122.66	25.98	40.22	93.34	83.95
95th-Percentile Queue Length [veh/ln]	4.14	6.54	1.31	1.91	8.45	0.73	8.54	1.87	2.90	6.72	6.04
95th-Percentile Queue Length [ft/ln]	103.48	163.52	32.67	47.66	211.36	18.37	213.48	46.76	72.39	168.00	151.12

Movement, Approach, & Intersection Results

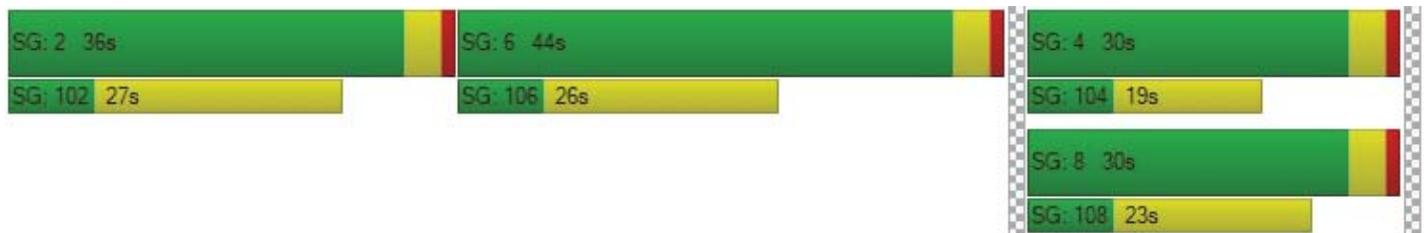
d_M, Delay for Movement [s/veh]	22.61	23.92	21.12	21.43	25.17	25.17	44.27	54.51	12.51	52.01	49.86	49.59
Movement LOS	C	C	C	C	C	C	D	D	B	D	D	D
d_A, Approach Delay [s/veh]	23.13			24.42			40.78			50.20		
Approach LOS	C			C			D			D		
d_I, Intersection Delay [s/veh]	33.96											
Intersection LOS	C											
Intersection V/C	0.377											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.55	44.55	44.55	44.55
I_p,int, Pedestrian LOS Score for Intersection	2.400	2.163	2.431	2.284
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	582	727	473	473
d_b, Bicycle Delay [s]	27.65	22.27	32.07	32.07
I_b,int, Bicycle LOS Score for Intersection	2.165	2.074	2.003	1.819
Bicycle LOS	B	B	B	A

Sequence

Ring 1	2	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 28: Berkeley Avenue at College Driveway No. 1

Control Type:	Two-way stop	Delay (sec / veh):	10.6
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.067

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Base Volume Input [veh/h]	3	180	242	0	47	15
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	180	242	0	47	15
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	45	61	0	12	4
Total Analysis Volume [veh/h]	3	180	242	0	47	15
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.07	0.02
d_M, Delay for Movement [s/veh]	7.72	0.00	0.00	0.00	10.60	9.98
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh/ln]	0.01	0.00	0.00	0.00	0.28	0.28
95th-Percentile Queue Length [ft/ln]	0.17	0.00	0.00	0.00	7.01	7.01
d_A, Approach Delay [s/veh]	0.13		0.00		10.45	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	1.38					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 29: Berkeley Avenue at College Driveway No. 2

Control Type:	Two-way stop	Delay (sec / veh):	10.9
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.000

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Base Volume Input [veh/h]	44	178	221	0	0	75
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	44	178	221	0	0	75
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	11	45	55	0	0	19
Total Analysis Volume [veh/h]	44	178	221	0	0	75
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.00	0.00	0.00	0.00	0.09
d_M, Delay for Movement [s/veh]	7.76	0.00	0.00	0.00	10.91	9.84
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh/ln]	0.10	0.00	0.00	0.00	0.30	0.30
95th-Percentile Queue Length [ft/ln]	2.53	0.00	0.00	0.00	7.54	7.54
d_A, Approach Delay [s/veh]	1.54		0.00		9.84	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	2.08					
Intersection LOS	B					

APPENDIX B-III

**YEAR 2020 CUMULATIVE PLUS PROJECT
SATURDAY ARRIVAL PEAK HOUR TRAFFIC CONDITIONS**

Intersection Level Of Service Report
Intersection 4: Lemon Street at Berkeley Avenue

Control Type:	Signalized	Delay (sec / veh):	35.4
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.444

Intersection Setup

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	⇐⇐⇐			⇐⇐			⇐⇐⇐			⇐⇐		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Base Volume Input [veh/h]	223	264	101	89	183	21	16	258	133	89	290	138
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	223	264	101	89	183	21	16	258	133	89	290	138
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	56	66	25	22	46	5	4	65	33	22	73	35
Total Analysis Volume [veh/h]	223	264	101	89	183	21	16	258	133	89	290	138
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Permiss	Permiss	Overlap	Permiss	Permiss	Permiss
Signal group	0	2	0	0	6	0	0	8	8	0	4	0
Auxiliary Signal Groups									2,8			
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	6	0	6	0
Maximum Green [s]	0	30	0	0	30	0	0	30	30	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	31	0	0	30	0	0	49	49	0	49	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	20	0	0	19	0	0	16	16	0	12	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall		No			No			No	No		No	
Maximum Recall		No			No			No	No		No	
Pedestrian Recall		No			No			No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	40	40	40	40	40	17	17	62	17	17	17
g / C, Green / Cycle	0.37	0.37	0.37	0.37	0.37	0.16	0.16	0.56	0.16	0.16	0.16
(v / s)_i Volume / Saturation Flow Rate	0.12	0.15	0.06	0.05	0.11	0.01	0.14	0.07	0.05	0.12	0.11
s, saturation flow rate [veh/h]	1800	1800	1800	1800	1800	1800	1900	1800	1800	1900	1800
c, Capacity [veh/h]	659	659	659	659	659	135	301	1010	107	301	285
d1, Uniform Delay [s]	25.17	25.84	23.36	23.20	24.87	39.21	44.97	11.42	40.89	44.20	43.68
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.50	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.39	1.81	0.49	0.43	1.22	0.39	6.99	0.27	15.13	4.00	3.05
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.34	0.40	0.15	0.14	0.31	0.12	0.86	0.13	0.83	0.76	0.70
d, Delay for Lane Group [s/veh]	26.56	27.65	23.85	23.62	26.09	39.60	51.96	11.69	56.01	48.20	46.73
Lane Group LOS	C	C	C	C	C	D	D	B	E	D	D
Critical Lane Group	No	Yes	No	No	Yes	No	Yes	No	No	No	No
50th-Percentile Queue Length [veh/ln]	4.44	5.42	1.85	1.62	4.01	0.38	7.39	1.59	2.58	6.29	5.33
50th-Percentile Queue Length [ft/ln]	111.07	135.56	46.28	40.47	100.23	9.57	184.87	39.67	64.62	157.27	133.26
95th-Percentile Queue Length [veh/ln]	7.90	9.24	3.33	2.91	7.22	0.69	11.85	2.86	4.65	10.40	9.12
95th-Percentile Queue Length [ft/ln]	197.49	231.04	83.30	72.84	180.41	17.23	296.37	71.40	116.32	260.10	227.92

Movement, Approach, & Intersection Results

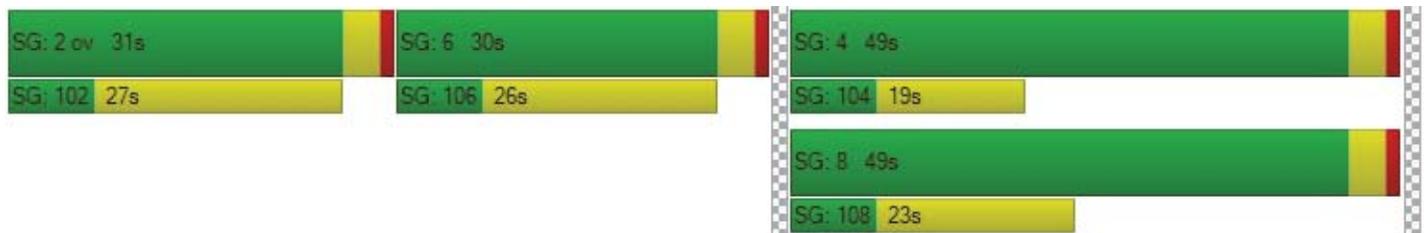
d_M, Delay for Movement [s/veh]	26.56	27.65	23.85	23.62	26.09	26.09	39.60	51.96	11.69	56.01	47.90	46.73
Movement LOS	C	C	C	C	C	C	D	D	B	E	D	D
d_A, Approach Delay [s/veh]	26.59			25.34			38.31			48.98		
Approach LOS	C			C			D			D		
d_I, Intersection Delay [s/veh]	35.44											
Intersection LOS	D											
Intersection V/C	0.444											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	44.55			44.55			44.55			44.55		
l_p,int, Pedestrian LOS Score for Intersection	2.509			2.204			2.493			2.376		
Crosswalk LOS	B			B			B			B		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	491			473			818			818		
d_b, Bicycle Delay [s]	31.31			32.07			19.20			19.20		
l_b,int, Bicycle LOS Score for Intersection	2.530			2.043			2.231			1.986		
Bicycle LOS	B			B			B			A		

Sequence

Ring 1	2	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 28: Berkeley Avenue at College Driveway No. 1

Control Type:	Two-way stop	Delay (sec / veh):	17.1
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.124

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Base Volume Input [veh/h]	197	392	300	1	43	43
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	197	392	300	1	43	43
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	49	98	75	0	11	11
Total Analysis Volume [veh/h]	197	392	300	1	43	43
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.16	0.00	0.00	0.00	0.12	0.06
d_M, Delay for Movement [s/veh]	8.39	0.00	0.00	0.00	17.05	11.56
Movement LOS	A	A	A	A	C	B
95th-Percentile Queue Length [veh/ln]	0.55	0.00	0.00	0.00	0.66	0.66
95th-Percentile Queue Length [ft/ln]	13.84	0.00	0.00	0.00	16.46	16.46
d_A, Approach Delay [s/veh]	2.80		0.00		14.31	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	2.95					
Intersection LOS	C					

Intersection Level Of Service Report
Intersection 29: Berkeley Avenue at College Driveway No. 2

Control Type:	Two-way stop	Delay (sec / veh):	18.9
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.027

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Base Volume Input [veh/h]	183	584	345	1	8	134
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	183	584	345	1	8	134
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	46	146	86	0	2	34
Total Analysis Volume [veh/h]	183	584	345	1	8	134
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.15	0.01	0.00	0.00	0.03	0.19
d_M, Delay for Movement [s/veh]	8.49	0.00	0.00	0.00	18.85	11.72
Movement LOS	A	A	A	A	C	B
95th-Percentile Queue Length [veh/ln]	0.53	0.00	0.00	0.00	0.83	0.83
95th-Percentile Queue Length [ft/ln]	13.27	0.00	0.00	0.00	20.81	20.81
d_A, Approach Delay [s/veh]	2.03		0.00		12.12	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	2.61					
Intersection LOS	C					

APPENDIX B-IV

**YEAR 2020 CUMULATIVE PLUS PROJECT
SATURDAY DEPARTURE PEAK HOUR TRAFFIC CONDITIONS**

Intersection Level Of Service Report
Intersection 4: Lemon Street at Berkeley Avenue

Control Type:	Signalized	Delay (sec / veh):	40.8
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.380

Intersection Setup

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	⇐⇐⇐			⇐⇐			⇐⇐⇐			⇐⇐		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Base Volume Input [veh/h]	164	195	47	62	223	27	16	174	84	105	217	62
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	164	195	47	62	223	27	16	174	84	105	217	62
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	41	49	12	16	56	7	4	44	21	26	54	16
Total Analysis Volume [veh/h]	164	195	47	62	223	27	16	174	84	105	217	62
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Permiss	Permiss	Overlap	Permiss	Permiss	Permiss
Signal group	0	2	0	0	6	0	0	8	8	0	4	0
Auxiliary Signal Groups									2,8			
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	6	0	6	0
Maximum Green [s]	0	30	0	0	30	0	0	30	30	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	33	0	0	34	0	0	43	43	0	43	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	20	0	0	19	0	0	16	16	0	12	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall		No			No			No	No		No	
Maximum Recall		No			No			No	No		No	
Pedestrian Recall		No			No			No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	43	43	43	43	43	12	12	59	12	12	12
g / C, Green / Cycle	0.39	0.39	0.39	0.39	0.39	0.11	0.11	0.54	0.11	0.11	0.11
(v / s)_i Volume / Saturation Flow Rate	0.09	0.11	0.03	0.03	0.14	0.01	0.09	0.05	0.06	0.08	0.07
s, saturation flow rate [veh/h]	1800	1800	1800	1800	1800	1800	1900	1800	1800	1900	1800
c, Capacity [veh/h]	699	699	699	699	699	119	216	969	93	216	204
d1, Uniform Delay [s]	22.60	23.03	21.09	21.27	23.85	43.55	47.52	12.27	45.51	46.78	46.58
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.50	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.79	0.99	0.19	0.25	1.42	0.51	6.94	0.18	85.10	3.74	3.40
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.23	0.28	0.07	0.09	0.36	0.13	0.81	0.09	1.13	0.68	0.65
d, Delay for Lane Group [s/veh]	23.38	24.02	21.27	21.52	25.27	44.06	54.45	12.44	130.60	50.51	49.99
Lane Group LOS	C	C	C	C	C	D	D	B	F	D	D
Critical Lane Group	No	Yes	No	No	Yes	No	Yes	No	No	No	No
50th-Percentile Queue Length [veh/ln]	3.00	3.64	0.80	1.06	4.86	0.41	5.05	1.04	4.55	4.08	3.65
50th-Percentile Queue Length [ft/ln]	74.99	91.08	19.94	26.54	121.44	10.19	126.29	25.89	113.86	101.88	91.14
95th-Percentile Queue Length [veh/ln]	5.40	6.56	1.44	1.91	8.47	0.73	8.74	1.86	8.20	7.34	6.56
95th-Percentile Queue Length [ft/ln]	134.99	163.94	35.88	47.78	211.80	18.34	218.44	46.60	204.95	183.38	164.05

Movement, Approach, & Intersection Results

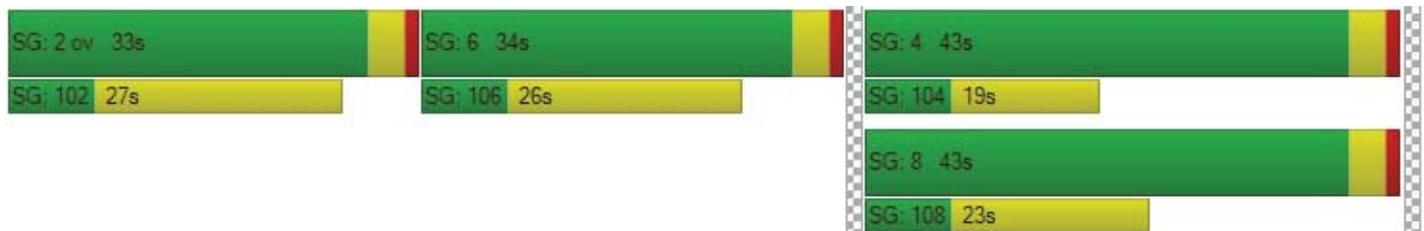
d_M, Delay for Movement [s/veh]	23.38	24.02	21.27	21.52	25.27	25.27	44.06	54.45	12.44	130.60	50.34	49.99
Movement LOS	C	C	C	C	C	C	D	D	B	F	D	D
d_A, Approach Delay [s/veh]	23.45			24.53			40.97			72.23		
Approach LOS	C			C			D			E		
d_I, Intersection Delay [s/veh]	40.80											
Intersection LOS	D											
Intersection V/C	0.380											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.55	44.55	44.55	44.55
I_p,int, Pedestrian LOS Score for Intersection	2.489	2.163	2.442	2.303
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	527	545	709	709
d_b, Bicycle Delay [s]	29.82	29.09	22.91	22.91
I_b,int, Bicycle LOS Score for Intersection	2.230	2.074	2.012	1.876
Bicycle LOS	B	B	B	A

Sequence

Ring 1	2	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 28: Berkeley Avenue at College Driveway No. 1

Control Type:	Two-way stop	Delay (sec / veh):	15.3
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.187

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Base Volume Input [veh/h]	25	180	346	0	116	188
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	25	180	346	0	116	188
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	45	87	0	29	47
Total Analysis Volume [veh/h]	25	180	346	0	116	188
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.00	0.00	0.00	0.19	0.27
d_M, Delay for Movement [s/veh]	8.03	0.00	0.00	0.00	15.25	14.62
Movement LOS	A	A	A	A	C	B
95th-Percentile Queue Length [veh/ln]	0.06	0.00	0.00	0.00	2.39	2.39
95th-Percentile Queue Length [ft/ln]	1.58	0.00	0.00	0.00	59.82	59.82
d_A, Approach Delay [s/veh]	0.98		0.00		14.86	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	5.52					
Intersection LOS	C					

Intersection Level Of Service Report
Intersection 29: Berkeley Avenue at College Driveway No. 2

Control Type:	Two-way stop	Delay (sec / veh):	15.0
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.372

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Base Volume Input [veh/h]	60	200	498	0	0	213
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	60	200	498	0	0	213
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	15	50	125	0	0	53
Total Analysis Volume [veh/h]	60	200	498	0	0	213
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.06	0.00	0.00	0.00	0.00	0.37
d_M, Delay for Movement [s/veh]	8.58	0.00	0.00	0.00	15.72	14.97
Movement LOS	A	A	A	A	C	B
95th-Percentile Queue Length [veh/ln]	0.18	0.00	0.00	0.00	1.71	1.71
95th-Percentile Queue Length [ft/ln]	4.47	0.00	0.00	0.00	42.83	42.83
d_A, Approach Delay [s/veh]	1.98		0.00		14.97	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	3.81					
Intersection LOS	B					

APPENDIX C

YEAR 2030 BUILDOUT PLUS ALTERNATIVE PROJECT TRAFFIC CONDITIONS INTERSECTION LEVEL OF SERVICE CALCULATION WORKSHEETS (SATURDAY FIELD EVENT ANALYSIS)

APPENDIX C-1

**YEAR 2030 BUILDOUT SATURDAY
ARRIVAL PEAK HOUR TRAFFIC CONDITIONS**

Intersection Level Of Service Report
Intersection 4: Lemon Street at Berkeley Avenue

Control Type:	Signalized	Delay (sec / veh):	35.2
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.478

Intersection Setup

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	⇐⇐⇐			⇐⇐			⇐⇐⇐			⇐⇐		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Base Volume Input [veh/h]	244	296	70	92	214	24	21	239	158	85	313	143
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	244	296	70	92	214	24	21	239	158	85	313	143
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	61	74	18	23	54	6	5	60	40	21	78	36
Total Analysis Volume [veh/h]	244	296	70	92	214	24	21	239	158	85	313	143
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Permiss	Permiss	Overlap	Permiss	Permiss	Permiss
Signal group	0	2	0	0	6	0	0	8	8	0	4	0
Auxiliary Signal Groups									2,8			
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	6	0	6	0
Maximum Green [s]	0	30	0	0	30	0	0	30	30	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	34	0	0	30	0	0	46	46	0	46	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	20	0	0	19	0	0	16	16	0	12	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall		No			No			No	No		No	
Maximum Recall		No			No			No	No		No	
Pedestrian Recall		No			No			No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	40	40	40	40	40	17	17	61	17	17	17
g / C, Green / Cycle	0.37	0.37	0.37	0.37	0.37	0.15	0.15	0.56	0.15	0.15	0.15
(v / s)_i Volume / Saturation Flow Rate	0.14	0.16	0.04	0.05	0.13	0.01	0.13	0.09	0.05	0.13	0.12
s, saturation flow rate [veh/h]	1800	1800	1800	1800	1800	1800	1900	1800	1800	1900	1800
c, Capacity [veh/h]	662	662	662	662	662	113	294	1006	118	294	279
d1, Uniform Delay [s]	25.36	26.23	22.81	23.10	25.26	39.67	44.85	11.69	41.15	45.00	44.43
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.50	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.58	2.18	0.32	0.44	1.52	0.78	5.40	0.33	8.02	6.06	4.24
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.37	0.45	0.11	0.14	0.36	0.19	0.81	0.16	0.72	0.83	0.76
d, Delay for Lane Group [s/veh]	26.93	28.41	23.13	23.54	26.78	40.45	50.25	12.02	49.17	51.06	48.66
Lane Group LOS	C	C	C	C	C	D	D	B	D	D	D
Critical Lane Group	No	Yes	No	No	Yes	No	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	4.92	6.21	1.25	1.67	4.78	0.51	6.71	1.93	2.31	6.93	5.82
50th-Percentile Queue Length [ft/ln]	122.95	155.22	31.33	41.76	119.39	12.79	167.76	48.13	57.71	173.29	145.53
95th-Percentile Queue Length [veh/ln]	8.55	10.30	2.26	3.01	8.36	0.92	10.96	3.47	4.15	11.25	9.78
95th-Percentile Queue Length [ft/ln]	213.87	257.38	56.39	75.16	208.99	23.03	273.96	86.64	103.87	281.23	244.45

