Any design that does not meet Caltrans minimum Design Standards will need an "Exception to Design Standard" fact sheet.

Traffic Signal Warrants - Year 2025

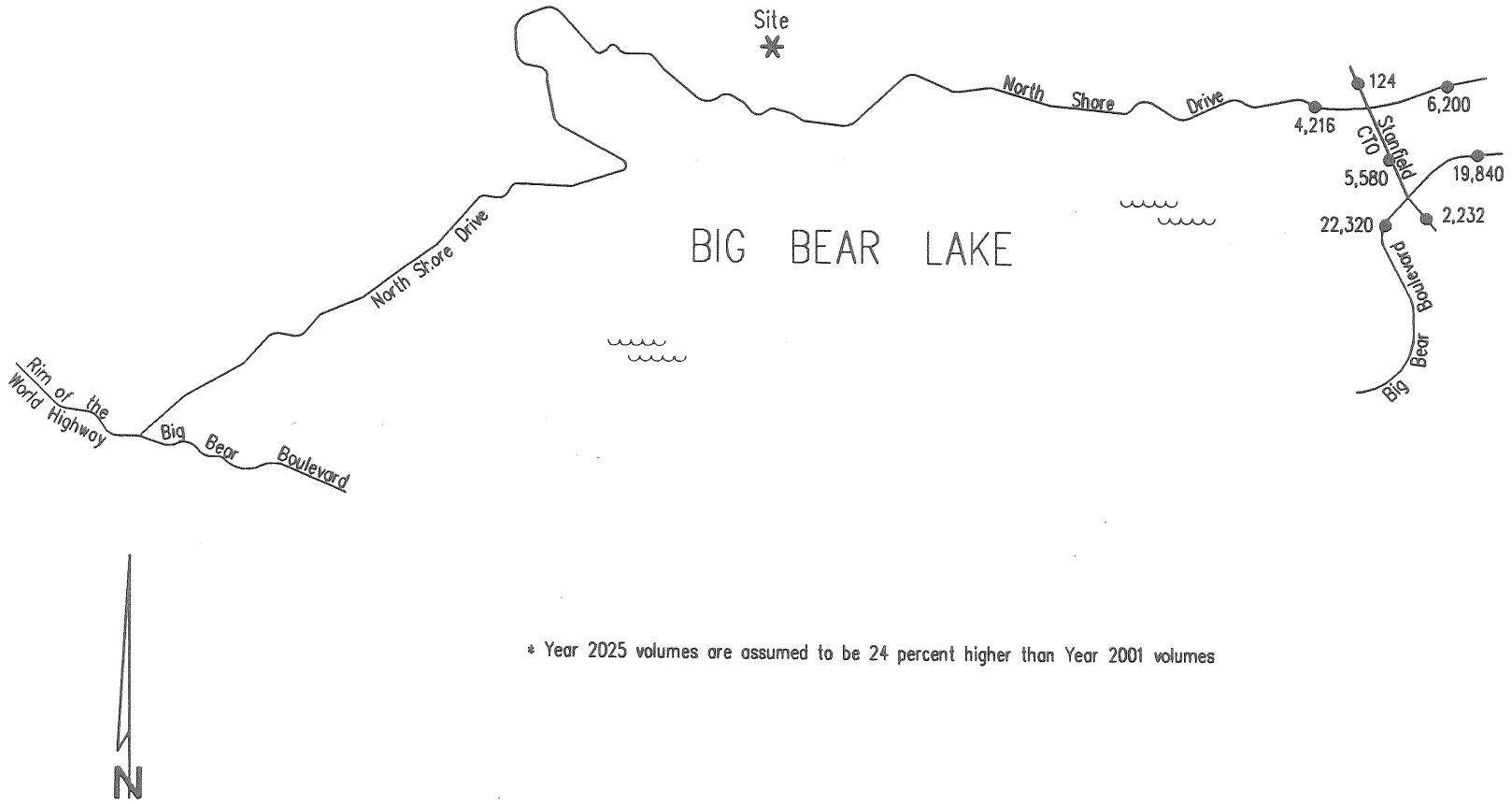
Traffic signals will be warranted at the intersections of Stanfield Cutoff and North Shore Drive based on Rural Warrants. The applicability of Rural Warrants was previously discussed.

Traffic signal warrants have been adopted by the Federal Highway Administration and CalTrans. These warrants are based upon the eight highest hour volumes in a day. It is assumed by CalTrans that the eighth highest hour is 62.5 percent of the peak hour, and the peak hour is generally 10 percent of the daily traffic. Thus, the signal warrants can also be expressed in terms of daily traffic volumes. Rural traffic volume warrants are utilized when the 85th percentile speed of the major street traffic exceeds 40 miles per hour or when the intersection lies within the built up area of an isolated community having a population of less than 10,000. Table 5 shows the signal warrants in terms of daily traffic volumes.

When calculating signal volume warrants, the volumes of both the major and minor street must meet or exceed those listed in Table 5. Determining the major street daily signal warrant volume involves calculating the number of daily vehicles approaching the intersection on both major street legs; usually the daily approach volume is 50 percent of the street's daily two-way volume on each leg. Finding the minor street daily signal warrant volume involves calculating the number of daily vehicles approaching the intersection on only the highest volume leg; usually the daily approach volume is 50 percent of the street's two-way daily volume. If the minor street forms a tee intersection with the major street, then the minor street volume is the highest volume because there is no other volume.

It should be noted that signals should be installed only when warranted and that installation of unwarranted signals can increase accident potential, energy consumption, and air pollutant emissions, while costing governmental jurisdictions approximately $500 per month for maintenance and utilities.

Figure 13
2025* Daily Traffic Volumes – Average Month



* Year 2025 volumes are assumed to be 24 percent higher than Year 2001 volumes

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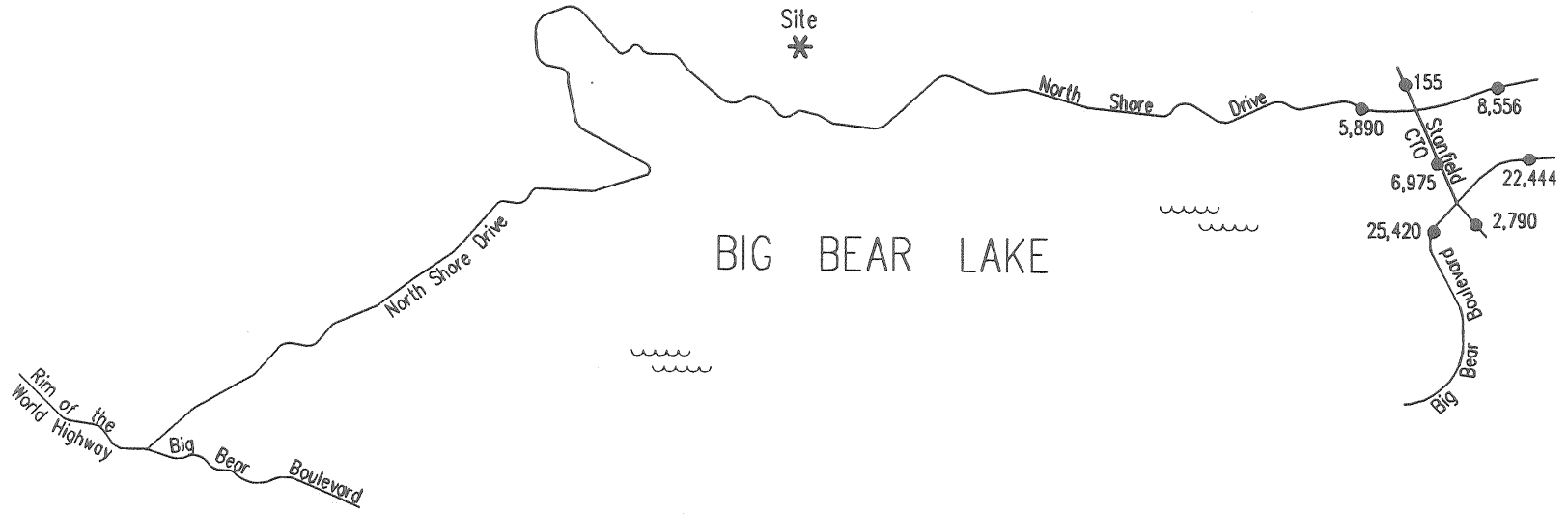
Figure 14
Year 2025 Daily Traffic Volumes – Peak Month*