Movement, Approach, & Intersection Results

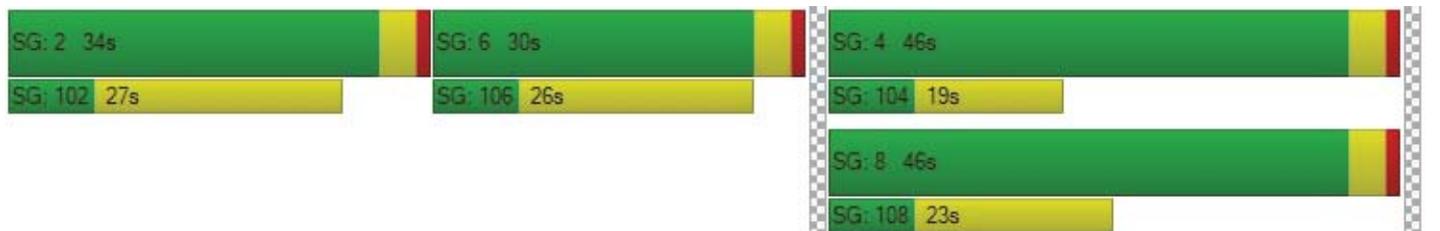
d_M, Delay for Movement [s/veh]	26.93	28.41	23.13	23.54	26.78	26.78	40.45	50.25	12.02	49.17	50.54	48.66
Movement LOS	C	C	C	C	C	C	D	D	B	D	D	D
d_A, Approach Delay [s/veh]	27.21			25.87			35.31			49.83		
Approach LOS	C			C			D			D		
d_I, Intersection Delay [s/veh]	35.21											
Intersection LOS	D											
Intersection V/C	0.478											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.55	44.55	44.55	44.55
I_p,int, Pedestrian LOS Score for Intersection	2.522	2.236	2.504	2.370
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	545	473	764	764
d_b, Bicycle Delay [s]	29.09	32.07	21.02	21.02
I_b,int, Bicycle LOS Score for Intersection	2.566	2.104	2.249	2.006
Bicycle LOS	B	B	B	B

Sequence

Ring 1	2	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 12: State College Boulevard at Chapman Avenue

Control Type:	Signalized	Delay (sec / veh):	50.8
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.863

Intersection Setup

Name	State College Boulevard			State College Boulevard			Chapman Avenue			Chapman Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	[Diagram]			[Diagram]			[Diagram]			[Diagram]		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	State College Boulevard			State College Boulevard			Chapman Avenue			Chapman Avenue		
Base Volume Input [veh/h]	144	407	209	153	374	301	310	1099	87	400	1074	134
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	144	407	209	153	374	301	310	1099	87	400	1074	134
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	36	102	52	38	94	75	78	275	22	100	269	34
Total Analysis Volume [veh/h]	144	407	209	153	374	301	310	1099	87	400	1074	134
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	1	6	6	3	8	0	7	4	0
Auxiliary Signal Groups						3,6						
Lead / Lag	Lead	-	-									
Minimum Green [s]	6	6	0	6	6	6	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	30	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	12	34	0	15	37	37	16	34	0	27	45	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	7	0	7	0	0	7	0
Pedestrian Clearance [s]	0	23	0	0	26	26	0	23	0	0	26	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No	No	No	No		No	No	
Maximum Recall	No	No		No	No	No	No	No		No	No	
Pedestrian Recall	No	No		No	No	No	No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	8	34	34	7	33	49	12	30	30	23	41	41
g / C, Green / Cycle	0.07	0.31	0.31	0.06	0.30	0.45	0.11	0.27	0.27	0.21	0.37	0.37
(v / s)_i Volume / Saturation Flow Rate	0.08	0.11	0.12	0.04	0.10	0.17	0.09	0.29	0.05	0.22	0.28	0.07
s, saturation flow rate [veh/h]	1800	3800	1800	3500	3800	1800	3500	3800	1800	1800	3800	1800
c, Capacity [veh/h]	132	1185	561	217	1144	804	383	1032	489	376	1411	668
d1, Uniform Delay [s]	51.00	29.18	29.48	50.61	29.83	20.23	47.89	40.09	30.69	43.52	30.32	23.50
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.17	0.11	0.11	0.11	0.32	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	64.99	0.79	1.89	4.12	0.76	0.45	4.13	34.61	0.17	54.60	0.87	0.15
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.09	0.34	0.37	0.70	0.33	0.37	0.81	1.07	0.18	1.06	0.76	0.20
d, Delay for Lane Group [s/veh]	115.99	29.97	31.37	54.74	30.59	20.68	52.02	74.69	30.86	98.12	31.20	23.65
Lane Group LOS	F	C	C	D	C	C	D	F	C	F	C	C
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	5.99	4.27	4.59	2.19	3.96	5.18	4.36	18.67	1.79	15.84	12.38	2.39
50th-Percentile Queue Length [ft/ln]	149.67	106.72	114.70	54.68	98.93	129.40	108.97	466.72	44.84	396.01	309.53	59.72
95th-Percentile Queue Length [veh/ln]	10.29	7.66	8.10	3.94	7.12	8.91	7.78	26.76	3.23	23.12	18.15	4.30
95th-Percentile Queue Length [ft/ln]	257.34	191.43	202.52	98.43	178.07	222.67	194.57	669.00	80.71	578.00	453.80	107.49

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	115.99	29.97	31.37	54.74	30.59	20.68	52.02	74.69	30.86	98.12	31.20	23.65
Movement LOS	F	C	C	D	C	C	D	F	C	F	C	C
d_A, Approach Delay [s/veh]	46.65			31.45			67.45			47.21		
Approach LOS	D			C			E			D		
d_I, Intersection Delay [s/veh]	50.79											
Intersection LOS	D											
Intersection V/C	0.863											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.55	44.55	44.55	44.55
I_p,int, Pedestrian LOS Score for Intersection	2.726	2.837	3.023	2.961
Crosswalk LOS	B	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	545	600	545	745
d_b, Bicycle Delay [s]	29.09	26.95	29.09	21.64
I_b,int, Bicycle LOS Score for Intersection	2.187	2.243	2.794	2.886
Bicycle LOS	B	B	C	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 28: Berkeley Avenue at College Driveway No. 1

Control Type:	Two-way stop	Delay (sec / veh):	13.0
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.064

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Base Volume Input [veh/h]	62	432	304	2	31	7
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	62	432	304	2	31	7
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	16	108	76	1	8	2
Total Analysis Volume [veh/h]	62	432	304	2	31	7
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.00	0.00	0.00	0.06	0.01
d_M, Delay for Movement [s/veh]	8.02	0.00	0.00	0.00	13.02	10.46
Movement LOS	A	A	A	A	B	B
95th-Percentile Queue Length [veh/ln]	0.16	0.00	0.00	0.00	0.24	0.24
95th-Percentile Queue Length [ft/ln]	3.89	0.00	0.00	0.00	5.95	5.95
d_A, Approach Delay [s/veh]	1.01		0.00		12.54	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	1.16					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 29: Berkeley Avenue at College Driveway No. 2

Control Type:	Two-way stop	Delay (sec / veh):	12.9
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.015

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration	↑		↑		← T →	
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Base Volume Input [veh/h]	0	489	318	0	8	116
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	489	318	0	8	116
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	122	80	0	2	29
Total Analysis Volume [veh/h]	0	489	318	0	8	116
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.02	0.16
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	0.00	12.88	11.07
Movement LOS		A	A		B	B
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.63	0.63
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	0.00	15.84	15.84
d_A, Approach Delay [s/veh]	0.00		0.00		11.18	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	1.49					
Intersection LOS	B					

APPENDIX C-II

**YEAR 2030 BUILDOUT SATURDAY
DEPARTURE PEAK HOUR TRAFFIC CONDITIONS**

Intersection Level Of Service Report
Intersection 4: Lemon Street at Berkeley Avenue

Control Type:	Signalized	Delay (sec / veh):	33.9
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.432

Intersection Setup

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	⇐⇐⇐			⇐⇐			⇐⇐⇐			⇐⇐		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Base Volume Input [veh/h]	151	225	50	64	256	30	21	191	105	63	216	64
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	151	225	50	64	256	30	21	191	105	63	216	64
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	38	56	13	16	64	8	5	48	26	16	54	16
Total Analysis Volume [veh/h]	151	225	50	64	256	30	21	191	105	63	216	64
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Permiss	Permiss	Overlap	Permiss	Permiss	Permiss
Signal group	0	2	0	0	6	0	0	8	8	0	4	0
Auxiliary Signal Groups									2,8			
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	6	0	6	0
Maximum Green [s]	0	30	0	0	30	0	0	30	30	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	36	0	0	44	0	0	30	30	0	30	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	20	0	0	19	0	0	16	16	0	12	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall		No			No			No	No		No	
Maximum Recall		No			No			No	No		No	
Pedestrian Recall		No			No			No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	42	42	42	42	42	13	13	60	13	13	13
g / C, Green / Cycle	0.38	0.38	0.38	0.38	0.38	0.12	0.12	0.54	0.12	0.12	0.12
(v / s)_i Volume / Saturation Flow Rate	0.08	0.13	0.03	0.04	0.16	0.01	0.10	0.06	0.04	0.08	0.07
s, saturation flow rate [veh/h]	1800	1800	1800	1800	1800	1800	1900	1800	1800	1900	1800
c, Capacity [veh/h]	691	691	691	691	691	134	234	978	90	234	222
d1, Uniform Delay [s]	22.77	23.83	21.45	21.62	24.80	42.75	46.97	12.17	43.78	45.80	45.62
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.50	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.73	1.25	0.20	0.27	1.83	0.54	6.85	0.22	9.38	2.78	2.59
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.22	0.33	0.07	0.09	0.41	0.16	0.82	0.11	0.70	0.63	0.60
d, Delay for Lane Group [s/veh]	23.49	25.09	21.65	21.89	26.62	43.29	53.82	12.39	53.16	48.57	48.21
Lane Group LOS	C	C	C	C	C	D	D	B	D	D	D
Critical Lane Group	No	Yes	No	No	Yes	No	Yes	No	No	No	No
50th-Percentile Queue Length [veh/ln]	2.76	4.33	0.86	1.11	5.76	0.53	5.52	1.29	1.80	3.99	3.59
50th-Percentile Queue Length [ft/ln]	69.10	108.37	21.45	27.69	144.12	13.21	138.06	32.36	44.90	99.86	89.73
95th-Percentile Queue Length [veh/ln]	4.98	7.75	1.54	1.99	9.70	0.95	9.38	2.33	3.23	7.19	6.46
95th-Percentile Queue Length [ft/ln]	124.38	193.73	38.60	49.84	242.56	23.77	234.42	58.25	80.81	179.75	161.52

Movement, Approach, & Intersection Results

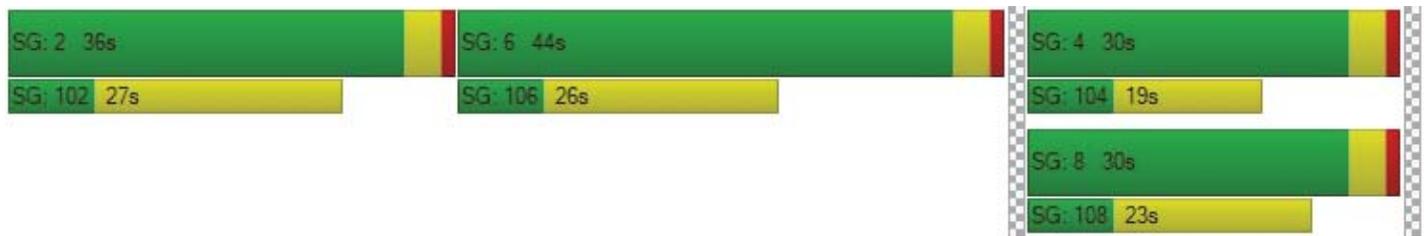
d_M, Delay for Movement [s/veh]	23.49	25.09	21.65	21.89	26.62	26.62	43.29	53.82	12.39	53.16	48.46	48.21
Movement LOS	C	C	C	C	C	C	D	D	B	D	D	D
d_A, Approach Delay [s/veh]	24.12			25.76			39.40			49.27		
Approach LOS	C			C			D			D		
d_I, Intersection Delay [s/veh]	33.90											
Intersection LOS	C											
Intersection V/C	0.432											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.55	44.55	44.55	44.55
I_p,int, Pedestrian LOS Score for Intersection	2.437	2.194	2.449	2.299
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	582	727	473	473
d_b, Bicycle Delay [s]	27.65	22.27	32.07	32.07
I_b,int, Bicycle LOS Score for Intersection	2.263	2.137	2.083	1.843
Bicycle LOS	B	B	B	A

Sequence

Ring 1	2	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 12: State College Boulevard at Chapman Avenue

Control Type:	Signalized	Delay (sec / veh):	47.9
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.851

Intersection Setup

Name	State College Boulevard			State College Boulevard			Chapman Avenue			Chapman Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	[Diagram]			[Diagram]			[Diagram]			[Diagram]		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	State College Boulevard			State College Boulevard			Chapman Avenue			Chapman Avenue		
Base Volume Input [veh/h]	151	488	229	179	378	301	313	1072	78	387	1070	143
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	151	488	229	179	378	301	313	1072	78	387	1070	143
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	38	122	57	45	95	75	78	268	20	97	268	36
Total Analysis Volume [veh/h]	151	488	229	179	378	301	313	1072	78	387	1070	143
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	1	6	6	3	8	0	7	4	0
Auxiliary Signal Groups						3,6						
Lead / Lag	Lead	-	-									
Minimum Green [s]	6	6	0	6	6	6	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	30	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	13	36	0	14	37	37	16	34	0	26	44	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	7	0	7	0	0	7	0
Pedestrian Clearance [s]	0	23	0	0	26	26	0	23	0	0	26	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No	No	No	No		No	No	
Maximum Recall	No	No		No	No	No	No	No		No	No	
Pedestrian Recall	No	No		No	No	No	No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	9	34	34	8	33	49	12	30	30	22	40	40
g / C, Green / Cycle	0.08	0.31	0.31	0.07	0.30	0.45	0.11	0.27	0.27	0.20	0.36	0.36
(v / s)_i Volume / Saturation Flow Rate	0.08	0.13	0.13	0.05	0.10	0.17	0.09	0.28	0.04	0.22	0.28	0.08
s, saturation flow rate [veh/h]	1800	3800	1800	3500	3800	1800	3500	3800	1800	1800	3800	1800
c, Capacity [veh/h]	148	1193	565	243	1144	804	383	1031	488	360	1376	652
d1, Uniform Delay [s]	50.50	29.73	29.69	50.22	29.85	20.22	47.94	40.10	30.54	44.02	31.18	24.33
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.17	0.11	0.11	0.11	0.30	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	39.84	1.04	2.16	4.32	0.77	0.45	4.33	24.95	0.15	58.20	0.98	0.17
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.02	0.41	0.41	0.74	0.33	0.37	0.82	1.04	0.16	1.07	0.78	0.22
d, Delay for Lane Group [s/veh]	90.35	30.77	31.84	54.54	30.62	20.67	52.27	65.05	30.69	102.22	32.16	24.50
Lane Group LOS	F	C	C	D	C	C	D	F	C	F	C	C
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	5.69	5.24	5.09	2.56	4.00	5.17	4.41	17.27	1.60	15.53	12.54	2.61
50th-Percentile Queue Length [ft/ln]	142.30	131.00	127.19	63.92	100.10	129.37	110.34	431.87	39.99	388.21	313.57	65.19
95th-Percentile Queue Length [veh/ln]	9.67	8.99	8.79	4.60	7.21	8.91	7.86	24.67	2.88	22.85	18.35	4.69
95th-Percentile Queue Length [ft/ln]	241.86	224.85	219.67	115.06	180.17	222.64	196.47	616.78	71.98	571.19	458.78	117.35

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	90.35	30.77	31.84	54.54	30.62	20.67	52.27	65.05	30.69	102.22	32.16	24.50
Movement LOS	F	C	C	D	C	C	D	F	C	F	C	C
d_A, Approach Delay [s/veh]	41.41			32.12			60.48			48.42		
Approach LOS	D			C			E			D		
d_I, Intersection Delay [s/veh]	47.91											
Intersection LOS	D											
Intersection V/C	0.851											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.55	44.55	44.55	44.55
I_p,int, Pedestrian LOS Score for Intersection	2.740	2.854	3.019	2.963
Crosswalk LOS	B	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	582	600	545	727
d_b, Bicycle Delay [s]	27.65	26.95	29.09	22.27
I_b,int, Bicycle LOS Score for Intersection	2.276	2.267	2.767	2.880
Bicycle LOS	B	B	C	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 28: Berkeley Avenue at College Driveway No. 1

Control Type:	Two-way stop	Delay (sec / veh):	11.7
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.083

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Base Volume Input [veh/h]	63	203	267	0	50	18
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	63	203	267	0	50	18
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	16	51	67	0	13	5
Total Analysis Volume [veh/h]	63	203	267	0	50	18
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.00	0.00	0.00	0.08	0.02
d_M, Delay for Movement [s/veh]	7.92	0.00	0.00	0.00	11.66	10.34
Movement LOS	A	A	A	A	B	B
95th-Percentile Queue Length [veh/ln]	0.15	0.00	0.00	0.00	0.36	0.36
95th-Percentile Queue Length [ft/ln]	3.83	0.00	0.00	0.00	8.90	8.90
d_A, Approach Delay [s/veh]	1.88		0.00		11.31	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	2.11					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 29: Berkeley Avenue at College Driveway No. 2

Control Type:	Two-way stop	Delay (sec / veh):	11.0
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.000

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration	↑		↑		← T →	
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Base Volume Input [veh/h]	0	260	249	0	0	87
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	260	249	0	0	87
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	65	62	0	0	22
Total Analysis Volume [veh/h]	0	260	249	0	0	87
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.11
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	0.00	10.98	10.12
Movement LOS		A	A		B	B
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.37	0.37
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	0.00	9.25	9.25
d_A, Approach Delay [s/veh]	0.00		0.00		10.12	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	1.48					
Intersection LOS	B					

APPENDIX C-III

**YEAR 2030 BUILDOUT PLUS PROJECT
SATURDAY ARRIVAL PEAK HOUR TRAFFIC CONDITIONS**

Intersection Level Of Service Report
Intersection 4: Lemon Street at Berkeley Avenue

Control Type:	Signalized	Delay (sec / veh):	35.8
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.500

Intersection Setup

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	↔↔↔			↔↔			↔↔↔			↔↔		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Base Volume Input [veh/h]	252	296	109	92	214	24	21	283	158	96	318	143
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	252	296	109	92	214	24	21	283	158	96	318	143
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	63	74	27	23	54	6	5	71	40	24	80	36
Total Analysis Volume [veh/h]	252	296	109	92	214	24	21	283	158	96	318	143
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Permiss	Permiss	Overlap	Permiss	Permiss	Permiss
Signal group	0	2	0	0	6	0	0	8	8	0	4	0
Auxiliary Signal Groups									2,8			
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	6	0	6	0
Maximum Green [s]	0	30	0	0	30	0	0	30	30	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	31	0	0	30	0	0	49	49	0	49	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	20	0	0	19	0	0	16	16	0	12	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall		No			No			No	No		No	
Maximum Recall		No			No			No	No		No	
Pedestrian Recall		No			No			No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	40	40	40	40	40	19	19	62	19	19	19
g / C, Green / Cycle	0.36	0.36	0.36	0.36	0.36	0.17	0.17	0.57	0.17	0.17	0.17
(v / s)_i Volume / Saturation Flow Rate	0.14	0.16	0.06	0.05	0.13	0.01	0.15	0.09	0.05	0.13	0.12
s, saturation flow rate [veh/h]	1800	1800	1800	1800	1800	1800	1900	1800	1800	1900	1800
c, Capacity [veh/h]	647	647	647	647	647	143	326	1022	106	326	309
d1, Uniform Delay [s]	26.18	26.94	23.96	23.72	25.94	38.10	44.24	11.25	39.78	43.29	42.73
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.11	0.12	0.50	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.76	2.32	0.56	0.46	1.61	0.47	7.50	0.32	23.25	3.62	2.77
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.39	0.46	0.17	0.14	0.37	0.15	0.87	0.15	0.91	0.76	0.69
d, Delay for Lane Group [s/veh]	27.94	29.26	24.52	24.18	27.55	38.57	51.74	11.57	63.02	46.91	45.49
Lane Group LOS	C	C	C	C	C	D	D	B	E	D	D
Critical Lane Group	No	Yes	No	No	Yes	No	Yes	No	No	No	No
50th-Percentile Queue Length [veh/ln]	5.20	6.32	2.03	1.70	4.86	0.49	8.13	1.88	2.95	6.70	5.67
50th-Percentile Queue Length [ft/ln]	129.96	157.98	50.85	42.45	121.45	12.37	203.23	46.95	73.87	167.46	141.75
95th-Percentile Queue Length [veh/ln]	8.94	10.44	3.66	3.06	8.47	0.89	12.81	3.38	5.32	10.94	9.57
95th-Percentile Queue Length [ft/ln]	223.44	261.04	91.53	76.41	211.82	22.26	320.13	84.51	132.96	273.57	239.37

Movement, Approach, & Intersection Results

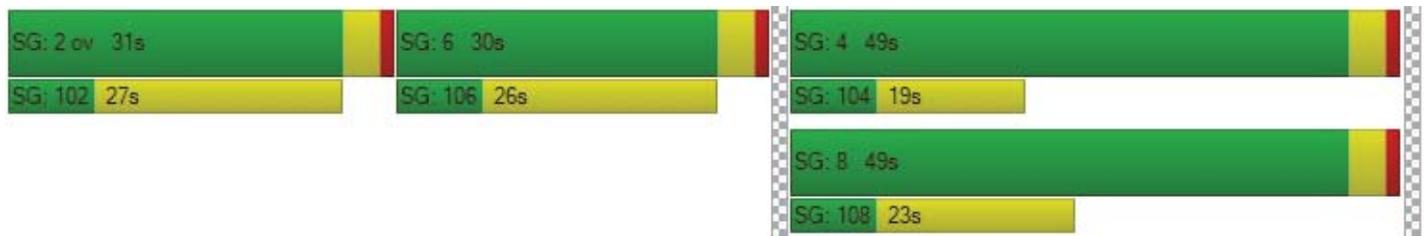
d_M, Delay for Movement [s/veh]	27.94	29.26	24.52	24.18	27.55	27.55	38.57	51.74	11.57	63.02	46.60	45.49
Movement LOS	C	C	C	C	C	C	D	D	B	E	D	D
d_A, Approach Delay [s/veh]	27.97			26.61			37.40			49.14		
Approach LOS	C			C			D			D		
d_I, Intersection Delay [s/veh]	35.80											
Intersection LOS	D											
Intersection V/C	0.500											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	44.55			44.55			44.55			44.55		
l_p,int, Pedestrian LOS Score for Intersection	2.551			2.236			2.515			2.394		
Crosswalk LOS	B			B			B			B		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	491			473			818			818		
d_b, Bicycle Delay [s]	31.31			32.07			19.20			19.20		
l_b,int, Bicycle LOS Score for Intersection	2.644			2.104			2.322			2.019		
Bicycle LOS	B			B			B			B		

Sequence

Ring 1	2	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 12: State College Boulevard at Chapman Avenue

Control Type:	Signalized	Delay (sec / veh):	57.4
Analysis Method:	HCM 6th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.897

Intersection Setup

Name	State College Boulevard			State College Boulevard			Chapman Avenue			Chapman Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	[Diagram]			[Diagram]			[Diagram]			[Diagram]		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	State College Boulevard			State College Boulevard			Chapman Avenue			Chapman Avenue		
Base Volume Input [veh/h]	155	407	209	153	374	312	313	1147	90	400	1252	134
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	155	407	209	153	374	312	313	1147	90	400	1252	134
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	39	102	52	38	94	78	78	287	23	100	313	34
Total Analysis Volume [veh/h]	155	407	209	153	374	312	313	1147	90	400	1252	134
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	1	6	6	3	8	0	7	4	0
Auxiliary Signal Groups						3,6						
Lead / Lag	Lead	-	-									
Minimum Green [s]	6	6	0	6	6	6	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	30	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	13	35	0	15	37	37	13	35	0	25	47	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	7	0	7	0	0	7	0
Pedestrian Clearance [s]	0	23	0	0	26	26	0	23	0	0	26	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No	No	No	No		No	No	
Maximum Recall	No	No		No	No	No	No	No		No	No	
Pedestrian Recall	No	No		No	No	No	No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	9	35	35	7	33	46	9	31	31	21	43	43
g / C, Green / Cycle	0.08	0.32	0.32	0.06	0.30	0.42	0.08	0.28	0.28	0.19	0.39	0.39
(v / s)_i Volume / Saturation Flow Rate	0.09	0.11	0.12	0.04	0.10	0.17	0.09	0.30	0.05	0.22	0.33	0.07
s, saturation flow rate [veh/h]	1800	3800	1800	3500	3800	1800	3500	3800	1800	1800	3800	1800
c, Capacity [veh/h]	148	1221	578	217	1145	756	288	1065	504	344	1478	700
d1, Uniform Delay [s]	50.50	28.38	28.67	50.61	29.80	22.41	50.50	39.61	30.01	44.52	30.63	22.19
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.18	0.11	0.11	0.11	0.32	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	47.69	0.74	1.75	4.12	0.76	0.61	52.48	39.40	0.17	92.33	1.43	0.13
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.05	0.33	0.36	0.70	0.33	0.41	1.09	1.08	0.18	1.16	0.85	0.19
d, Delay for Lane Group [s/veh]	98.20	29.12	30.42	54.74	30.56	23.02	102.98	79.01	30.18	136.85	32.06	22.32
Lane Group LOS	F	C	C	D	C	C	F	F	C	F	C	C
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	6.01	4.20	4.51	2.19	3.96	5.74	6.04	19.95	1.83	18.10	15.01	2.31
50th-Percentile Queue Length [ft/ln]	150.37	104.96	112.69	54.68	98.89	143.53	150.97	498.67	45.81	452.45	375.22	57.69
95th-Percentile Queue Length [veh/ln]	10.20	7.56	7.99	3.94	7.12	9.67	10.36	28.54	3.30	27.05	21.36	4.15
95th-Percentile Queue Length [ft/ln]	255.00	188.93	199.74	98.43	178.00	241.77	258.97	713.52	82.45	676.26	534.06	103.84

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	98.20	29.12	30.42	54.74	30.56	23.02	102.98	79.01	30.18	136.85	32.06	22.32
Movement LOS	F	C	C	D	C	C	F	F	C	F	C	C
d_A, Approach Delay [s/veh]	43.36			32.16			81.01			54.80		
Approach LOS	D			C			F			D		
d_I, Intersection Delay [s/veh]	57.39											
Intersection LOS	E											
Intersection V/C	0.897											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.55	44.55	44.55	44.55
I_p,int, Pedestrian LOS Score for Intersection	2.728	2.839	3.059	2.998
Crosswalk LOS	B	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	564	600	564	782
d_b, Bicycle Delay [s]	28.37	26.95	28.37	20.40
I_b,int, Bicycle LOS Score for Intersection	2.196	2.252	2.838	3.033
Bicycle LOS	B	B	C	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 28: Berkeley Avenue at College Driveway No. 1

Control Type:	Two-way stop	Delay (sec / veh):	24.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.204

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	35.00		35.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Base Volume Input [veh/h]	284	543	327	2	46	45
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	284	543	327	2	46	45
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	71	136	82	1	12	11
Total Analysis Volume [veh/h]	284	543	327	2	46	45
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.23	0.01	0.00	0.00	0.20	0.06
d_M, Delay for Movement [s/veh]	8.80	0.00	0.00	0.00	24.76	13.85
Movement LOS	A	A	A	A	C	B
95th-Percentile Queue Length [veh/ln]	0.89	0.00	0.00	0.00	1.06	1.06
95th-Percentile Queue Length [ft/ln]	22.33	0.00	0.00	0.00	26.42	26.42
d_A, Approach Delay [s/veh]	3.02		0.00		19.37	
Approach LOS	A		A		C	
d_I, Intersection Delay [s/veh]	3.42					
Intersection LOS	C					

Intersection Level Of Service Report
Intersection 29: Berkeley Avenue at College Driveway No. 2

Control Type:	Two-way stop	Delay (sec / veh):	16.2
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.021

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration	↑		↑		↔	
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	35.00		35.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Base Volume Input [veh/h]	0	823	378	0	8	146
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	823	378	0	8	146
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	206	95	0	2	37
Total Analysis Volume [veh/h]	0	823	378	0	8	146
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.01	0.00	0.00	0.02	0.22
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	0.00	16.18	12.13
Movement LOS		A	A		C	B
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.93	0.93
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	0.00	23.24	23.24
d_A, Approach Delay [s/veh]	0.00		0.00		12.34	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	1.40					
Intersection LOS	C					

APPENDIX C-IV

**YEAR 2030 BUILDOUT PLUS PROJECT
SATURDAY DEPARTURE PEAK HOUR TRAFFIC CONDITIONS**

Intersection Level Of Service Report
Intersection 4: Lemon Street at Berkeley Avenue

Control Type:	Signalized	Delay (sec / veh):	41.7
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.434

Intersection Setup

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	⇐⇐⇐			⇐⇐			⇐⇐⇐			⇐⇐		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Base Volume Input [veh/h]	186	225	54	64	256	30	21	196	105	111	237	64
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	186	225	54	64	256	30	21	196	105	111	237	64
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	47	56	14	16	64	8	5	49	26	28	59	16
Total Analysis Volume [veh/h]	186	225	54	64	256	30	21	196	105	111	237	64
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Permiss	Permiss	Overlap	Permiss	Permiss	Permiss
Signal group	0	2	0	0	6	0	0	8	8	0	4	0
Auxiliary Signal Groups									2,8			
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	6	0	6	0
Maximum Green [s]	0	30	0	0	30	0	0	30	30	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	31	0	0	34	0	0	45	45	0	45	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	20	0	0	19	0	0	16	16	0	12	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall		No			No			No	No		No	
Maximum Recall		No			No			No	No		No	
Pedestrian Recall		No			No			No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	42	42	42	42	42	14	14	60	14	14	14
g / C, Green / Cycle	0.38	0.38	0.38	0.38	0.38	0.13	0.13	0.54	0.13	0.13	0.13
(v / s)_i Volume / Saturation Flow Rate	0.10	0.13	0.03	0.04	0.16	0.01	0.10	0.06	0.06	0.08	0.08
s, saturation flow rate [veh/h]	1800	1800	1800	1800	1800	1800	1900	1800	1800	1900	1800
c, Capacity [veh/h]	689	689	689	689	689	130	238	980	93	238	226
d1, Uniform Delay [s]	23.35	23.93	21.59	21.71	24.89	42.51	46.84	12.10	44.31	45.83	45.63
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.50	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.96	1.26	0.22	0.27	1.84	0.58	6.93	0.22	106.06	3.16	2.89
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.27	0.33	0.08	0.09	0.42	0.16	0.82	0.11	1.19	0.66	0.63
d, Delay for Lane Group [s/veh]	24.32	25.19	21.81	21.98	26.74	43.09	53.77	12.32	150.37	49.00	48.52
Lane Group LOS	C	C	C	C	C	D	D	B	F	D	D
Critical Lane Group	No	Yes	No	No	Yes	No	Yes	No	No	No	No
50th-Percentile Queue Length [veh/ln]	3.50	4.35	0.93	1.11	5.78	0.53	5.67	1.29	5.10	4.33	3.87
50th-Percentile Queue Length [ft/ln]	87.39	108.65	23.28	27.76	144.50	13.18	141.69	32.25	127.43	108.23	96.79
95th-Percentile Queue Length [veh/ln]	6.29	7.76	1.68	2.00	9.72	0.95	9.57	2.32	9.17	7.74	6.97
95th-Percentile Queue Length [ft/ln]	157.30	194.12	41.90	49.97	243.07	23.73	239.30	58.05	229.37	193.54	174.22

Movement, Approach, & Intersection Results

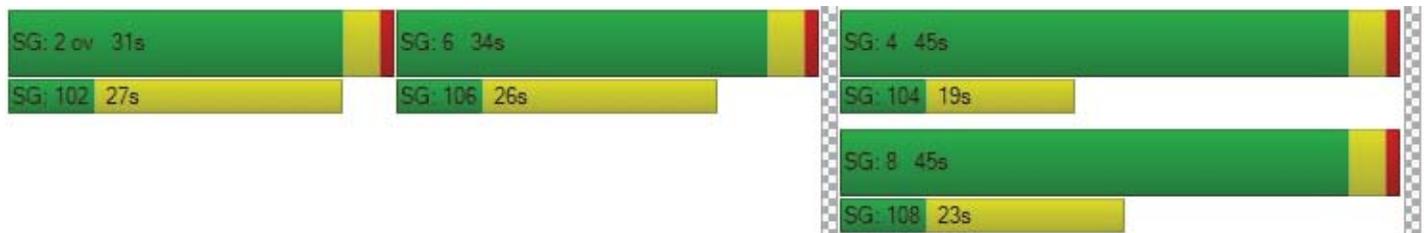
d_M, Delay for Movement [s/veh]	24.32	25.19	21.81	21.98	26.74	26.74	43.09	53.77	12.32	150.37	48.84	48.52
Movement LOS	C	C	C	C	C	C	D	D	B	F	D	D
d_A, Approach Delay [s/veh]	24.45			25.87			39.56			76.14		
Approach LOS	C			C			D			E		
d_I, Intersection Delay [s/veh]	41.66											
Intersection LOS	D											
Intersection V/C	0.434											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.55	44.55	44.55	44.55
I_p,int, Pedestrian LOS Score for Intersection	2.527	2.194	2.461	2.318
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	491	545	745	745
d_b, Bicycle Delay [s]	31.31	29.09	21.64	21.64
I_b,int, Bicycle LOS Score for Intersection	2.327	2.137	2.091	1.900
Bicycle LOS	B	B	B	A

Sequence

Ring 1	2	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 12: State College Boulevard at Chapman Avenue

Control Type:	Signalized	Delay (sec / veh):	60.2
Analysis Method:	HCM 6th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.918

Intersection Setup

Name	State College Boulevard			State College Boulevard			Chapman Avenue			Chapman Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	[Diagram]			[Diagram]			[Diagram]			[Diagram]		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	State College Boulevard			State College Boulevard			Chapman Avenue			Chapman Avenue		
Base Volume Input [veh/h]	152	488	229	179	378	302	327	1293	92	387	1090	143
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	152	488	229	179	378	302	327	1293	92	387	1090	143
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	38	122	57	45	95	76	82	323	23	97	273	36
Total Analysis Volume [veh/h]	152	488	229	179	378	302	327	1293	92	387	1090	143
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	1	6	6	3	8	0	7	4	0
Auxiliary Signal Groups						3,6						
Lead / Lag	Lead	-	-									
Minimum Green [s]	6	6	0	6	6	6	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	30	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	12	35	0	14	37	37	17	39	0	22	44	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	7	0	7	0	0	7	0
Pedestrian Clearance [s]	0	23	0	0	26	26	0	23	0	0	26	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No	No	No	No		No	No	
Maximum Recall	No	No		No	No	No	No	No		No	No	
Pedestrian Recall	No	No		No	No	No	No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	8	33	33	8	33	50	13	35	35	18	40	40
g / C, Green / Cycle	0.07	0.30	0.30	0.07	0.30	0.46	0.12	0.32	0.32	0.16	0.36	0.36
(v / s)_i Volume / Saturation Flow Rate	0.08	0.13	0.13	0.05	0.10	0.17	0.09	0.34	0.05	0.22	0.29	0.08
s, saturation flow rate [veh/h]	1800	3800	1800	3500	3800	1800	3500	3800	1800	1800	3800	1800
c, Capacity [veh/h]	131	1158	549	242	1144	820	414	1204	570	295	1376	652
d1, Uniform Delay [s]	51.00	30.50	30.46	50.23	29.83	19.58	47.17	37.58	27.06	46.01	31.38	24.31
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.17	0.11	0.11	0.11	0.30	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	88.65	1.13	2.33	4.38	0.77	0.43	3.40	37.65	0.13	154.79	1.06	0.17
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.16	0.42	0.42	0.74	0.33	0.37	0.79	1.07	0.16	1.31	0.79	0.22
d, Delay for Lane Group [s/veh]	139.65	31.63	32.79	54.60	30.61	20.00	50.58	75.23	27.19	200.80	32.44	24.48
Lane Group LOS	F	C	C	D	C	C	D	F	C	F	C	C
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	6.83	5.33	5.18	2.56	4.00	5.09	4.54	22.13	1.76	20.66	12.88	2.61
50th-Percentile Queue Length [ft/ln]	170.85	133.13	129.41	63.96	100.08	127.31	113.38	553.29	44.09	516.47	321.96	65.17
95th-Percentile Queue Length [veh/ln]	11.65	9.11	8.91	4.61	7.21	8.79	8.03	31.26	3.17	31.69	18.76	4.69
95th-Percentile Queue Length [ft/ln]	291.22	227.75	222.69	115.13	180.14	219.83	200.70	781.40	79.36	792.24	469.09	117.31

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	139.65	31.63	32.79	54.60	30.61	20.00	50.58	75.23	27.19	200.80	32.44	24.48
Movement LOS	F	C	C	D	C	C	D	F	C	F	C	C
d_A, Approach Delay [s/veh]	50.83			31.88			67.94			71.96		
Approach LOS	D			C			E			E		
d_I, Intersection Delay [s/veh]	60.17											
Intersection LOS	E											
Intersection V/C	0.918											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.55	44.55	44.55	44.55
I_p,int, Pedestrian LOS Score for Intersection	2.743	2.857	3.057	3.002
Crosswalk LOS	B	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	564	600	636	727
d_b, Bicycle Delay [s]	28.37	26.95	25.57	22.27
I_b,int, Bicycle LOS Score for Intersection	2.277	2.268	2.972	2.896
Bicycle LOS	B	B	C	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 28: Berkeley Avenue at College Driveway No. 1

Control Type:	Two-way stop	Delay (sec / veh):	17.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.226

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	35.00		35.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Base Volume Input [veh/h]	89	216	371	0	119	191
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	89	216	371	0	119	191
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	22	54	93	0	30	48
Total Analysis Volume [veh/h]	89	216	371	0	119	191
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.00	0.00	0.00	0.23	0.28
d_M, Delay for Movement [s/veh]	8.28	0.00	0.00	0.00	17.82	16.31
Movement LOS	A	A	A	A	C	C
95th-Percentile Queue Length [veh/ln]	0.24	0.00	0.00	0.00	2.89	2.89
95th-Percentile Queue Length [ft/ln]	6.07	0.00	0.00	0.00	72.26	72.26
d_A, Approach Delay [s/veh]	2.42		0.00		16.89	
Approach LOS	A		A		C	
d_I, Intersection Delay [s/veh]	6.06					
Intersection LOS	C					

Intersection Level Of Service Report
Intersection 29: Berkeley Avenue at College Driveway No. 2

Control Type:	Two-way stop	Delay (sec / veh):	15.9
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.408

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration	↑		↑		← T →	
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	35.00		35.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Base Volume Input [veh/h]	0	298	526	0	0	225
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	298	526	0	0	225
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	75	132	0	0	56
Total Analysis Volume [veh/h]	0	298	526	0	0	225
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.01	0.00	0.00	0.41
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	0.00	16.37	15.94
Movement LOS		A	A		C	C
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	1.97	1.97
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	0.00	49.26	49.26
d_A, Approach Delay [s/veh]	0.00		0.00		15.94	
Approach LOS	A		A		C	
d_I, Intersection Delay [s/veh]	3.42					
Intersection LOS	C					

APPENDIX C-V

**YEAR 2030 BUILDOUT PLUS PROJECT WITH IMPROVEMENTS
SATURDAY ARRIVAL PEAK HOUR TRAFFIC CONDITIONS**

Intersection Level Of Service Report

Intersection 12: State College Boulevard at Chapman Avenue

Control Type:	Signalized	Delay (sec / veh):	39.1
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.791

Intersection Setup

Name	State College Boulevard			State College Boulevard			Chapman Avenue			Chapman Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	[Diagram]			[Diagram]			[Diagram]			[Diagram]		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	State College Boulevard			State College Boulevard			Chapman Avenue			Chapman Avenue		
Base Volume Input [veh/h]	155	407	209	153	374	312	313	1147	90	400	1252	134
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	155	407	209	153	374	312	313	1147	90	400	1252	134
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	39	102	52	38	94	78	78	287	23	100	313	34
Total Analysis Volume [veh/h]	155	407	209	153	374	312	313	1147	90	400	1252	134
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	5	2	0	1	6	6	3	8	0	7	4	0
Auxiliary Signal Groups						3,6						
Lead / Lag	Lead	-	-									
Minimum Green [s]	6	6	0	6	6	6	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	30	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	14	34	0	17	37	37	15	41	0	18	44	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	7	0	7	0	0	7	0
Pedestrian Clearance [s]	0	23	0	0	26	26	0	23	0	0	26	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No	No	No	No		No	No	
Maximum Recall	No	No		No	No	No	No	No		No	No	
Pedestrian Recall	No	No		No	No	No	No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	10	36	36	7	33	48	11	37	37	14	40	40
g / C, Green / Cycle	0.09	0.33	0.33	0.06	0.30	0.44	0.10	0.33	0.33	0.13	0.36	0.36
(v / s)_i Volume / Saturation Flow Rate	0.09	0.11	0.12	0.04	0.10	0.17	0.09	0.30	0.05	0.11	0.35	0.07
s, saturation flow rate [veh/h]	1800	3800	1800	3500	3800	1800	3500	3800	1800	3600	3600	1800
c, Capacity [veh/h]	164	1260	597	218	1151	791	351	1266	600	459	1298	649
d1, Uniform Delay [s]	49.73	27.52	27.80	50.58	29.65	20.92	48.92	35.03	25.74	47.13	34.50	24.31
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.18	0.11	0.11	0.11	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	21.81	0.68	1.62	4.07	0.75	0.54	7.95	2.77	0.11	5.30	5.96	0.16
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.95	0.32	0.35	0.70	0.32	0.39	0.89	0.91	0.15	0.87	0.96	0.21
d, Delay for Lane Group [s/veh]	71.54	28.20	29.42	54.65	30.40	21.46	56.87	37.80	25.86	52.43	40.46	24.46
Lane Group LOS	E	C	C	D	C	C	E	D	C	D	D	C
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	5.22	4.12	4.42	2.18	3.94	5.50	4.62	14.84	1.67	5.69	17.04	2.44
50th-Percentile Queue Length [ft/ln]	130.38	103.02	110.49	54.62	98.60	137.60	115.44	370.94	41.85	142.23	426.06	60.92
95th-Percentile Queue Length [veh/ln]	8.96	7.42	7.87	3.93	7.10	9.35	8.14	21.15	3.01	9.60	23.81	4.39
95th-Percentile Queue Length [ft/ln]	224.01	185.43	196.68	98.32	177.49	233.79	203.55	528.87	75.33	240.02	595.31	109.65