* Peak month volumes are assumed to be 25 percent higher than average month

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10. Existing + Project + Other Development Traffic Conditions - Year 2025

Substantial additional development is presently planned in the vicinity of the site. To assess future traffic conditions, project traffic is combined with existing traffic and traffic from other surrounding development. Figure 15 illustrates traffic conditions including other planned development with the project.

Other Development Growth - Year 2025

To account for growth which can be expected in the area, a growth rate of 1 percent per year compounded annually for 24 years has been assumed. The total compounded growth over 24 years is 24 percent. The basis of this growth rate assumption is the County of San Bernardino.

Cumulative Conditions Daily Traffic Volumes - Year 2025

Figure 15 displays the cumulative traffic volumes that exist in the peak month when the project traffic volumes and other future development traffic volumes are added to existing traffic volumes. See Table 6 for the calculation of intersection leg daily traffic volumes.

Cumulative Conditions Peak Hour Turning Movement Volumes - Year 2025

Appendix C contains plots of the cumulative conditions peak hour intersection turning movement volumes. Additionally, the same plots show the peak hour leg approach volumes and two-way peak hour leg volumes.

Cumulative Conditions Intersection Lanes - Year 2025

The Appendix C plots of peak hour turning movement volumes for each intersection also show the number of cumulative conditions intersection through and turning movement lanes. The lanes are also listed in Table 1.

Cumulative Conditions Intersection Delay - Year 2025

The Intersection Delay for the cumulative traffic conditions have been calculated and are shown in Table 1.

Appendix B contains the Intersection Delay calculations. An explanation of Intersection Delay and how it is calculated is also included in Appendix B.

Cumulative Conditions Level of Service - Year 2025

From the Intersection Delay analysis, the intersection Level of Service (LOS) can be determined. LOS is directly related to Intersection Delay. Table 2 shows how LOS is related to Intersection Delay, and describes LOS.

From Table 1, it can be seen that the intersection of Stanfield Cutoff and Big Bear Boulevard operates at LOS F, with or without the project, without mitigation measures, whether using the Delay method or the ICU method. To accommodate year 2006 traffic, it is recommended that the eastbound right turn lane be converted to an eastbound through lane through the intersection. This mitigation measure also solves the 2025 traffic conditions.

The project does not have a significant impact on this intersection based on the thresholds of significance described in Section 2. It therefore is not required to help mitigate this deficiency.

Traffic Signal Warrants - Year 2025

Traffic signals will be warranted with or without the project at the intersection of Stanfield Cutoff and North Shore Drive based on Rural Warrants. The applicability of Rural Warrants was previously discussed.

Traffic signal warrants have been adopted by the Federal Highway Administration and CalTrans. These warrants are based upon the eight highest hour volumes in a day. It is assumed by CalTrans that the eighth highest hour is 62.5 percent of the peak hour, and the peak hour is generally 10 percent of the daily traffic. Thus, the signal warrants can also be expressed in terms of daily traffic volumes. Rural traffic volume warrants are utilized when the 85th percentile speed of the major street traffic exceeds 40 miles per hour or when the intersection lies within the built up area of an isolated community having a population of less than 10,000. Table 5 shows the signal warrants in terms of daily traffic volumes.

When calculating signal volume warrants, the volumes of both the major and minor street must meet or exceed those listed in Table 5. Determining the major street daily signal warrant volume involves calculating the number of daily vehicles approaching the intersection on both major street legs; usually the daily approach volume is 50 percent of the street's daily two-way volume on each leg. Finding the minor street daily signal

warrant volume involves calculating the number of daily vehicles approaching the intersection on only the highest volume leg; usually the daily approach volume is 50 percent of the street's two-way daily volume. If the minor street forms a tee intersection with the major street, then the minor street volume is the highest volume because there is no other volume.