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	71.54	28.20	29.42	54.65	30.40	21.46	56.87	37.80	25.86	52.43	40.46	24.46
Movement LOS	E	C	C	D	C	C	E	D	C	D	D	C
d_A, Approach Delay [s/veh]	37.25			31.50			40.96			41.94		
Approach LOS	D			C			D			D		
d_I, Intersection Delay [s/veh]	39.13											
Intersection LOS	D											
Intersection V/C	0.791											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.55	44.55	44.55	44.55
I_p,int, Pedestrian LOS Score for Intersection	2.728	2.839	3.059	3.062
Crosswalk LOS	B	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	545	600	673	727
d_b, Bicycle Delay [s]	29.09	26.95	24.22	22.27
I_b,int, Bicycle LOS Score for Intersection	2.196	2.252	2.838	3.033
Bicycle LOS	B	B	C	C

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



APPENDIX C-VI

**YEAR 2030 BUILDOUT PLUS PROJECT WITH IMPROVEMENTS
SATURDAY DEPARTURE PEAK HOUR TRAFFIC CONDITIONS**

Intersection Level Of Service Report

Intersection 12: State College Boulevard at Chapman Avenue

Control Type:	Signalized	Delay (sec / veh):	37.4
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.792

Intersection Setup

Name	State College Boulevard			State College Boulevard			Chapman Avenue			Chapman Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	[Diagram]			[Diagram]			[Diagram]			[Diagram]		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	State College Boulevard			State College Boulevard			Chapman Avenue			Chapman Avenue		
Base Volume Input [veh/h]	152	488	229	179	378	302	327	1293	92	387	1090	143
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	152	488	229	179	378	302	327	1293	92	387	1090	143
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	38	122	57	45	95	76	82	323	23	97	273	36
Total Analysis Volume [veh/h]	152	488	229	179	378	302	327	1293	92	387	1090	143
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	5	2	0	1	6	6	3	8	0	7	4	0
Auxiliary Signal Groups						3,6						
Lead / Lag	Lag	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	6	6	6	0	6	6	0
Maximum Green [s]	30	30	0	30	30	30	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	12	34	0	15	37	37	21	44	0	17	40	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	7	0	7	0	0	7	0
Pedestrian Clearance [s]	0	23	0	0	26	26	0	23	0	0	26	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No	No	No	No		No	No	
Maximum Recall	No	No		No	No	No	No	No		No	No	
Pedestrian Recall	No	No		No	No	No	No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	8	34	34	8	34	63	13	40	40	13	39	39
g / C, Green / Cycle	0.07	0.31	0.31	0.07	0.31	0.57	0.12	0.36	0.36	0.12	0.36	0.36
(v / s)_i Volume / Saturation Flow Rate	0.08	0.13	0.13	0.05	0.10	0.17	0.09	0.34	0.05	0.11	0.30	0.08
s, saturation flow rate [veh/h]	1800	3800	1800	3500	3800	1800	3500	3800	1800	3600	3600	1800
c, Capacity [veh/h]	165	1172	555	243	1160	1024	413	1369	648	419	1290	645
d1, Uniform Delay [s]	51.55	30.18	30.14	50.19	29.49	12.29	47.20	34.13	23.73	48.14	32.47	24.60
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.17	0.11	0.11	0.11	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	17.93	1.09	2.25	4.29	0.75	0.25	3.45	4.15	0.10	8.99	1.60	0.17
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.92	0.42	0.41	0.74	0.33	0.29	0.79	0.94	0.14	0.92	0.84	0.22
d, Delay for Lane Group [s/veh]	69.48	31.27	32.39	54.48	30.24	12.54	50.65	38.29	23.83	57.13	34.08	24.77
Lane Group LOS	E	C	C	D	C	B	D	D	C	E	C	C
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	5.05	5.28	5.13	2.56	3.97	3.81	4.54	17.15	1.64	5.75	13.36	2.63
50th-Percentile Queue Length [ft/ln]	126.21	132.12	128.37	63.88	99.28	95.16	113.47	428.69	40.91	143.67	333.88	65.69
95th-Percentile Queue Length [veh/ln]	8.73	9.06	8.85	4.60	7.15	6.85	8.03	23.94	2.95	9.68	19.35	4.73
95th-Percentile Queue Length [ft/ln]	218.34	226.38	221.27	114.98	178.71	171.28	200.82	598.47	73.63	241.96	483.71	118.25

Movement, Approach, & Intersection Results

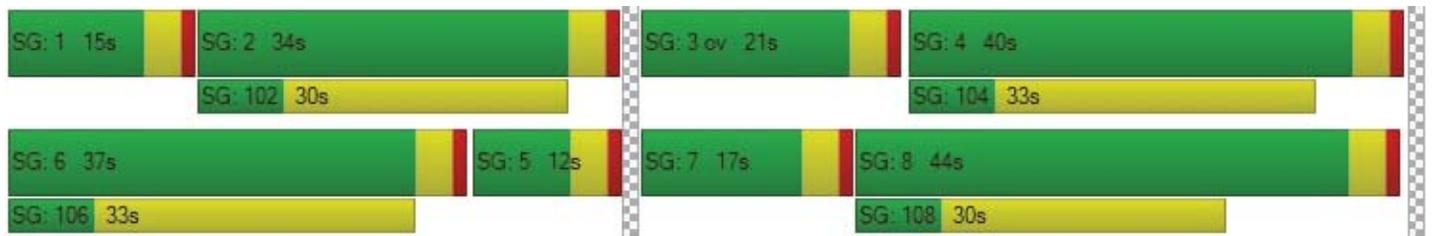
d_M, Delay for Movement [s/veh]	69.48	31.27	32.39	54.48	30.24	12.54	50.65	38.29	23.83	57.13	34.08	24.77
Movement LOS	E	C	C	D	C	B	D	D	C	E	C	C
d_A, Approach Delay [s/veh]	38.25			29.07			39.87			38.76		
Approach LOS	D			C			D			D		
d_I, Intersection Delay [s/veh]	37.40											
Intersection LOS	D											
Intersection V/C	0.792											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	44.55			44.55			44.55			44.55		
I_p,int, Pedestrian LOS Score for Intersection	2.743			2.857			3.273			3.066		
Crosswalk LOS	B			C			C			C		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	545			600			727			655		
d_b, Bicycle Delay [s]	29.09			26.95			22.27			24.89		
I_b,int, Bicycle LOS Score for Intersection	2.277			2.268			2.972			2.896		
Bicycle LOS	B			B			C			C		

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



APPENDIX D

EXISTING PLUS ALTERNATIVE PROJECT TRAFFIC CONDITIONS INTERSECTION LEVEL OF SERVICE CALCULATION WORKSHEETS (FRIDAY FIELD EVENT ANALYSIS)

APPENDIX D-1

**EXISTING FRIDAY ARRIVAL PEAK HOUR
TRAFFIC CONDITIONS**

Intersection Level Of Service Report
Intersection 4: Lemon Street at Berkeley Avenue

Control Type:	Signalized	Delay (sec / veh):	49.9
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.460

Intersection Setup

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	⇐⇐⇐			⇐⇐			⇐⇐⇐			⇐⇐		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Base Volume Input [veh/h]	233	274	77	62	247	23	105	204	10	117	307	69
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	233	274	77	62	247	23	105	204	10	117	307	69
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	58	69	19	16	62	6	26	51	3	29	77	17
Total Analysis Volume [veh/h]	233	274	77	62	247	23	105	204	10	117	307	69
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Permiss	Permiss	Overlap	Permiss	Permiss	Permiss
Signal group	0	2	0	0	6	0	0	8	8	0	4	0
Auxiliary Signal Groups									2,8			
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	6	0	6	0
Maximum Green [s]	0	30	0	0	30	0	0	30	30	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	32	0	0	32	0	0	46	46	0	46	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	20	0	0	19	0	0	16	16	0	12	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall		No			No			No	No		No	
Maximum Recall		No			No			No	No		No	
Pedestrian Recall		No			No			No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	42	42	42	42	42	14	14	60	14	14	14
g / C, Green / Cycle	0.38	0.38	0.38	0.38	0.38	0.13	0.13	0.55	0.13	0.13	0.13
(v / s)_i Volume / Saturation Flow Rate	0.13	0.15	0.04	0.03	0.15	0.06	0.11	0.01	0.07	0.10	0.10
s, saturation flow rate [veh/h]	1800	1800	1800	1800	1800	1800	1900	1800	1800	1900	1800
c, Capacity [veh/h]	685	685	685	685	685	99	246	984	93	246	233
d1, Uniform Delay [s]	24.20	24.85	22.01	21.82	24.78	44.07	46.66	11.37	43.91	46.49	46.23
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.50	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.35	1.74	0.33	0.26	1.70	60.18	7.10	0.02	136.29	6.13	5.21
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.34	0.40	0.11	0.09	0.39	1.06	0.83	0.01	1.26	0.81	0.77
d, Delay for Lane Group [s/veh]	25.55	26.59	22.34	22.08	26.48	104.25	53.77	11.38	180.20	52.62	51.44
Lane Group LOS	C	C	C	C	C	F	D	B	F	D	D
Critical Lane Group	No	Yes	No	No	Yes	No	Yes	No	No	No	No
50th-Percentile Queue Length [veh/ln]	4.54	5.51	1.35	1.08	5.41	4.13	5.91	0.12	5.82	5.66	5.03
50th-Percentile Queue Length [ft/ln]	113.60	137.71	33.80	26.96	135.29	103.15	147.63	2.89	145.48	141.38	125.68
95th-Percentile Queue Length [veh/ln]	8.04	9.36	2.43	1.94	9.23	7.43	9.89	0.21	10.47	9.55	8.70
95th-Percentile Queue Length [ft/ln]	200.99	233.93	60.83	48.52	230.66	185.66	247.26	5.20	261.86	238.87	217.61

Movement, Approach, & Intersection Results

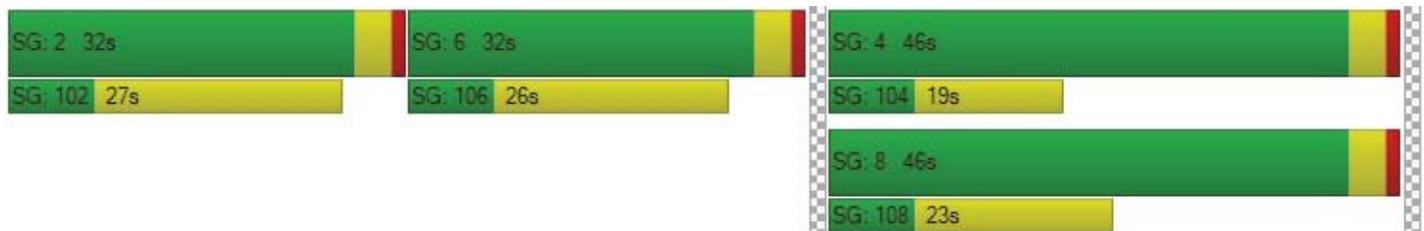
d_M, Delay for Movement [s/veh]	25.55	26.59	22.34	22.08	26.48	26.48	104.25	53.77	11.38	180.20	52.20	51.44
Movement LOS	C	C	C	C	C	C	F	D	B	F	D	D
d_A, Approach Delay [s/veh]	25.61			25.66			69.05			82.47		
Approach LOS	C			C			E			F		
d_I, Intersection Delay [s/veh]	49.86											
Intersection LOS	D											
Intersection V/C	0.460											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.55	44.55	44.55	44.55
I_p,int, Pedestrian LOS Score for Intersection	2.541	2.353	2.481	2.344
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	509	509	764	764
d_b, Bicycle Delay [s]	30.56	30.56	21.02	21.02
I_b,int, Bicycle LOS Score for Intersection	2.523	2.107	2.086	1.966
Bicycle LOS	B	B	B	A

Sequence

Ring 1	2	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 27: Lemon Street at Fullerton College Drive

Control Type:	Signalized	Delay (sec / veh):	12.7
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.306

Intersection Setup

Name	Lemon Street			Lemon Street			Fullerton College Drive			Fullerton College Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			Yes		

Volumes

Name	Lemon Street			Lemon Street			Fullerton College Drive			Fullerton College Drive		
Base Volume Input [veh/h]	0	594	46	88	447	0	91	37	112	29	0	19
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	594	46	88	447	0	91	37	112	29	0	19
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	149	12	22	112	0	23	9	28	7	0	5
Total Analysis Volume [veh/h]	0	594	46	88	447	0	91	37	112	29	0	19
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	ProtPer	Permiss							
Signal group	0	2	0	1	6	0	0	8	0	4	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	Lead	-	-
Minimum Green [s]	0	6	0	6	6	0	0	6	0	6	0	0
Maximum Green [s]	0	30	0	30	30	0	0	30	0	30	0	0
Amber [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0
All red [s]	0.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0
Split [s]	0	37	0	10	47	0	0	63	0	63	0	0
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0
Walk [s]	0	7	0	0	7	0	0	0	0	7	0	0
Pedestrian Clearance [s]	0	13	0	0	14	0	0	0	0	16	0	0
Rest In Walk		No			No			No		No		
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0
Minimum Recall		No		No	No			No		No		
Maximum Recall		No		No	No			No		No		
Pedestrian Recall		No		No	No			No		No		
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	L	C	L	R
C, Cycle Length [s]	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	2.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	81	81	91	91	11	11	11	11
g / C, Green / Cycle	0.74	0.74	0.82	0.82	0.10	0.10	0.10	0.10
(v / s)_i Volume / Saturation Flow Rate	0.17	0.18	0.05	0.12	0.05	0.08	0.02	0.01
s, saturation flow rate [veh/h]	1900	1800	1800	3800	1800	1800	1800	1800
c, Capacity [veh/h]	1397	1324	1462	3129	222	220	78	187
d1, Uniform Delay [s]	4.63	4.68	1.80	1.94	46.52	48.15	44.89	44.64
k, delay calibration	0.50	0.50	0.11	0.50	0.11	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.38	0.43	0.02	0.10	1.21	3.65	2.89	0.24
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.23	0.24	0.06	0.14	0.41	0.68	0.37	0.10
d, Delay for Lane Group [s/veh]	5.01	5.11	1.82	2.04	47.73	51.80	47.78	44.87
Lane Group LOS	A	A	A	A	D	D	D	D
Critical Lane Group	No	Yes	Yes	No	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.14	2.18	0.24	0.68	2.42	4.20	0.79	0.48
50th-Percentile Queue Length [ft/ln]	53.57	54.40	5.97	16.90	60.57	105.07	19.63	12.07
95th-Percentile Queue Length [veh/ln]	3.86	3.92	0.43	1.22	4.36	7.56	1.41	0.87
95th-Percentile Queue Length [ft/ln]	96.42	97.93	10.74	30.43	109.03	189.12	35.33	21.72

Movement, Approach, & Intersection Results

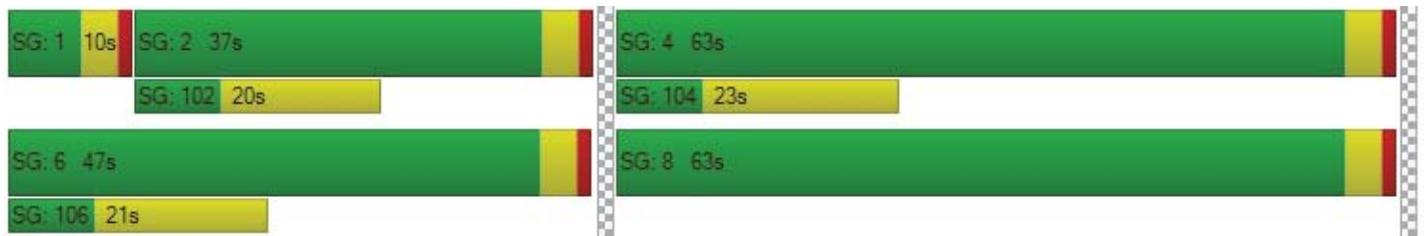
d_M, Delay for Movement [s/veh]	0.00	5.06	5.11	1.82	2.04	0.00	47.73	51.80	51.80	47.78	0.00	44.87
Movement LOS		A	A	A	A		D	D	D	D		D
d_A, Approach Delay [s/veh]		5.06		2.00			50.26		46.63			
Approach LOS		A		A			D		D			
d_I, Intersection Delay [s/veh]	12.72											
Intersection LOS	B											
Intersection V/C	0.306											

Other Modes

g_Walk,mi, Effective Walk Time [s]		0.0		11.0		11.0		11.0		11.0
M_corner, Corner Circulation Area [ft ² /ped]		0.00		0.00		0.00		0.00		0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]		0.00		0.00		0.00		0.00		0.00
d_p, Pedestrian Delay [s]		0.00		44.55		44.55		44.55		44.55
I_p,int, Pedestrian LOS Score for Intersection		0.000		2.680		1.841		2.115		
Crosswalk LOS		F		B		A		B		
s_b, Saturation Flow Rate of the bicycle lane		2000		2000		2000		2000		
c_b, Capacity of the bicycle lane [bicycles/h]		600		782		1073		0		
d_b, Bicycle Delay [s]		26.95		20.40		11.82		55.00		
I_b,int, Bicycle LOS Score for Intersection		2.088		2.001		1.956		4.132		
Bicycle LOS		B		B		A		D		

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 28: Berkeley Avenue at College Driveway No. 1

Control Type:	Two-way stop	Delay (sec / veh):	11.1
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.005

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Base Volume Input [veh/h]	5	383	232	0	3	12
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	5	383	232	0	3	12
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	96	58	0	1	3
Total Analysis Volume [veh/h]	5	383	232	0	3	12
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.01
d_M, Delay for Movement [s/veh]	7.71	0.00	0.00	0.00	11.10	9.56
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh/ln]	0.01	0.00	0.00	0.00	0.06	0.06
95th-Percentile Queue Length [ft/ln]	0.28	0.00	0.00	0.00	1.52	1.52
d_A, Approach Delay [s/veh]	0.10		0.00		9.86	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.29					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 29: Berkeley Avenue at College Driveway No. 2

Control Type:	Two-way stop	Delay (sec / veh):	11.7
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.009

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Base Volume Input [veh/h]	27	417	236	0	5	15
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	27	417	236	0	5	15
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	104	59	0	1	4
Total Analysis Volume [veh/h]	27	417	236	0	5	15
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.00	0.00	0.00	0.01	0.02
d_M, Delay for Movement [s/veh]	7.76	0.00	0.00	0.00	11.68	9.63
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh/ln]	0.06	0.00	0.00	0.00	0.09	0.09
95th-Percentile Queue Length [ft/ln]	1.55	0.00	0.00	0.00	2.14	2.14
d_A, Approach Delay [s/veh]	0.47		0.00		10.14	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	0.59					
Intersection LOS	B					

APPENDIX D-II

EXISTING FRIDAY DEPARTURE PEAK HOUR
TRAFFIC CONDITIONS

Intersection Level Of Service Report
Intersection 4: Lemon Street at Berkeley Avenue

Control Type:	Signalized	Delay (sec / veh):	31.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.320

Intersection Setup

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	⇌⇌⇌			⇌			⇌⇌⇌			⇌⇌		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Base Volume Input [veh/h]	200	204	141	18	141	37	11	136	125	77	129	50
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	200	204	141	18	141	37	11	136	125	77	129	50
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	50	51	35	5	35	9	3	34	31	19	32	13
Total Analysis Volume [veh/h]	200	204	141	18	141	37	11	136	125	77	129	50
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Permiss	Permiss	Overlap	Permiss	Permiss	Permiss
Signal group	0	2	0	0	6	0	0	8	8	0	4	0
Auxiliary Signal Groups									2,8			
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	6	0	6	0
Maximum Green [s]	0	30	0	0	30	0	0	30	30	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	38	0	0	33	0	0	39	39	0	39	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	20	0	0	19	0	0	16	16	0	12	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall		No			No			No	No		No	
Maximum Recall		No			No			No	No		No	
Pedestrian Recall		No			No			No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	44	44	44	44	44	10	10	58	10	10	10
g / C, Green / Cycle	0.40	0.40	0.40	0.40	0.40	0.09	0.09	0.53	0.09	0.09	0.09
(v / s)_i Volume / Saturation Flow Rate	0.11	0.11	0.08	0.01	0.10	0.01	0.07	0.07	0.04	0.05	0.05
s, saturation flow rate [veh/h]	1800	1800	1800	1800	1800	1800	1900	1800	1800	1900	1800
c, Capacity [veh/h]	716	716	716	716	716	134	180	953	95	180	171
d1, Uniform Delay [s]	22.36	22.50	21.61	20.11	22.10	45.28	48.48	13.08	47.02	47.35	47.24
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.50	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.95	1.02	0.61	0.06	0.83	0.26	6.27	0.29	14.99	2.32	2.23
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.28	0.29	0.20	0.03	0.25	0.08	0.75	0.13	0.81	0.52	0.50
d, Delay for Lane Group [s/veh]	23.31	23.51	22.22	20.18	22.93	45.54	54.75	13.37	62.00	49.67	49.47
Lane Group LOS	C	C	C	C	C	D	D	B	E	D	D
Critical Lane Group	No	Yes	No	No	Yes	No	Yes	No	No	No	No
50th-Percentile Queue Length [veh/ln]	3.62	3.82	2.49	0.29	3.22	0.28	3.94	1.62	2.39	2.57	2.32
50th-Percentile Queue Length [ft/ln]	90.49	95.52	62.29	7.36	80.61	7.10	98.60	40.52	59.71	64.17	57.93
95th-Percentile Queue Length [veh/ln]	6.52	6.88	4.49	0.53	5.80	0.51	7.10	2.92	4.30	4.62	4.17
95th-Percentile Queue Length [ft/ln]	162.88	171.93	112.13	13.25	145.09	12.78	177.48	72.94	107.48	115.51	104.27

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	23.31	23.51	22.22	20.18	22.93	22.93	45.54	54.75	13.37	62.00	49.62	49.47
Movement LOS	C	C	C	C	C	C	D	D	B	E	D	D
d_A, Approach Delay [s/veh]	23.11			22.67			35.36			53.32		
Approach LOS	C			C			D			D		
d_I, Intersection Delay [s/veh]	31.76											
Intersection LOS	C											
Intersection V/C	0.320											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.55	44.55	44.55	44.55
I_p,int, Pedestrian LOS Score for Intersection	2.467	2.115	2.434	2.275
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	618	527	636	636
d_b, Bicycle Delay [s]	26.25	29.82	25.57	25.57
I_b,int, Bicycle LOS Score for Intersection	2.459	1.883	2.008	1.771
Bicycle LOS	B	A	B	A

Sequence

Ring 1	2	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 27: Lemon Street at Fullerton College Drive

Control Type:	Signalized	Delay (sec / veh):	26.6
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.230

Intersection Setup

Name	Lemon Street			Lemon Street			Fullerton College Drive			Fullerton College Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			Yes		

Volumes

Name	Lemon Street			Lemon Street			Fullerton College Drive			Fullerton College Drive		
Base Volume Input [veh/h]	0	328	12	26	362	0	123	2	191	91	0	33
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	328	12	26	362	0	123	2	191	91	0	33
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	82	3	7	91	0	31	1	48	23	0	8
Total Analysis Volume [veh/h]	0	328	12	26	362	0	123	2	191	91	0	33
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	ProtPer	Permiss							
Signal group	0	2	0	1	6	0	0	8	0	4	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	Lead	-	-
Minimum Green [s]	0	6	0	6	6	0	0	6	0	6	0	0
Maximum Green [s]	0	30	0	30	30	0	0	30	0	30	0	0
Amber [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0
All red [s]	0.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0
Split [s]	0	53	0	10	63	0	0	47	0	47	0	0
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0
Walk [s]	0	7	0	0	7	0	0	0	0	7	0	0
Pedestrian Clearance [s]	0	13	0	0	14	0	0	0	0	16	0	0
Rest In Walk		No			No			No		No		
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0
Minimum Recall		No		No	No			No		No		
Maximum Recall		No		No	No			No		No		
Pedestrian Recall		No		No	No			No		No		
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	L	C	L	R
C, Cycle Length [s]	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	2.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	80	80	88	88	14	14	14	14
g / C, Green / Cycle	0.73	0.73	0.80	0.80	0.13	0.13	0.13	0.13
(v / s)_i Volume / Saturation Flow Rate	0.09	0.09	0.01	0.10	0.07	0.11	0.05	0.02
s, saturation flow rate [veh/h]	1900	1800	1800	3800	1800	1800	1800	1800
c, Capacity [veh/h]	1389	1316	1473	3033	267	265	81	232
d1, Uniform Delay [s]	4.37	4.39	2.27	2.47	44.77	46.72	43.67	42.49
k, delay calibration	0.50	0.50	0.11	0.50	0.11	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.18	0.20	0.00	0.08	1.24	3.81	84.39	0.28
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.12	0.13	0.02	0.12	0.46	0.73	1.12	0.14
d, Delay for Lane Group [s/veh]	4.55	4.60	2.28	2.56	46.01	50.53	128.06	42.76
Lane Group LOS	A	A	A	A	D	D	F	D
Critical Lane Group	No	Yes	Yes	No	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.06	1.07	0.09	0.69	3.22	5.41	3.91	0.82
50th-Percentile Queue Length [ft/ln]	26.57	26.81	2.21	17.25	80.60	135.24	97.76	20.39
95th-Percentile Queue Length [veh/ln]	1.91	1.93	0.16	1.24	5.80	9.22	7.04	1.47
95th-Percentile Queue Length [ft/ln]	47.82	48.26	3.98	31.05	145.09	230.60	175.98	36.69

Movement, Approach, & Intersection Results

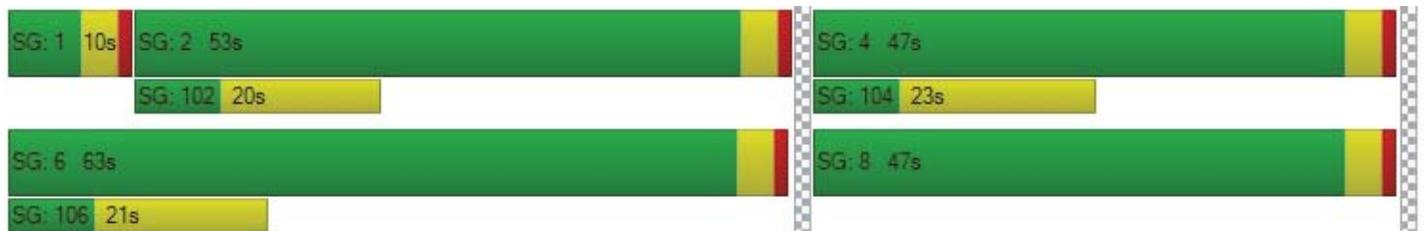
d_M, Delay for Movement [s/veh]	0.00	4.57	4.60	2.28	2.56	0.00	46.01	50.53	50.53	128.06	0.00	42.76
Movement LOS		A	A	A	A		D	D	D	F		D
d_A, Approach Delay [s/veh]	4.57			2.54			48.77			105.36		
Approach LOS	A			A			D			F		
d_I, Intersection Delay [s/veh]	26.55											
Intersection LOS	C											
Intersection V/C	0.230											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	0.00			44.55			44.55			44.55		
I_p,int, Pedestrian LOS Score for Intersection	0.000			2.654			1.878			2.031		
Crosswalk LOS	F			B			A			B		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	891			1073			782			0		
d_b, Bicycle Delay [s]	16.91			11.82			20.40			55.00		
I_b,int, Bicycle LOS Score for Intersection	1.840			1.880			2.081			4.132		
Bicycle LOS	A			A			B			D		

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 28: Berkeley Avenue at College Driveway No. 1

Control Type:	Two-way stop	Delay (sec / veh):	10.0
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.011

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Base Volume Input [veh/h]	0	172	212	0	8	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	172	212	0	8	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	43	53	0	2	0
Total Analysis Volume [veh/h]	0	172	212	0	8	0
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.01	0.00
d_M, Delay for Movement [s/veh]	7.65	0.00	0.00	0.00	10.01	9.40
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.03	0.03
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	0.00	0.83	0.83
d_A, Approach Delay [s/veh]	0.00		0.00		10.01	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	0.20					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 29: Berkeley Avenue at College Driveway No. 2

Control Type:	Two-way stop	Delay (sec / veh):	9.5
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.029

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Base Volume Input [veh/h]	5	167	216	0	0	24
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	5	167	216	0	0	24
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	42	54	0	0	6
Total Analysis Volume [veh/h]	5	167	216	0	0	24
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.03
d_M, Delay for Movement [s/veh]	7.67	0.00	0.00	0.00	10.13	9.50
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh/ln]	0.01	0.00	0.00	0.00	0.09	0.09
95th-Percentile Queue Length [ft/ln]	0.28	0.00	0.00	0.00	2.25	2.25
d_A, Approach Delay [s/veh]	0.22		0.00		9.50	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.65					
Intersection LOS	A					

APPENDIX D-III

**EXISTING PLUS PROJECT
FRIDAY ARRIVAL PEAK HOUR
TRAFFIC CONDITIONS**

Intersection Level Of Service Report
Intersection 4: Lemon Street at Berkeley Avenue

Control Type:	Signalized	Delay (sec / veh):	49.5
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.485

Intersection Setup

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	⇌⇌⇌			⇌			⇌⇌⇌			⇌⇌		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Base Volume Input [veh/h]	241	274	116	62	247	23	105	248	10	128	312	69
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	241	274	116	62	247	23	105	248	10	128	312	69
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	60	69	29	16	62	6	26	62	3	32	78	17
Total Analysis Volume [veh/h]	241	274	116	62	247	23	105	248	10	128	312	69
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	111
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Permiss	Permiss	Overlap	Permiss	Permiss	Permiss
Signal Group	0	2	0	0	6	0	0	8	8	0	4	0
Auxiliary Signal Groups									2,8			
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	6	0	6	0
Maximum Green [s]	0	30	0	0	30	0	0	30	30	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	31	0	0	52	0	0	28	28	0	28	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	20	0	0	19	0	0	16	16	0	12	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall		No			No			No	No		No	
Maximum Recall		No			No			No	No		No	
Pedestrian Recall		No			No			No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Cycle Length [s]	111	111	111	111	111	111	111	111	111	111	111
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	41	41	41	41	41	17	17	62	17	17	17
g / C, Green / Cycle	0.37	0.37	0.37	0.37	0.37	0.15	0.15	0.56	0.15	0.15	0.15
(v / s)_i Volume / Saturation Flow Rate	0.13	0.15	0.06	0.03	0.15	0.06	0.13	0.01	0.07	0.11	0.10
s, saturation flow rate [veh/h]	1800	1800	1800	1800	1800	1800	1900	1800	1800	1900	1800
c, Capacity [veh/h]	666	666	666	666	666	142	289	1004	93	289	274
d1, Uniform Delay [s]	25.39	25.94	23.50	22.77	25.87	42.27	45.78	10.88	41.98	44.50	44.24
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.50	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.53	1.88	0.57	0.28	1.83	7.30	7.32	0.02	180.87	2.99	2.70
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.36	0.41	0.17	0.09	0.41	0.74	0.86	0.01	1.37	0.69	0.66
d, Delay for Lane Group [s/veh]	26.91	27.81	24.07	23.05	27.70	49.57	53.09	10.90	222.85	47.48	46.94
Lane Group LOS	C	C	C	C	C	D	D	B	F	D	D
Critical Lane Group	No	Yes	No	No	Yes	No	Yes	No	No	No	No
50th-Percentile Queue Length [veh/ln]	4.88	5.68	2.15	1.11	5.58	2.88	7.22	0.11	6.98	5.45	4.87
50th-Percentile Queue Length [ft/ln]	121.91	142.08	53.81	27.79	139.58	72.01	180.47	2.83	174.58	136.26	121.76
95th-Percentile Queue Length [veh/ln]	8.50	9.59	3.87	2.00	9.46	5.18	11.62	0.20	12.57	9.28	8.49
95th-Percentile Queue Length [ft/ln]	212.44	239.83	96.86	50.02	236.46	129.62	290.62	5.09	314.25	231.98	212.24

Movement, Approach, & Intersection Results

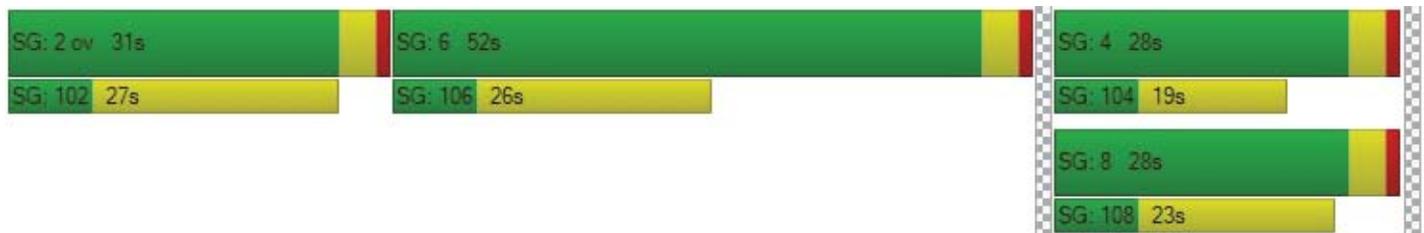
d_M, Delay for Movement [s/veh]	26.91	27.81	24.07	23.05	27.70	27.70	49.57	53.09	10.90	222.85	47.29	46.94
Movement LOS	C	C	C	C	C	C	D	D	B	F	D	D
d_A, Approach Delay [s/veh]	26.78			26.83			50.91			91.39		
Approach LOS	C			C			D			F		
d_I, Intersection Delay [s/veh]	49.49											
Intersection LOS	D											
Intersection V/C	0.485											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	45.05	45.05	45.05	45.05
I_p,int, Pedestrian LOS Score for Intersection	2.571	2.353	2.493	2.369
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	486	865	432	432
d_b, Bicycle Delay [s]	31.78	17.88	34.09	34.09
I_b,int, Bicycle LOS Score for Intersection	2.601	2.107	2.159	1.980
Bicycle LOS	B	B	B	A

Sequence

Ring 1	2	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 27: Lemon Street at Fullerton College Drive

Control Type:	Signalized	Delay (sec / veh):	13.6
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.361

Intersection Setup

Name	Lemon Street			Lemon Street			Fullerton College Drive			Fullerton College Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			Yes		

Volumes

Name	Lemon Street			Lemon Street			Fullerton College Drive			Fullerton College Drive		
Base Volume Input [veh/h]	0	772	46	88	458	0	91	37	112	67	0	19
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	772	46	88	458	0	91	37	112	67	0	19
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	193	12	22	115	0	23	9	28	17	0	5
Total Analysis Volume [veh/h]	0	772	46	88	458	0	91	37	112	67	0	19
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	ProtPer	Permiss							
Signal Group	0	2	0	1	6	0	0	8	0	4	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	Lead	-	-
Minimum Green [s]	0	6	0	6	6	0	0	6	0	6	0	0
Maximum Green [s]	0	30	0	30	30	0	0	30	0	30	0	0
Amber [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0
All red [s]	0.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0
Split [s]	0	56	0	10	66	0	0	44	0	44	0	0
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0
Walk [s]	0	7	0	0	7	0	0	0	0	7	0	0
Pedestrian Clearance [s]	0	13	0	0	14	0	0	0	0	16	0	0
Rest In Walk		No			No			No		No		
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0
Minimum Recall		No		No	No			No		No		
Maximum Recall		No		No	No			No		No		
Pedestrian Recall		No		No	No			No		No		
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	L	C	L	R
C, Cycle Length [s]	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	2.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	81	81	91	91	11	11	11	11
g / C, Green / Cycle	0.74	0.74	0.82	0.82	0.10	0.10	0.10	0.10
(v / s)_i Volume / Saturation Flow Rate	0.22	0.23	0.05	0.12	0.05	0.08	0.04	0.01
s, saturation flow rate [veh/h]	1900	1800	1800	3800	1800	1800	1800	1800
c, Capacity [veh/h]	1397	1324	1425	3130	222	219	79	187
d1, Uniform Delay [s]	4.90	4.98	1.80	1.95	46.53	48.16	45.88	44.65
k, delay calibration	0.50	0.50	0.11	0.50	0.11	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.53	0.61	0.02	0.10	1.21	3.66	21.70	0.24
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.29	0.31	0.06	0.15	0.41	0.68	0.85	0.10
d, Delay for Lane Group [s/veh]	5.43	5.58	1.82	2.04	47.74	51.82	67.58	44.88
Lane Group LOS	A	A	A	A	D	D	E	D
Critical Lane Group	No	Yes	Yes	No	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.91	2.96	0.24	0.69	2.42	4.20	2.18	0.48
50th-Percentile Queue Length [ft/ln]	72.65	74.11	5.96	17.36	60.58	105.09	54.46	12.07
95th-Percentile Queue Length [veh/ln]	5.23	5.34	0.43	1.25	4.36	7.57	3.92	0.87
95th-Percentile Queue Length [ft/ln]	130.77	133.39	10.74	31.24	109.05	189.15	98.02	21.72

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	5.50	5.58	1.82	2.04	0.00	47.74	51.82	51.82	67.58	0.00	44.88
Movement LOS		A	A	A	A		D	D	D	E		D
d_A, Approach Delay [s/veh]		5.51		2.01			50.27		62.56			
Approach LOS		A		A			D		E			
d_I, Intersection Delay [s/veh]	13.64											
Intersection LOS	B											
Intersection V/C	0.361											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	44.55	44.55	44.55
I_p,int, Pedestrian LOS Score for Intersection	0.000	2.717	1.841	2.128
Crosswalk LOS	F	B	A	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	945	1127	727	0
d_b, Bicycle Delay [s]	15.29	10.47	22.27	55.00
I_b,int, Bicycle LOS Score for Intersection	2.234	2.010	1.956	4.132
Bicycle LOS	B	B	A	D

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 28: Berkeley Avenue at College Driveway No. 1

Control Type:	Two-way stop	Delay (sec / veh):	16.0
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.051

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Base Volume Input [veh/h]	200	383	255	0	18	50
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	200	383	255	0	18	50
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	50	96	64	0	5	13
Total Analysis Volume [veh/h]	200	383	255	0	18	50
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.15	0.00	0.00	0.00	0.05	0.06
d_M, Delay for Movement [s/veh]	8.24	0.00	0.00	0.00	15.99	10.38
Movement LOS	A	A	A	A	C	B
95th-Percentile Queue Length [veh/ln]	0.54	0.00	0.00	0.00	0.39	0.39
95th-Percentile Queue Length [ft/ln]	13.46	0.00	0.00	0.00	9.67	9.67
d_A, Approach Delay [s/veh]	2.83		0.00		11.87	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	2.71					
Intersection LOS	C					

Intersection Level Of Service Report
Intersection 29: Berkeley Avenue at College Driveway No. 2

Control Type:	Two-way stop	Delay (sec / veh):	17.3
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.016

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Base Volume Input [veh/h]	166	612	296	0	5	45
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	166	612	296	0	5	45
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	42	153	74	0	1	11
Total Analysis Volume [veh/h]	166	612	296	0	5	45
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.13	0.01	0.00	0.00	0.02	0.06
d_M, Delay for Movement [s/veh]	8.27	0.00	0.00	0.00	17.33	10.30
Movement LOS	A	A	A	A	C	B
95th-Percentile Queue Length [veh/ln]	0.45	0.00	0.00	0.00	0.25	0.25
95th-Percentile Queue Length [ft/ln]	11.29	0.00	0.00	0.00	6.24	6.24
d_A, Approach Delay [s/veh]	1.77		0.00		11.01	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	1.71					
Intersection LOS	C					

APPENDIX D-IV

**EXISTING PLUS PROJECT
FRIDAY DEPARTURE PEAK HOUR
TRAFFIC CONDITIONS**

Intersection Level Of Service Report
Intersection 4: Lemon Street at Berkeley Avenue

Control Type:	Signalized	Delay (sec / veh):	46.2
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.334