It should be noted that signals should be installed only when warranted and that installation of unwarranted signals can increase accident potential, energy consumption, and air pollutant emissions, while costing governmental jurisdictions approximately $500 per month for maintenance and utilities.

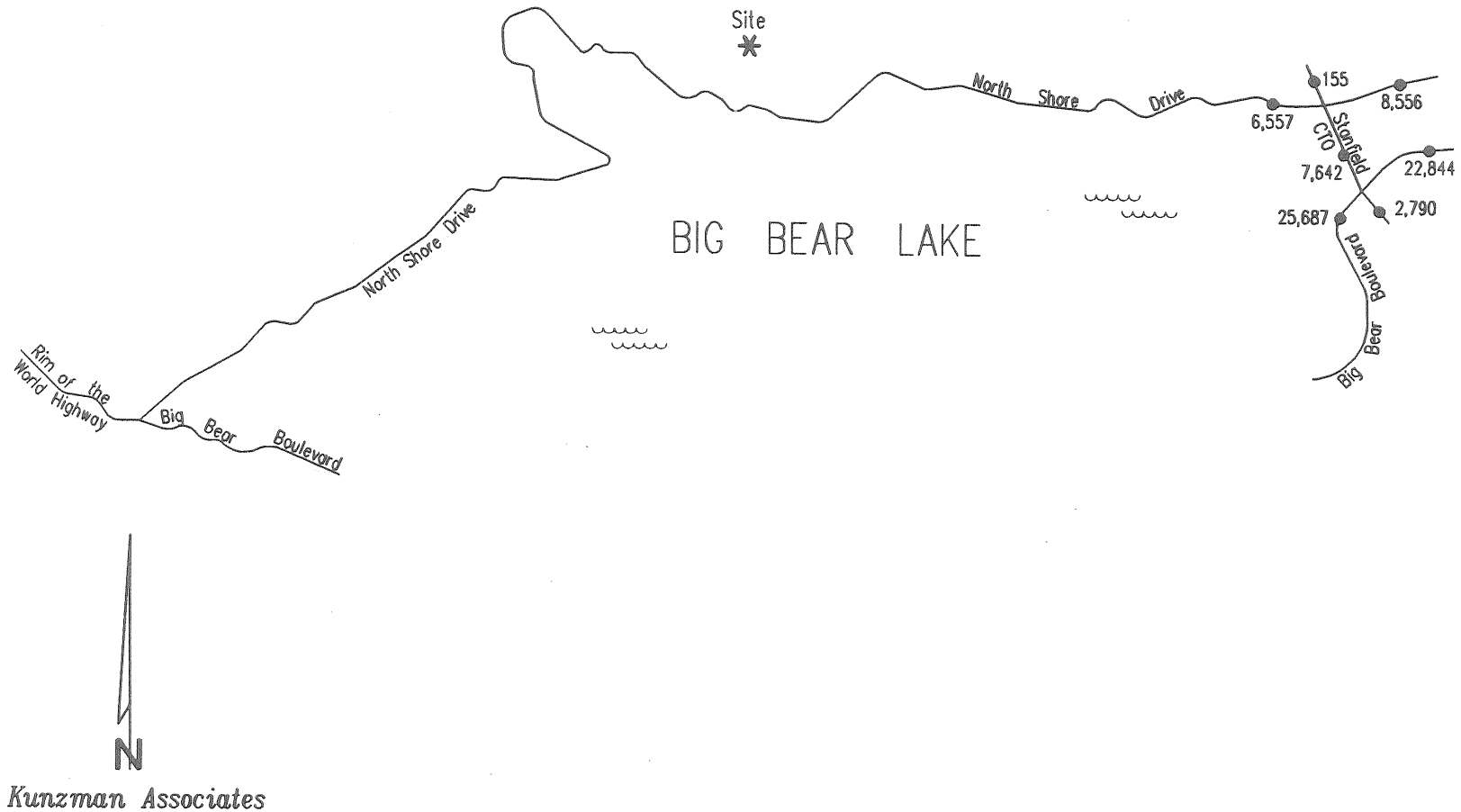
Pro Rata Share of Offsite Improvement Costs

Although the project does not significantly impact the intersection of Stanfield Cutoff and North Shore, nor the intersection of Stanfield Cutoff and Big Bear Boulevard per the thresholds discussed in Section 2 of this report, the County of San Bernardino has requested that a pro rata share of the cost of offsite mitigation measures be calculated.