Intersection Setup

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	↵↵↵			↵↵			↵↵↵			↵↵		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Base Volume Input [veh/h]	235	204	145	18	141	37	11	141	125	125	150	50
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	235	204	145	18	141	37	11	141	125	125	150	50
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	59	51	36	5	35	9	3	35	31	31	38	13
Total Analysis Volume [veh/h]	235	204	145	18	141	37	11	141	125	125	150	50
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Permiss	Permiss	Overlap	Permiss	Permiss	Permiss
Signal group	0	2	0	0	6	0	0	8	8	0	4	0
Auxiliary Signal Groups									2,8			
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	6	0	6	0
Maximum Green [s]	0	30	0	0	30	0	0	30	30	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	39	0	0	30	0	0	41	41	0	41	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	20	0	0	19	0	0	16	16	0	12	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall		No			No			No	No		No	
Maximum Recall		No			No			No	No		No	
Pedestrian Recall		No			No			No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	44	44	44	44	44	11	11	58	11	11	11
g / C, Green / Cycle	0.40	0.40	0.40	0.40	0.40	0.10	0.10	0.53	0.10	0.10	0.10
(v / s)_i Volume / Saturation Flow Rate	0.12	0.12	0.08	0.01	0.10	0.01	0.07	0.07	0.07	0.06	0.05
s, saturation flow rate [veh/h]	1800	1800	1800	1800	1800	1800	1900	1800	1800	1900	1800
c, Capacity [veh/h]	714	714	714	714	714	128	185	955	95	185	175
d1, Uniform Delay [s]	22.71	22.84	21.75	20.20	22.19	45.03	48.34	13.01	47.24	47.38	47.24
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.50	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.08	1.15	0.64	0.07	0.84	0.28	6.33	0.28	159.12	2.73	2.57
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.30	0.31	0.20	0.03	0.25	0.09	0.76	0.13	1.32	0.57	0.54
d, Delay for Lane Group [s/veh]	23.79	23.99	22.39	20.27	23.03	45.31	54.67	13.30	206.36	50.10	49.81
Lane Group LOS	C	C	C	C	C	D	D	B	F	D	D
Critical Lane Group	No	Yes	No	No	Yes	No	Yes	No	No	No	No
50th-Percentile Queue Length [veh/ln]	4.00	4.20	2.58	0.30	3.23	0.28	4.09	1.62	6.66	2.89	2.60
50th-Percentile Queue Length [ft/ln]	100.06	105.10	64.40	7.38	80.82	7.09	102.20	40.38	166.42	72.30	64.92
95th-Percentile Queue Length [veh/ln]	7.20	7.57	4.64	0.53	5.82	0.51	7.36	2.91	11.87	5.21	4.67
95th-Percentile Queue Length [ft/ln]	180.11	189.17	115.92	13.29	145.48	12.76	183.95	72.69	296.77	130.13	116.85

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	23.80	23.99	22.39	20.27	23.03	23.03	45.31	54.67	13.30	206.36	50.02	49.81
Movement LOS	C	C	C	C	C	C	D	D	B	F	D	D
d_A, Approach Delay [s/veh]	23.52			22.77			35.63			110.12		
Approach LOS	C			C			D			F		
d_I, Intersection Delay [s/veh]	46.21											
Intersection LOS	D											
Intersection V/C	0.334											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.55	44.55	44.55	44.55
I_p,int, Pedestrian LOS Score for Intersection	2.556	2.115	2.446	2.294
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	636	473	673	673
d_b, Bicycle Delay [s]	25.57	32.07	24.22	24.22
I_b,int, Bicycle LOS Score for Intersection	2.523	1.883	2.017	1.828
Bicycle LOS	B	A	B	A

Sequence

Ring 1	2	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 27: Lemon Street at Fullerton College Drive

Control Type:	Signalized	Delay (sec / veh):	208.0
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.286

Intersection Setup

Name	Lemon Street			Lemon Street			Fullerton College Drive			Fullerton College Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	↑			↵ ↑			↵↑↑			↑↑		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			Yes		

Volumes

Name	Lemon Street			Lemon Street			Fullerton College Drive			Fullerton College Drive		
Base Volume Input [veh/h]	0	348	12	26	410	0	123	2	191	264	0	33
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	348	12	26	410	0	123	2	191	264	0	33
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	87	3	7	103	0	31	1	48	66	0	8
Total Analysis Volume [veh/h]	0	348	12	26	410	0	123	2	191	264	0	33
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	ProtPer	Permiss							
Signal group	0	2	0	1	6	0	0	8	0	4	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	Lead	-	-
Minimum Green [s]	0	6	0	6	6	0	0	6	0	6	0	0
Maximum Green [s]	0	30	0	30	30	0	0	30	0	30	0	0
Amber [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0
All red [s]	0.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0
Split [s]	0	34	0	10	44	0	0	66	0	66	0	0
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0
Walk [s]	0	7	0	0	7	0	0	0	0	7	0	0
Pedestrian Clearance [s]	0	13	0	0	14	0	0	0	0	16	0	0
Rest In Walk		No			No			No		No		
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0
Minimum Recall		No		No	No			No		No		
Maximum Recall		No		No	No			No		No		
Pedestrian Recall		No		No	No			No		No		
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	L	C	L	R
C, Cycle Length [s]	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	2.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	80	80	88	88	14	14	14	14
g / C, Green / Cycle	0.73	0.73	0.80	0.80	0.13	0.13	0.13	0.13
(v / s)_i Volume / Saturation Flow Rate	0.09	0.10	0.01	0.11	0.07	0.11	0.15	0.02
s, saturation flow rate [veh/h]	1900	1800	1800	3800	1800	1800	1800	1800
c, Capacity [veh/h]	1389	1316	1470	3032	269	266	83	233
d1, Uniform Delay [s]	4.39	4.42	2.28	2.52	44.73	46.68	43.69	42.45
k, delay calibration	0.50	0.50	0.11	0.50	0.11	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.19	0.22	0.00	0.09	1.21	3.77	991.98	0.28
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.13	0.14	0.02	0.14	0.46	0.73	3.19	0.14
d, Delay for Lane Group [s/veh]	4.59	4.64	2.29	2.61	45.94	50.45	1035.66	42.73
Lane Group LOS	A	A	A	A	D	D	F	D
Critical Lane Group	No	No	No	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	1.13	1.14	0.09	0.79	3.22	5.41	24.87	0.82
50th-Percentile Queue Length [ft/ln]	28.30	28.57	2.22	19.86	80.55	135.15	621.68	20.38
95th-Percentile Queue Length [veh/ln]	2.04	2.06	0.16	1.43	5.80	9.22	41.49	1.47
95th-Percentile Queue Length [ft/ln]	50.94	51.43	3.99	35.75	144.99	230.48	1037.28	36.68

Movement, Approach, & Intersection Results

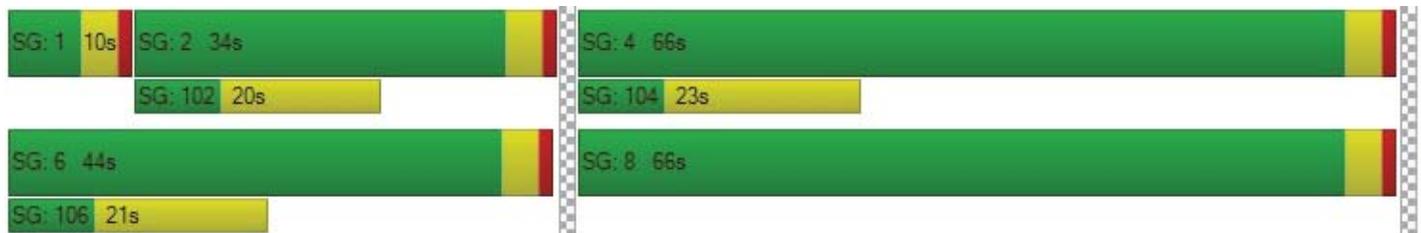
d_M, Delay for Movement [s/veh]	0.00	4.61	4.64	2.29	2.61	0.00	45.94	50.45	50.45	1035.66	0.00	42.73
Movement LOS		A	A	A	A		D	D	D	F		D
d_A, Approach Delay [s/veh]		4.61		2.59			48.70		925.33			
Approach LOS		A		A			D		F			
d_I, Intersection Delay [s/veh]	207.95											
Intersection LOS	F											
Intersection V/C	0.286											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	44.55	44.55	44.55
I_p,int, Pedestrian LOS Score for Intersection	0.000	2.668	1.878	2.087
Crosswalk LOS	F	B	A	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	545	727	1127	0
d_b, Bicycle Delay [s]	29.09	22.27	10.47	55.00
I_b,int, Bicycle LOS Score for Intersection	1.857	1.919	2.081	4.132
Bicycle LOS	A	A	B	D

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 28: Berkeley Avenue at College Driveway No. 1

Control Type:	Two-way stop	Delay (sec / veh):	13.5
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.120

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Base Volume Input [veh/h]	22	172	316	0	77	173
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	22	172	316	0	77	173
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	43	79	0	19	43
Total Analysis Volume [veh/h]	22	172	316	0	77	173
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.00	0.00	0.00	0.12	0.24
d_M, Delay for Movement [s/veh]	7.95	0.00	0.00	0.00	13.45	12.83
Movement LOS	A	A	A	A	B	B
95th-Percentile Queue Length [veh/ln]	0.05	0.00	0.00	0.00	1.63	1.63
95th-Percentile Queue Length [ft/ln]	1.35	0.00	0.00	0.00	40.73	40.73
d_A, Approach Delay [s/veh]	0.90		0.00		13.02	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	4.51					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 29: Berkeley Avenue at College Driveway No. 2

Control Type:	Two-way stop	Delay (sec / veh):	13.7
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.281

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Base Volume Input [veh/h]	21	189	493	0	0	162
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	21	189	493	0	0	162
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	47	123	0	0	41
Total Analysis Volume [veh/h]	21	189	493	0	0	162
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.00	0.00	0.00	0.00	0.28
d_M, Delay for Movement [s/veh]	8.43	0.00	0.00	0.00	14.02	13.68
Movement LOS	A	A	A	A	B	B
95th-Percentile Queue Length [veh/ln]	0.06	0.00	0.00	0.00	1.15	1.15
95th-Percentile Queue Length [ft/ln]	1.50	0.00	0.00	0.00	28.71	28.71
d_A, Approach Delay [s/veh]	0.84		0.00		13.68	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	2.77					
Intersection LOS	B					

APPENDIX D-V

**EXISTING PLUS PROJECT WITH IMPROVEMENTS
FRIDAY DEPARTURE PEAK HOUR
TRAFFIC CONDITIONS**

Intersection Level Of Service Report
Intersection 27: Lemon Street at Fullerton College Drive

Control Type:	Signalized	Delay (sec / veh):	12.9
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.309

Intersection Setup

Name	Lemon Street			Lemon Street			Fullerton College Drive			Fullerton College Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			Yes		

Volumes

Name	Lemon Street			Lemon Street			Fullerton College Drive			Fullerton College Drive		
Base Volume Input [veh/h]	0	348	12	26	410	0	123	2	191	264	0	33
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	348	12	26	410	0	123	2	191	264	0	33
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	87	3	7	103	0	31	1	48	66	0	8
Total Analysis Volume [veh/h]	0	348	12	26	410	0	123	2	191	264	0	33
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	45
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Permiss											
Signal Group	0	2	0	1	6	0	0	8	0	4	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	0	6	0	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	30	0	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0
Split [s]	0	15	0	0	15	0	0	30	0	30	0	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0
Walk [s]	0	7	0	0	7	0	0	0	0	7	0	0
Pedestrian Clearance [s]	0	3	0	0	4	0	0	0	0	5	0	0
Rest In Walk		No			No			No		No		
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0
Minimum Recall		No			No			No		No		
Maximum Recall		No			No			No		No		
Pedestrian Recall		No			No			No		No		
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	L	C	L	R
C, Cycle Length [s]	45	45	45	45	45	45	45	45
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	2.00	0.00	2.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	29	29	29	29	9	9	9	9
g / C, Green / Cycle	0.63	0.63	0.63	0.63	0.19	0.19	0.19	0.19
(v / s)_i Volume / Saturation Flow Rate	0.09	0.10	0.01	0.11	0.07	0.11	0.15	0.02
s, saturation flow rate [veh/h]	1900	1800	1800	3800	1800	1800	1800	1800
c, Capacity [veh/h]	1199	1136	1133	2397	443	425	273	346
d1, Uniform Delay [s]	3.40	3.42	3.12	3.45	15.83	16.52	17.28	15.02
k, delay calibration	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.27	0.30	0.04	0.15	0.34	0.76	18.60	0.12
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.15	0.16	0.02	0.17	0.28	0.45	0.97	0.10
d, Delay for Lane Group [s/veh]	3.66	3.72	3.16	3.60	16.16	17.27	35.88	15.14
Lane Group LOS	A	A	A	A	B	B	D	B
Critical Lane Group	No	No	No	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.43	0.44	0.06	0.45	1.00	1.66	3.65	0.26
50th-Percentile Queue Length [ft/ln]	10.77	10.97	1.43	11.19	24.98	41.45	91.37	6.38
95th-Percentile Queue Length [veh/ln]	0.78	0.79	0.10	0.81	1.80	2.98	6.58	0.46
95th-Percentile Queue Length [ft/ln]	19.39	19.75	2.57	20.14	44.97	74.61	164.47	11.49

Movement, Approach, & Intersection Results

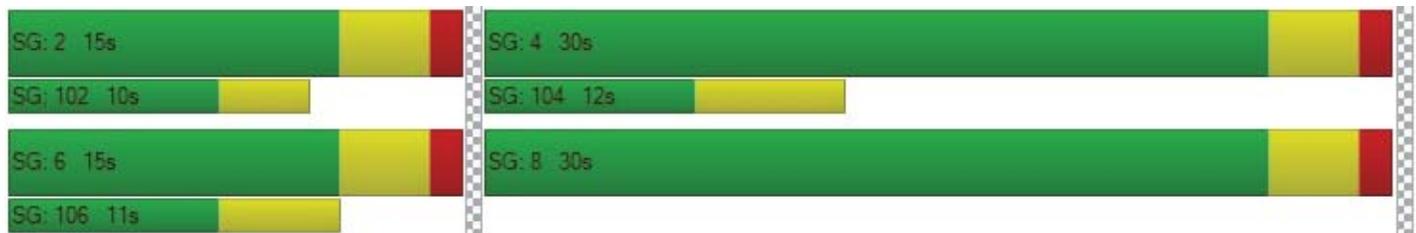
d_M, Delay for Movement [s/veh]	0.00	3.69	3.72	3.16	3.60	0.00	16.16	17.27	17.27	35.88	0.00	15.14
Movement LOS		A	A	A	A		B	B	B	D		B
d_A, Approach Delay [s/veh]		3.69		3.58			16.84		33.58			
Approach LOS		A		A			B		C			
d_I, Intersection Delay [s/veh]	12.91											
Intersection LOS	B											
Intersection V/C	0.309											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	12.84	12.84	12.84
I_p,int, Pedestrian LOS Score for Intersection	0.000	2.618	1.829	2.046
Crosswalk LOS	F	B	A	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	489	489	1156	0
d_b, Bicycle Delay [s]	12.84	12.84	4.01	22.50
I_b,int, Bicycle LOS Score for Intersection	1.857	1.919	2.081	4.132
Bicycle LOS	A	A	B	D

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



APPENDIX E

YEAR 2020 CUMULATIVE PLUS ALTERNATIVE PROJECT TRAFFIC CONDITIONS INTERSECTION LEVEL OF SERVICE CALCULATION WORKSHEETS (FRIDAY FIELD EVENT ANALYSIS)

APPENDIX E-1

**YEAR 2020 CUMULATIVE
FRIDAY ARRIVAL PEAK HOUR
TRAFFIC CONDITIONS**

Intersection Level Of Service Report
Intersection 4: Lemon Street at Berkeley Avenue

Control Type:	Signalized	Delay (sec / veh):	51.1
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.467

Intersection Setup

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	⇐⇐⇐			⇐⇐			⇐⇐⇐			⇐⇐		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Base Volume Input [veh/h]	236	277	82	63	249	23	106	211	10	120	312	70
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	236	277	82	63	249	23	106	211	10	120	312	70
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	59	69	21	16	62	6	27	53	3	30	78	18
Total Analysis Volume [veh/h]	236	277	82	63	249	23	106	211	10	120	312	70
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Permiss	Permiss	Overlap	Permiss	Permiss	Permiss
Signal group	0	2	0	0	6	0	0	8	8	0	4	0
Auxiliary Signal Groups									2,8			
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	6	0	6	0
Maximum Green [s]	0	30	0	0	30	0	0	30	30	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	32	0	0	32	0	0	46	46	0	46	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	20	0	0	19	0	0	16	16	0	12	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall		No			No			No	No		No	
Maximum Recall		No			No			No	No		No	
Pedestrian Recall		No			No			No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	42	42	42	42	42	15	15	60	15	15	15
g / C, Green / Cycle	0.38	0.38	0.38	0.38	0.38	0.13	0.13	0.55	0.13	0.13	0.13
(v / s)_i Volume / Saturation Flow Rate	0.13	0.15	0.05	0.04	0.15	0.06	0.11	0.01	0.07	0.11	0.10
s, saturation flow rate [veh/h]	1800	1800	1800	1800	1800	1800	1900	1800	1800	1900	1800
c, Capacity [veh/h]	683	683	683	683	683	101	251	986	91	251	238
d1, Uniform Delay [s]	24.36	25.02	22.18	21.94	24.94	43.83	46.53	11.29	43.57	46.26	45.99
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.50	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.39	1.79	0.36	0.27	1.74	54.82	7.35	0.02	157.85	5.81	4.95
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.35	0.41	0.12	0.09	0.40	1.05	0.84	0.01	1.32	0.80	0.76
d, Delay for Lane Group [s/veh]	25.75	26.81	22.54	22.20	26.67	98.64	53.88	11.31	201.43	52.06	50.93
Lane Group LOS	C	C	C	C	C	F	D	B	F	D	D
Critical Lane Group	No	Yes	No	No	Yes	No	Yes	No	No	No	No
50th-Percentile Queue Length [veh/ln]	4.63	5.60	1.45	1.10	5.48	4.07	6.12	0.11	6.27	5.72	5.08
50th-Percentile Queue Length [ft/ln]	115.67	139.97	36.21	27.49	136.93	101.77	153.01	2.87	156.78	142.91	127.02
95th-Percentile Queue Length [veh/ln]	8.15	9.48	2.61	1.98	9.32	7.33	10.18	0.21	11.29	9.64	8.78
95th-Percentile Queue Length [ft/ln]	203.86	236.99	65.18	49.49	232.88	183.19	254.44	5.17	282.20	240.93	219.43

Movement, Approach, & Intersection Results

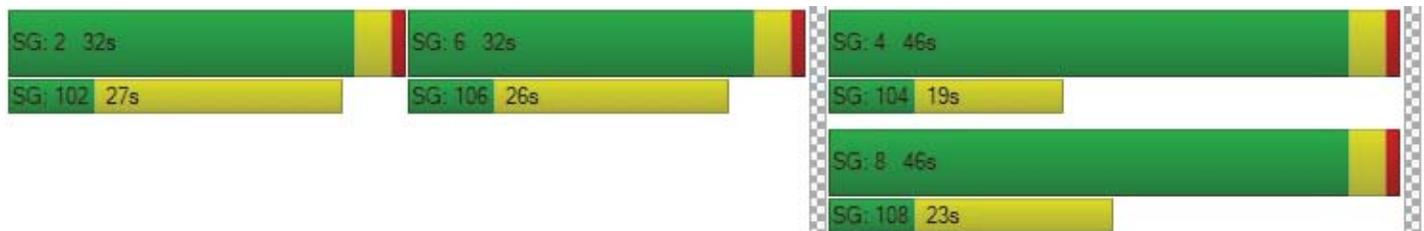
d_M, Delay for Movement [s/veh]	25.75	26.81	22.54	22.20	26.67	26.67	98.64	53.88	11.31	201.43	51.66	50.93
Movement LOS	C	C	C	C	C	C	F	D	B	F	D	D
d_A, Approach Delay [s/veh]	25.80			25.83			67.09			87.36		
Approach LOS	C			C			E			F		
d_I, Intersection Delay [s/veh]	51.05											
Intersection LOS	D											
Intersection V/C	0.467											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	44.55			44.55			44.55			44.55		
l_p,int, Pedestrian LOS Score for Intersection	2.549			2.357			2.485			2.350		
Crosswalk LOS	B			B			B			B		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	509			509			764			764		
d_b, Bicycle Delay [s]	30.56			30.56			21.02			21.02		
l_b,int, Bicycle LOS Score for Intersection	2.541			2.112			2.099			1.974		
Bicycle LOS	B			B			B			A		

Sequence

Ring 1	2	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 27: Lemon Street at Fullerton College Drive

Control Type:	Signalized	Delay (sec / veh):	12.9
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.316

Intersection Setup

Name	Lemon Street			Lemon Street			Fullerton College Drive			Fullerton College Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			Yes		

Volumes

Name	Lemon Street			Lemon Street			Fullerton College Drive			Fullerton College Drive		
Base Volume Input [veh/h]	0	623	46	89	453	0	92	37	113	40	0	19
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	623	46	89	453	0	92	37	113	40	0	19
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	156	12	22	113	0	23	9	28	10	0	5
Total Analysis Volume [veh/h]	0	623	46	89	453	0	92	37	113	40	0	19
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	ProtPer	Permiss							
Signal group	0	2	0	1	6	0	0	8	0	4	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	Lead	-	-
Minimum Green [s]	0	6	0	6	6	0	0	6	0	6	0	0
Maximum Green [s]	0	30	0	30	30	0	0	30	0	30	0	0
Amber [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0
All red [s]	0.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0
Split [s]	0	37	0	10	47	0	0	63	0	63	0	0
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0
Walk [s]	0	7	0	0	7	0	0	0	0	7	0	0
Pedestrian Clearance [s]	0	13	0	0	14	0	0	0	0	16	0	0
Rest In Walk		No			No			No		No		
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0
Minimum Recall		No		No	No			No		No		
Maximum Recall		No		No	No			No		No		
Pedestrian Recall		No		No	No			No		No		
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	L	C	L	R
C, Cycle Length [s]	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	2.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	81	81	91	91	11	11	11	11
g / C, Green / Cycle	0.74	0.74	0.82	0.82	0.10	0.10	0.10	0.10
(v / s)_i Volume / Saturation Flow Rate	0.18	0.19	0.05	0.12	0.05	0.08	0.02	0.01
s, saturation flow rate [veh/h]	1900	1800	1800	3800	1800	1800	1800	1800
c, Capacity [veh/h]	1396	1323	1455	3127	223	221	78	188
d1, Uniform Delay [s]	4.70	4.75	1.81	1.96	46.49	48.12	45.11	44.58
k, delay calibration	0.50	0.50	0.11	0.50	0.11	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.41	0.46	0.02	0.10	1.22	3.66	5.06	0.23
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.24	0.25	0.06	0.14	0.41	0.68	0.51	0.10
d, Delay for Lane Group [s/veh]	5.10	5.21	1.83	2.06	47.71	51.78	50.17	44.81
Lane Group LOS	A	A	A	A	D	D	D	D
Critical Lane Group	No	Yes	Yes	No	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.27	2.31	0.24	0.69	2.45	4.23	1.11	0.48
50th-Percentile Queue Length [ft/ln]	56.75	57.67	6.08	17.28	61.23	105.76	27.79	12.06
95th-Percentile Queue Length [veh/ln]	4.09	4.15	0.44	1.24	4.41	7.60	2.00	0.87
95th-Percentile Queue Length [ft/ln]	102.14	103.81	10.95	31.10	110.22	190.08	50.02	21.70

Movement, Approach, & Intersection Results

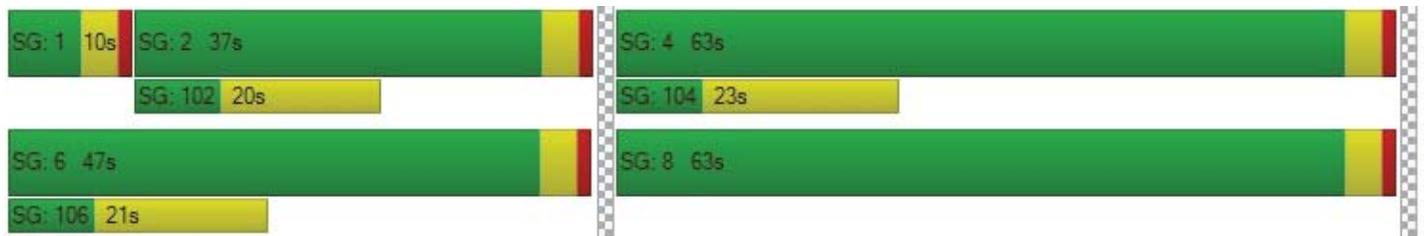
d_M, Delay for Movement [s/veh]	0.00	5.15	5.21	1.83	2.06	0.00	47.71	51.78	51.78	50.17	0.00	44.81
Movement LOS		A	A	A	A		D	D	D	D		D
d_A, Approach Delay [s/veh]		5.16		2.02			50.23		48.44			
Approach LOS		A		A			D		D			
d_I, Intersection Delay [s/veh]	12.93											
Intersection LOS	B											
Intersection V/C	0.316											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0		11.0		11.0		11.0		11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00		0.00		0.00		0.00		0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00		0.00		0.00		0.00		0.00
d_p, Pedestrian Delay [s]	0.00		44.55		44.55		44.55		44.55
I_p,int, Pedestrian LOS Score for Intersection	0.000		2.689		1.842		2.120		
Crosswalk LOS	F		B		A		B		
s_b, Saturation Flow Rate of the bicycle lane	2000		2000		2000		2000		2000
c_b, Capacity of the bicycle lane [bicycles/h]	600		782		1073		0		
d_b, Bicycle Delay [s]	26.95		20.40		11.82		55.00		
I_b,int, Bicycle LOS Score for Intersection	2.112		2.007		1.959		4.132		
Bicycle LOS	B		B		A		D		

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



**Intersection Level Of Service Report
Intersection 28: Berkeley Avenue at College Driveway No. 1**

Control Type:	Two-way stop	Delay (sec / veh):	11.2
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.007

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Base Volume Input [veh/h]	10	392	237	0	4	13
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	10	392	237	0	4	13
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	98	59	0	1	3
Total Analysis Volume [veh/h]	10	392	237	0	4	13
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.01	0.02
d_M, Delay for Movement [s/veh]	7.73	0.00	0.00	0.00	11.25	9.60
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh/ln]	0.02	0.00	0.00	0.00	0.07	0.07
95th-Percentile Queue Length [ft/ln]	0.57	0.00	0.00	0.00	1.77	1.77
d_A, Approach Delay [s/veh]	0.19		0.00		9.99	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.38					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 29: Berkeley Avenue at College Driveway No. 2

Control Type:	Two-way stop	Delay (sec / veh):	11.9
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.009

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Base Volume Input [veh/h]	32	431	242	0	5	19
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	32	431	242	0	5	19
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	108	61	0	1	5
Total Analysis Volume [veh/h]	32	431	242	0	5	19
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.00	0.00	0.00	0.01	0.02
d_M, Delay for Movement [s/veh]	7.79	0.00	0.00	0.00	11.90	9.69
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh/ln]	0.07	0.00	0.00	0.00	0.10	0.10
95th-Percentile Queue Length [ft/ln]	1.86	0.00	0.00	0.00	2.57	2.57
d_A, Approach Delay [s/veh]	0.54		0.00		10.15	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	0.68					
Intersection LOS	B					

APPENDIX E-II

**YEAR 2020 CUMULATIVE
FRIDAY DEPARTURE PEAK HOUR
TRAFFIC CONDITIONS**

Intersection Level Of Service Report
Intersection 4: Lemon Street at Berkeley Avenue

Control Type:	Signalized	Delay (sec / veh):	32.1
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.326

Intersection Setup

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	⇐⇐⇐			⇐⇐			⇐⇐⇐			⇐⇐		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Base Volume Input [veh/h]	203	206	146	18	142	37	11	142	126	80	132	51
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	203	206	146	18	142	37	11	142	126	80	132	51
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	51	52	37	5	36	9	3	36	32	20	33	13
Total Analysis Volume [veh/h]	203	206	146	18	142	37	11	142	126	80	132	51
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Permiss	Permiss	Overlap	Permiss	Permiss	Permiss
Signal group	0	2	0	0	6	0	0	8	8	0	4	0
Auxiliary Signal Groups									2,8			
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	6	0	6	0
Maximum Green [s]	0	30	0	0	30	0	0	30	30	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	37	0	0	33	0	0	40	40	0	40	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	20	0	0	19	0	0	16	16	0	12	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall		No			No			No	No		No	
Maximum Recall		No			No			No	No		No	
Pedestrian Recall		No			No			No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	44	44	44	44	44	11	11	58	11	11	11
g / C, Green / Cycle	0.40	0.40	0.40	0.40	0.40	0.10	0.10	0.53	0.10	0.10	0.10
(v / s)_i Volume / Saturation Flow Rate	0.11	0.12	0.08	0.01	0.10	0.01	0.07	0.07	0.04	0.05	0.05
s, saturation flow rate [veh/h]	1800	1800	1800	1800	1800	1800	1900	1800	1800	1900	1800
c, Capacity [veh/h]	714	714	714	714	714	137	186	955	95	186	176
d1, Uniform Delay [s]	22.51	22.65	21.78	20.22	22.23	44.97	48.31	13.00	46.78	47.08	46.96
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.50	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.98	1.04	0.65	0.07	0.84	0.25	6.34	0.29	17.68	2.21	2.12
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.28	0.29	0.20	0.03	0.25	0.08	0.76	0.13	0.84	0.52	0.49
d, Delay for Lane Group [s/veh]	23.49	23.69	22.43	20.28	23.07	45.22	54.64	13.29	64.45	49.29	49.08
Lane Group LOS	C	C	C	C	C	D	D	B	E	D	D
Critical Lane Group	No	Yes	No	No	Yes	No	Yes	No	No	No	No
50th-Percentile Queue Length [veh/ln]	3.68	3.89	2.60	0.30	3.26	0.28	4.12	1.63	2.53	2.61	2.36
50th-Percentile Queue Length [ft/ln]	92.08	97.17	64.92	7.39	81.38	7.06	102.90	40.70	63.31	65.34	58.92
95th-Percentile Queue Length [veh/ln]	6.63	7.00	4.67	0.53	5.86	0.51	7.41	2.93	4.56	4.70	4.24
95th-Percentile Queue Length [ft/ln]	165.75	174.90	116.86	13.29	146.48	12.72	185.22	73.26	113.95	117.61	106.06

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	23.49	23.69	22.43	20.28	23.07	23.07	45.22	54.64	13.29	64.45	49.23	49.08
Movement LOS	C	C	C	C	C	C	D	D	B	E	D	D
d_A, Approach Delay [s/veh]	23.29			22.81			35.60			53.83		
Approach LOS	C			C			D			D		
d_I, Intersection Delay [s/veh]	32.08											
Intersection LOS	C											
Intersection V/C	0.326											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.55	44.55	44.55	44.55
I_p,int, Pedestrian LOS Score for Intersection	2.475	2.117	2.436	2.279
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	600	527	655	655
d_b, Bicycle Delay [s]	26.95	29.82	24.89	24.89
I_b,int, Bicycle LOS Score for Intersection	2.475	1.885	2.020	1.777
Bicycle LOS	B	A	B	A

Sequence

Ring 1	2	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 27: Lemon Street at Fullerton College Drive

Control Type:	Signalized	Delay (sec / veh):	31.8
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.240

Intersection Setup

Name	Lemon Street			Lemon Street			Fullerton College Drive			Fullerton College Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			Yes		

Volumes

Name	Lemon Street			Lemon Street			Fullerton College Drive			Fullerton College Drive		
Base Volume Input [veh/h]	0	354	12	26	368	0	124	2	193	103	0	33
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	354	12	26	368	0	124	2	193	103	0	33
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	89	3	7	92	0	31	1	48	26	0	8
Total Analysis Volume [veh/h]	0	354	12	26	368	0	124	2	193	103	0	33
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	ProtPer	Permiss							
Signal group	0	2	0	1	6	0	0	8	0	4	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	Lead	-	-
Minimum Green [s]	0	6	0	6	6	0	0	6	0	6	0	0
Maximum Green [s]	0	30	0	30	30	0	0	30	0	30	0	0
Amber [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0
All red [s]	0.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0
Split [s]	0	53	0	10	63	0	0	47	0	47	0	0
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0
Walk [s]	0	7	0	0	7	0	0	0	0	7	0	0
Pedestrian Clearance [s]	0	13	0	0	14	0	0	0	0	16	0	0
Rest In Walk		No			No			No		No		
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0
Minimum Recall		No		No	No			No		No		
Maximum Recall		No		No	No			No		No		
Pedestrian Recall		No		No	No			No		No		
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	L	C	L	R
C, Cycle Length [s]	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	2.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	80	80	88	88	14	14	14	14
g / C, Green / Cycle	0.73	0.73	0.80	0.80	0.13	0.13	0.13	0.13
(v / s)_i Volume / Saturation Flow Rate	0.10	0.10	0.01	0.10	0.07	0.11	0.06	0.02
s, saturation flow rate [veh/h]	1900	1800	1800	3800	1800	1800	1800	1800
c, Capacity [veh/h]	1387	1314	1466	3029	269	267	81	234
d1, Uniform Delay [s]	4.44	4.47	2.30	2.51	44.68	46.65	43.56	42.38
k, delay calibration	0.50	0.50	0.11	0.50	0.11	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.20	0.22	0.00	0.08	1.23	3.82	141.11	0.27
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.13	0.14	0.02	0.12	0.46	0.73	1.27	0.14
d, Delay for Lane Group [s/veh]	4.64	4.69	2.30	2.59	45.91	50.47	184.67	42.65
Lane Group LOS	A	A	A	A	D	D	F	D
Critical Lane Group	No	Yes	Yes	No	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.16	1.17	0.09	0.71	3.25	5.46	5.19	0.81
50th-Percentile Queue Length [ft/ln]	29.00	29.28	2.23	17.75	81.17	136.61	129.73	20.35
95th-Percentile Queue Length [veh/ln]	2.09	2.11	0.16	1.28	5.84	9.30	9.34	1.47
95th-Percentile Queue Length [ft/ln]	52.20	52.71	4.02	31.94	146.11	232.45	233.52	36.63

Movement, Approach, & Intersection Results

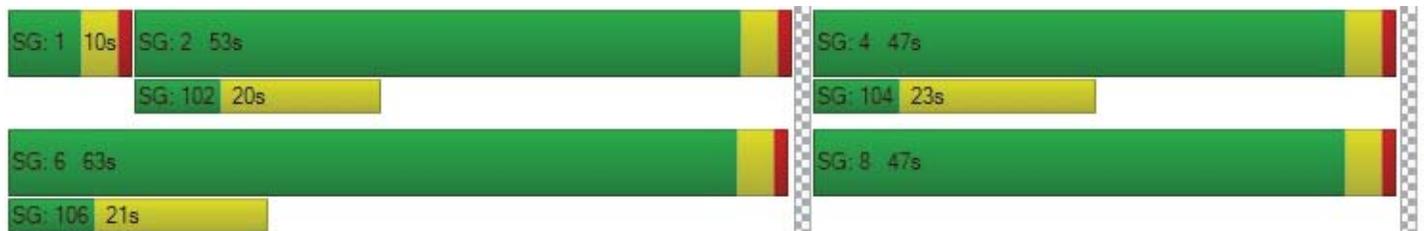
d_M, Delay for Movement [s/veh]	0.00	4.66	4.69	2.30	2.59	0.00	45.91	50.47	50.47	184.67	0.00	42.65
Movement LOS		A	A	A	A		D	D	D	F		D
d_A, Approach Delay [s/veh]		4.66		2.57			48.70		150.21			
Approach LOS		A		A			D		F			
d_I, Intersection Delay [s/veh]	31.84											
Intersection LOS	C											
Intersection V/C	0.240											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	44.55	44.55	44.55
I_p,int, Pedestrian LOS Score for Intersection	0.000	2.662	1.880	2.035
Crosswalk LOS	F	B	A	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	891	1073	782	0
d_b, Bicycle Delay [s]	16.91	11.82	20.40	55.00
I_b,int, Bicycle LOS Score for Intersection	1.862	1.885	2.086	4.132
Bicycle LOS	A	A	B	D

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 28: Berkeley Avenue at College Driveway No. 1

Control Type:	Two-way stop	Delay (sec / veh):	10.1
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.013

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Base Volume Input [veh/h]	5	179	217	0	9	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	5	179	217	0	9	1
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	45	54	0	2	0
Total Analysis Volume [veh/h]	5	179	217	0	9	1
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.01	0.00
d_M, Delay for Movement [s/veh]	7.67	0.00	0.00	0.00	10.11	9.44
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh/ln]	0.01	0.00	0.00	0.00	0.04	0.04
95th-Percentile Queue Length [ft/ln]	0.28	0.00	0.00	0.00	1.05	1.05
d_A, Approach Delay [s/veh]	0.21		0.00		10.05	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	0.34					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 29: Berkeley Avenue at College Driveway No. 2

Control Type:	Two-way stop	Delay (sec / veh):	9.6
Analysis Method:	HCM 6th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.034

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Base Volume Input [veh/h]	10	179	222	0	0	28
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	10	179	222	0	0	28
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	45	56	0	0	7
Total Analysis Volume [veh/h]	10	179	222	0	0	28
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.00	0.03
d_M, Delay for Movement [s/veh]	7.69	0.00	0.00	0.00	10.26	9.56
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh/ln]	0.02	0.00	0.00	0.00	0.11	0.11
95th-Percentile Queue Length [ft/ln]	0.56	0.00	0.00	0.00	2.66	2.66
d_A, Approach Delay [s/veh]	0.41		0.00		9.56	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.78					
Intersection LOS	A					

APPENDIX E-III

YEAR 2020 CUMULATIVE PLUS PROJECT
FRIDAY ARRIVAL PEAK HOUR
TRAFFIC CONDITIONS

Intersection Level Of Service Report
Intersection 4: Lemon Street at Berkeley Avenue

Control Type:	Signalized	Delay (sec / veh):	51.0
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.493

Intersection Setup

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	⇐⇐⇐			⇐⇐			⇐⇐⇐			⇐⇐		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Base Volume Input [veh/h]	244	277	121	63	249	23	106	255	10	131	317	70
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	244	277	121	63	249	23	106	255	10	131	317	70
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	61	69	30	16	62	6	27	64	3	33	79	18
Total Analysis Volume [veh/h]	244	277	121	63	249	23	106	255	10	131	317	70
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	111
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Permiss	Permiss	Overlap	Permiss	Permiss	Permiss
Signal Group	0	2	0	0	6	0	0	8	8	0	4	0
Auxiliary Signal Groups									2,8			
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	6	0	6	0
Maximum Green [s]	0	30	0	0	30	0	0	30	30	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	31	0	0	53	0	0	27	27	0	27	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	20	0	0	19	0	0	16	16	0	12	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall		No			No			No	No		No	
Maximum Recall		No			No			No	No		No	
Pedestrian Recall		No			No			No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Cycle Length [s]	111	111	111	111	111	111	111	111	111	111	111
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	41	41	41	41	41	17	17	62	17	17	17
g / C, Green / Cycle	0.37	0.37	0.37	0.37	0.37	0.15	0.15	0.56	0.15	0.15	0.15
(v / s)_i Volume / Saturation Flow Rate	0.14	0.15	0.07	0.04	0.15	0.06	0.13	0.01	0.07	0.11	0.10
s, saturation flow rate [veh/h]	1800	1800	1800	1800	1800	1800	1900	1800	1800	1900	1800
c, Capacity [veh/h]	662	662	662	662	662	145	296	1008	92	296	280
d1, Uniform Delay [s]	25.58	26.14	23.71	22.92	26.05	41.94	45.58	10.79	41.60	44.20	43.94
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.50	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.58	1.94	0.61	0.29	1.88	6.89	7.35	0.02	201.64	2.85	2.58
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.37	0.42	0.18	0.10	0.41	0.73	0.86	0.01	1.42	0.69	0.65
d, Delay for Lane Group [s/veh]	27.16	28.07	24.31	23.20	27.93	48.83	52.94	10.81	243.24	47.06	46.52
Lane Group LOS	C	C	C	C	C	D	D	B	F	D	D
Critical Lane Group	No	Yes	No	No	Yes	No	Yes	No	No	No	No
50th-Percentile Queue Length [veh/ln]	4.97	5.78	2.26	1.13	5.65	2.88	7.42	0.11	7.43	5.51	4.92
50th-Percentile Queue Length [ft/ln]	124.15	144.50	56.51	28.35	141.35	72.09	185.47	2.81	185.63	137.82	123.09
95th-Percentile Queue Length [veh/ln]	8.62	9.72	4.07	2.04	9.55	5.19	11.89	0.20	13.37	9.36	8.56
95th-Percentile Queue Length [ft/ln]	215.51	243.07	101.72	51.03	238.84	129.76	297.14	5.06	334.13	234.09	214.06

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	27.16	28.07	24.31	23.20	27.93	27.93	48.83	52.94	10.81	243.24	46.87	46.52
Movement LOS	C	C	C	C	C	C	D	D	B	F	D	D
d_A, Approach Delay [s/veh]	27.02			27.04			50.63			96.48		
Approach LOS	C			C			D			F		
d_I, Intersection Delay [s/veh]	51.00											
Intersection LOS	D											
Intersection V/C	0.493											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	45.05	45.05	45.05	45.05
I_p,int, Pedestrian LOS Score for Intersection	2.579	2.357	2.496	2.374
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	486	883	414	414
d_b, Bicycle Delay [s]	31.78	17.32	34.88	34.88
I_b,int, Bicycle LOS Score for Intersection	2.619	2.112	2.172	1.987
Bicycle LOS	B	B	B	A

Sequence

Ring 1	2	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 27: Lemon Street at Fullerton College Drive

Control Type:	Signalized	Delay (sec / veh):	15.0
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.371

Intersection Setup

Name	Lemon Street			Lemon Street			Fullerton College Drive			Fullerton College Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			Yes		

Volumes

Name	Lemon Street			Lemon Street			Fullerton College Drive			Fullerton College Drive		
Base Volume Input [veh/h]	0	801	46	89	464	0	92	37	113	78	0	19
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	801	46	89	464	0	92	37	113	78	0	19
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	200	12	22	116	0	23	9	28	20	0	5
Total Analysis Volume [veh/h]	0	801	46	89	464	0	92	37	113	78	0	19
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	ProtPer	Permiss							
Signal Group	0	2	0	1	6	0	0	8	0	4	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	Lead	-	-
Minimum Green [s]	0	6	0	6	6	0	0	6	0	6	0	0
Maximum Green [s]	0	30	0	30	30	0	0	30	0	30	0	0
Amber [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0
All red [s]	0.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0
Split [s]	0	54	0	10	64	0	0	46	0	46	0	0
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0
Walk [s]	0	7	0	0	7	0	0	0	0	7	0	0
Pedestrian Clearance [s]	0	13	0	0	14	0	0	0	0	16	0	0
Rest In Walk		No			No			No		No		
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0
Minimum Recall		No		No	No			No		No		
Maximum Recall		No		No	No			No		No		
Pedestrian Recall		No		No	No			No		No		
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	L	C	L	R
C, Cycle Length [s]	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	2.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	81	81	91	91	11	11	11	11
g / C, Green / Cycle	0.74	0.74	0.82	0.82	0.10	0.10	0.10	0.10
(v / s)_i Volume / Saturation Flow Rate	0.22	0.24	0.05	0.12	0.05	0.08	0.04	0.01
s, saturation flow rate [veh/h]	1900	1800	1800	3800	1800	1800	1800	1800
c, Capacity [veh/h]	1396	1323	1417	3127	223	220	79	188
d1, Uniform Delay [s]	4.98	5.06	1.81	1.96	46.49	48.13	46.11	44.59
k, delay calibration	0.50	0.50	0.11	0.50	0.11	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.56	0.64	0.02	0.10	1.22	3.66	45.39	0.23
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.30	0.32	0.06	0.15	0.41	0.68	0.99	0.10
d, Delay for Lane Group [s/veh]	5.54	5.70	1.83	2.06	47.71	51.79	91.51	44.82
Lane Group LOS	A	A	A	A	D	D	F	D
Critical Lane Group	No	Yes	Yes	No	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	3.05	3.12	0.24	0.71	2.45	4.23	2.99	0.48
50th-Percentile Queue Length [ft/ln]	76.30	77.89	6.08	17.74	61.24	105.77	74.68	12.06
95th-Percentile Queue Length [veh/ln]	5.49	5.61	0.44	1.28	4.41	7.60	5.38	0.87
95th-Percentile Queue Length [ft/ln]	137.33	140.19	10.95	31.93	110.22	190.11	134.42	21.70

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	5.61	5.70	1.83	2.06	0.00	47.71	51.79	51.79	91.51	0.00	44.82
Movement LOS		A	A	A	A		D	D	D	F		D
d_A, Approach Delay [s/veh]		5.62			2.03			50.24			82.36	
Approach LOS		A			A			D			F	
d_I, Intersection Delay [s/veh]		14.97										
Intersection LOS		B										
Intersection V/C		0.371										

Other Modes

g_Walk,mi, Effective Walk Time [s]		0.0			11.0			11.0			11.0	
M_corner, Corner Circulation Area [ft ² /ped]		0.00			0.00			0.00			0.00	
M_CW, Crosswalk Circulation Area [ft ² /ped]		0.00			0.00			0.00			0.00	
d_p, Pedestrian Delay [s]		0.00			44.55			44.55			44.55	
I_p,int, Pedestrian LOS Score for Intersection		0.000			2.726			1.842			2.133	
Crosswalk LOS		F			B			A			B	
s_b, Saturation Flow Rate of the bicycle lane		2000			2000			2000			2000	
c_b, Capacity of the bicycle lane [bicycles/h]		909			1091			764			0	
d_b, Bicycle Delay [s]		16.36			11.36			21.02			55.00	
I_b,int, Bicycle LOS Score for Intersection		2.258			2.016			1.959			4.132	
Bicycle LOS		B			B			A			D	

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 28: Berkeley Avenue at College Driveway No. 1

Control Type:	Two-way stop	Delay (sec / veh):	16.3
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.055

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Base Volume Input [veh/h]	205	392	260	0	19	51
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	205	392	260	0	19	51
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	51	98	65	0	5	13
Total Analysis Volume [veh/h]	205	392	260	0	19	51
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.16	0.00	0.00	0.00	0.06	0.07
d_M, Delay for Movement [s/veh]	8.27	0.00	0.00	0.00	16.32	10.47
Movement LOS	A	A	A	A	C	B
95th-Percentile Queue Length [veh/ln]	0.56	0.00	0.00	0.00	0.41	0.41
95th-Percentile Queue Length [ft/ln]	13.93	0.00	0.00	0.00	10.23	10.23
d_A, Approach Delay [s/veh]	2.84		0.00		12.06	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	2.74					
Intersection LOS	C					

Intersection Level Of Service Report
Intersection 29: Berkeley Avenue at College Driveway No. 2

Control Type:	Two-way stop	Delay (sec / veh):	17.7
Analysis Method:	HCM 6th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.017

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Base Volume Input [veh/h]	171	626	302	0	5	49
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	171	626	302	0	5	49
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	43	157	76	0	1	12
Total Analysis Volume [veh/h]	171	626	302	0	5	49
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.14	0.01	0.00	0.00	0.02	0.07
d_M, Delay for Movement [s/veh]	8.31	0.00	0.00	0.00	17.74	10.39
Movement LOS	A	A	A	A	C	B
95th-Percentile Queue Length [veh/ln]	0.47	0.00	0.00	0.00	0.27	0.27
95th-Percentile Queue Length [ft/ln]	11.75	0.00	0.00	0.00	6.80	6.80
d_A, Approach Delay [s/veh]	1.78		0.00		11.07	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	1.75					
Intersection LOS	C					

APPENDIX E-IV

**YEAR 2020 CUMULATIVE PLUS PROJECT
FRIDAY DEPARTURE PEAK HOUR
TRAFFIC CONDITIONS**

Intersection Level Of Service Report
Intersection 4: Lemon Street at Berkeley Avenue

Control Type:	Signalized	Delay (sec / veh):	47.6
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.340

Intersection Setup

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	⇌⇌⇌			⇌			⇌⇌⇌			⇌⇌		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Lemon Street			Lemon Street			Berkeley Avenue			Berkeley Avenue		
Base Volume Input [veh/h]	238	206	150	18	142	37	11	147	126	128	153	51
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	238	206	150	18	142	37	11	147	126	128	153	51
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	60	52	38	5	36	9	3	37	32	32	38	13
Total Analysis Volume [veh/h]	238	206	150	18	142	37	11	147	126	128	153	51
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Permiss	Permiss	Overlap	Permiss	Permiss	Permiss
Signal group	0	2	0	0	6	0	0	8	8	0	4	0
Auxiliary Signal Groups									2,8			
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	6	0	6	0
Maximum Green [s]	0	30	0	0	30	0	0	30	30	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	38	0	0	30	0	0	42	42	0	42	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	20	0	0	19	0	0	16	16	0	12	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall		No			No			No	No		No	
Maximum Recall		No			No			No	No		No	
Pedestrian Recall		No			No			No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	43	43	43	43	43	11	11	58	11	11	11
g / C, Green / Cycle	0.40	0.40	0.40	0.40	0.40	0.10	0.10	0.53	0.10	0.10	0.10
(v / s)_i Volume / Saturation Flow Rate	0.12	0.13	0.08	0.01	0.10	0.01	0.08	0.07	0.07	0.06	0.05
s, saturation flow rate [veh/h]	1800	1800	1800	1800	1800	1800	1900	1800	1800	1900	1800
c, Capacity [veh/h]	711	711	711	711	711	132	191	958	95	191	181
d1, Uniform Delay [s]	22.86	23.00	21.93	20.30	22.32	44.72	48.17	12.93	46.91	47.11	46.96
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.50	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.11	1.18	0.68	0.07	0.85	0.27	6.39	0.28	172.96	2.58	2.43
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.31	0.32	0.21	0.03	0.25	0.08	0.77	0.13	1.35	0.56	0.53
d, Delay for Lane Group [s/veh]	23.97	24.18	22.60	20.37	23.17	44.99	54.56	13.22	219.87	49.68	49.40
Lane Group LOS	C	C	C	C	C	D	D	B	F	D	D
Critical Lane Group	No	Yes	No	No	Yes	No	Yes	No	No	No	No
50th-Percentile Queue Length [veh/ln]	4.07	4.27	2.68	0.30	3.26	0.28	4.26	1.62	7.01	2.94	2.63
50th-Percentile Queue Length [ft/ln]	101.73	106.81	67.05	7.40	81.59	7.05	106.49	40.56	175.15	73.42	65.87
95th-Percentile Queue Length [veh/ln]	7.32	7.66	4.83	0.53	5.87	0.51	7.64	2.92	12.47	5.29	4.74
95th-Percentile Queue Length [ft/ln]	183.11	191.56	120.70	13.33	146.87	12.70	191.11	73.01	311.65	132.16	118.56

Movement, Approach, & Intersection Results

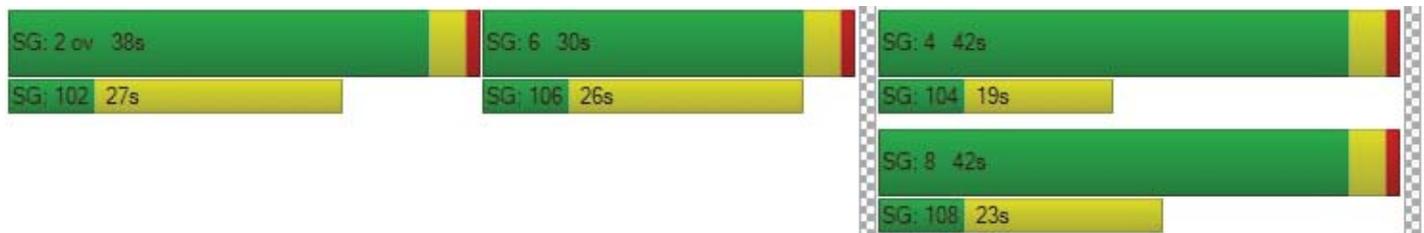
d_M, Delay for Movement [s/veh]	23.99	24.18	22.60	20.37	23.17	23.17	44.99	54.56	13.22	219.87	49.60	49.40
Movement LOS	C	C	C	C	C	C	D	D	B	F	D	D
d_A, Approach Delay [s/veh]	23.70			22.91			35.85			115.21		
Approach LOS	C			C			D			F		
d_I, Intersection Delay [s/veh]	47.64											
Intersection LOS	D											
Intersection V/C	0.340											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.55	44.55	44.55	44.55
l_p,int, Pedestrian LOS Score for Intersection	2.564	2.117	2.448	2.298
Crosswalk LOS	B	B	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	618	473	691	691
d_b, Bicycle Delay [s]	26.25	32.07	23.56	23.56
l_b,int, Bicycle LOS Score for Intersection	2.540	1.885	2.028	1.834
Bicycle LOS	B	A	B	A

Sequence

Ring 1	2	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 27: Lemon Street at Fullerton College Drive

Control Type:	Signalized	Delay (sec / veh):	219.6
Analysis Method:	HCM 6th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.297

Intersection Setup

Name	Lemon Street			Lemon Street			Fullerton College Drive			Fullerton College Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			Yes		

Volumes

Name	Lemon Street			Lemon Street			Fullerton College Drive			Fullerton College Drive		
Base Volume Input [veh/h]	0	374	12	26	416	0	124	2	193	276	0	33
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	374	12	26	416	0	124	2	193	276	0	33
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	94	3	7	104	0	31	1	48	69	0	8
Total Analysis Volume [veh/h]	0	374	12	26	416	0	124	2	193	276	0	33
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	ProtPer	Permiss							
Signal group	0	2	0	1	6	0	0	8	0	4	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	Lead	-	-
Minimum Green [s]	0	6	0	6	6	0	0	6	0	6	0	0
Maximum Green [s]	0	30	0	30	30	0	0	30	0	30	0	0
Amber [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0
All red [s]	0.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0
Split [s]	0	34	0	10	44	0	0	66	0	66	0	0
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0
Walk [s]	0	7	0	0	7	0	0	0	0	7	0	0
Pedestrian Clearance [s]	0	13	0	0	14	0	0	0	0	16	0	0
Rest In Walk		No			No			No		No		
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0
Minimum Recall		No		No	No			No		No		
Maximum Recall		No		No	No			No		No		
Pedestrian Recall		No		No	No			No		No		
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	L	C	L	R
C, Cycle Length [s]	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	2.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	80	80	88	88	14	14	14	14
g / C, Green / Cycle	0.73	0.73	0.80	0.80	0.13	0.13	0.13	0.13
(v / s)_i Volume / Saturation Flow Rate	0.10	0.11	0.01	0.11	0.07	0.11	0.15	0.02
s, saturation flow rate [veh/h]	1900	1800	1800	3800	1800	1800	1800	1800
c, Capacity [veh/h]	1387	1314	1463	3027	272	268	84	235
d1, Uniform Delay [s]	4.47	4.49	2.31	2.55	44.64	46.61	43.59	42.34
k, delay calibration	0.50	0.50	0.11	0.50	0.11	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.21	0.24	0.00	0.09	1.19	3.77	1042.97	0.27
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.14	0.15	0.02	0.14	0.46	0.73	3.30	0.14
d, Delay for Lane Group [s/veh]	4.68	4.73	2.31	2.65	45.83	50.38	1086.55	42.61
Lane Group LOS	A	A	A	A	D	D	F	D
Critical Lane Group	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	1.23	1.24	0.09	0.82	3.24	5.46	26.28	0.81
50th-Percentile Queue Length [ft/ln]	30.78	31.09	2.24	20.40	81.11	136.50	657.11	20.35
95th-Percentile Queue Length [veh/ln]	2.22	2.24	0.16	1.47	5.84	9.29	43.67	1.46
95th-Percentile Queue Length [ft/ln]	55.40	55.96	4.03	36.72	145.99	232.30	1091.72	36.62

Movement, Approach, & Intersection Results

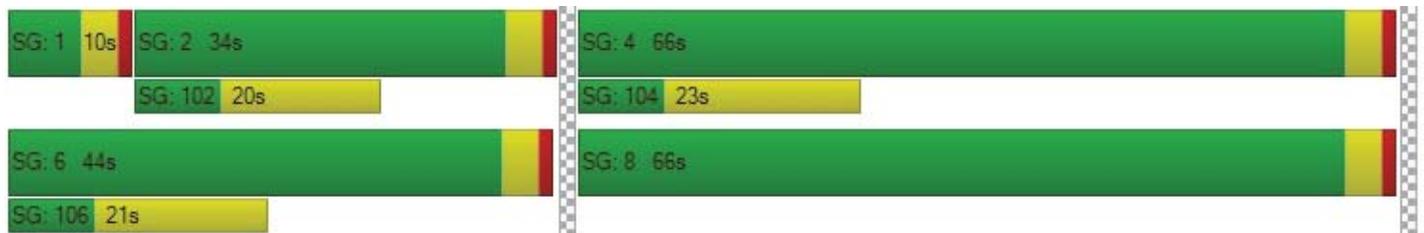
d_M, Delay for Movement [s/veh]	0.00	4.70	4.73	2.31	2.65	0.00	45.83	50.38	50.38	1086.55	0.00	42.61
Movement LOS		A	A	A	A		D	D	D	F		D
d_A, Approach Delay [s/veh]	4.70			2.63			48.61			975.06		
Approach LOS	A			A			D			F		
d_I, Intersection Delay [s/veh]	219.63											
Intersection LOS	F											
Intersection V/C	0.297											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	0.00			44.55			44.55			44.55		
I_p,int, Pedestrian LOS Score for Intersection	0.000			2.676			1.880			2.091		
Crosswalk LOS	F			B			A			B		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	545			727			1127			0		
d_b, Bicycle Delay [s]	29.09			22.27			10.47			55.00		
I_b,int, Bicycle LOS Score for Intersection	1.878			1.924			2.086			4.132		
Bicycle LOS	A			A			B			D		

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 28: Berkeley Avenue at College Driveway No. 1

Control Type:	Two-way stop	Delay (sec / veh):	13.7
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.123

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 1	
Base Volume Input [veh/h]	27	179	321	0	78	174
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	27	179	321	0	78	174
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	45	80	0	20	44
Total Analysis Volume [veh/h]	27	179	321	0	78	174
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.00	0.00	0.00	0.12	0.24
d_M, Delay for Movement [s/veh]	7.97	0.00	0.00	0.00	13.66	12.97
Movement LOS	A	A	A	A	B	B
95th-Percentile Queue Length [veh/ln]	0.07	0.00	0.00	0.00	1.67	1.67
95th-Percentile Queue Length [ft/ln]	1.67	0.00	0.00	0.00	41.84	41.84
d_A, Approach Delay [s/veh]	1.04		0.00		13.18	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	4.54					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 29: Berkeley Avenue at College Driveway No. 2

Control Type:	Two-way stop	Delay (sec / veh):	13.9
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.290

Intersection Setup

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Berkeley Avenue		Berkeley Avenue		College Driveway No. 2	
Base Volume Input [veh/h]	26	201	499	0	0	166
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	26	201	499	0	0	166
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	50	125	0	0	42
Total Analysis Volume [veh/h]	26	201	499	0	0	166
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			Yes
Number of Storage Spaces in Median	0	0	2

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.00	0.00	0.00	0.00	0.29
d_M, Delay for Movement [s/veh]	8.46	0.00	0.00	0.00	14.26	13.86
Movement LOS	A	A	A	A	B	B
95th-Percentile Queue Length [veh/ln]	0.08	0.00	0.00	0.00	1.20	1.20
95th-Percentile Queue Length [ft/ln]	1.88	0.00	0.00	0.00	29.99	29.99
d_A, Approach Delay [s/veh]	0.97		0.00		13.86	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	2.83					
Intersection LOS	B					

APPENDIX E-V

**YEAR 2020 CUMULATIVE PLUS PROJECT WITH IMPROVEMENTS
FRIDAY DEPARTURE PEAK HOUR TRAFFIC CONDITIONS**

Intersection Level Of Service Report
Intersection 27: Lemon Street at Fullerton College Drive

Control Type:	Signalized	Delay (sec / veh):	12.9
Analysis Method:	HCM 6th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.319

Intersection Setup

Name	Lemon Street			Lemon Street			Fullerton College Drive			Fullerton College Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			Yes			Yes			Yes		

Volumes

Name	Lemon Street			Lemon Street			Fullerton College Drive			Fullerton College Drive		
Base Volume Input [veh/h]	0	374	12	26	416	0	124	2	193	276	0	33
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	374	12	26	416	0	124	2	193	276	0	33
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	94	3	7	104	0	31	1	48	69	0	8
Total Analysis Volume [veh/h]	0	374	12	26	416	0	124	2	193	276	0	33
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	45
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Permiss											
Signal Group	0	2	0	1	6	0	0	8	0	4	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	0	6	0	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	30	0	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0
Split [s]	0	15	0	0	15	0	0	30	0	30	0	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0
Walk [s]	0	7	0	0	7	0	0	0	0	7	0	0
Pedestrian Clearance [s]	0	3	0	0	4	0	0	0	0	5	0	0
Rest In Walk		No			No			No		No		
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0
Minimum Recall		No			No			No		No		
Maximum Recall		No			No			No		No		
Pedestrian Recall		No			No			No		No		
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	L	C	L	R
C, Cycle Length [s]	45	45	45	45	45	45	45	45
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	2.00	0.00	2.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	28	28	28	28	9	9	9	9
g / C, Green / Cycle	0.63	0.63	0.63	0.63	0.20	0.20	0.20	0.20
(v / s)_i Volume / Saturation Flow Rate	0.10	0.11	0.01	0.11	0.07	0.11	0.15	0.02
s, saturation flow rate [veh/h]	1900	1800	1800	3800	1800	1800	1800	1800
c, Capacity [veh/h]	1185	1123	1113	2371	456	438	285	358
d1, Uniform Delay [s]	3.56	3.58	3.24	3.59	15.56	16.25	17.11	14.76
k, delay calibration	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.30	0.33	0.04	0.16	0.32	0.71	18.56	0.11
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.16	0.17	0.02	0.18	0.27	0.45	0.97	0.09
d, Delay for Lane Group [s/veh]	3.85	3.91	3.28	3.75	15.88	16.96	35.68	14.87
Lane Group LOS	A	A	A	A	B	B	D	B
Critical Lane Group	No	No	No	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.49	0.50	0.06	0.48	0.99	1.65	3.80	0.25
50th-Percentile Queue Length [ft/ln]	12.16	12.39	1.49	11.91	24.87	41.34	95.09	6.30
95th-Percentile Queue Length [veh/ln]	0.88	0.89	0.11	0.86	1.79	2.98	6.85	0.45
95th-Percentile Queue Length [ft/ln]	21.89	22.29	2.69	21.44	44.76	74.42	171.16	11.33

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	3.88	3.91	3.28	3.75	0.00	15.88	16.96	16.96	35.68	0.00	14.87
Movement LOS		A	A	A	A		B	B	B	D		B
d_A, Approach Delay [s/veh]		3.88		3.72			16.54		33.45			
Approach LOS		A		A			B		C			
d_I, Intersection Delay [s/veh]	12.88											
Intersection LOS	B											
Intersection V/C	0.319											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	12.84	12.84	12.84
I_p,int, Pedestrian LOS Score for Intersection	0.000	2.626	1.830	2.050
Crosswalk LOS	F	B	A	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	489	489	1156	0
d_b, Bicycle Delay [s]	12.84	12.84	4.01	22.50
I_b,int, Bicycle LOS Score for Intersection	1.878	1.924	2.086	4.132
Bicycle LOS	A	A	B	D

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