Specifically, for Stanfield Cutoff and North Shore, the traffic signal is estimated by the County to cost $250,000. The sum of the peak month leg volumes today is 17,400 per Figure 6. The sum of the leg volumes in 2025 without the project is 21,576 per Figure 14. The project adds 1220 vehicles per day to the intersection leg volumes per Figure 8. The project's pro rata share is calculated as follows: 1220/(21,576+1220-17,400), or 22.61 percent the $250,000. The project's pro-rata share of the offsite improvement cost is $56,523.

Specifically, for Stanfield Cutoff and Big Bear Boulevard, the eastbound right turn lane needs to be converted to an eastbound through lane. This will involve adding pavement on the north side of the west leg of the intersection. It is estimated the amount of pavement needed is 12 feet wide by 300 feet long, plus a 600 foot 50 to 1 transition from the 12 feet added width back to zero feet added. This will involve 7,200 square feet of pavement at an estimated cost of $10 per square foot for construction and $15 per square foot for right of way, or $180,000. The $10.00 per square foot for construction is equivalent to $1.27 million for one lane mile in each direction. The sum of the peak month leg volumes today is 46,475 per Figure 6. The sum of the leg volumes in 2025 without the project is 57,629 per Figure 14. The project adds 1220 vehicles per day to the intersection leg volumes per Figure 8. The project's pro rata share is calculated as follows: 1220/(57,629+1220-46,475), or 9.86 percent the $180,000. The project's pro-rata share of the offsite improvement costs is $17,748.

Figure 15
Year 2025 Plus Project Daily Traffic Volumes – Peak Month



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11. Internal Circulation

Discussed below are site access and internal circulation.

Site Access

To assure smooth traffic operations for vehicles entering and exiting the site, a 150 foot left turn pocket on is recommended on North Shore Drive at each project access location. The County of San Bernardino has suggested that it should be a continuous left turn pocket across the frontage of the property. Because it is a State Highway, Caltrans will need to decide which they prefer.

There is a question of what the design requirements need to be in a mountain area. There are design standards and there are design guidelines. For the design standards, there is not much flexibility. For design speed, shoulder widths, and parkway size, there is flexibility. The maximum degree of flexibility should be considered by Caltrans, with safety being of paramount importance.

The available right of way in the mountains is restricted, the topography is difficult, and in many situations there are large pine trees in a location that may preclude the use of typical design criteria. There needs to be flexibility in design requirements in the mountains. Whatever design is accepted needs to meet minimum acceptable criteria which may be less than normal criteria.

This is a Caltrans decision subject to agreement by the County of San Bernardino.

A STOP sign should be installed to control outbound traffic on all site access roadways to North Shore Drive.

With more than one driveway, good emergency access is assured because there are two ways of reaching any point within the site.

Maintain a high level of service along arterials by restricting parking and controlling roadway access.

Landscape plantings and signs should be limited to 36 inches in height within 25 feet of project driveways to assure good visibility.

As is the case for any roadway design, the County should periodically review traffic operations in the vicinity of the

project once the project is constructed to assure that the traffic operations are satisfactory.

Internal Roadway Sizing

To identify future internal circulation needs to the project, future traffic volumes for roadways internal to the project have been determined. The maximum volume is approximately 400 vehicles per day which is satisfactory for a two lane road.

Internal Circulation

The traffic circulation internal to the proposed project has been reviewed from a traffic engineering viewpoint, and the findings are as follows:

Cul-de-sac Lengths: None of the cul-de-sacs have excessive length which is important for emergency equipment access.

Four-Legged Intersections: On arterials, four legged intersections are desirable to reduce turning movements, and expedite traffic movement. On local streets, four legged intersections are undesirable and the project has no four legged intersections on local streets.

Distance Between Intersections: It is desirable to place intersections at least two hundred feet apart. All intersections are 200 feet apart.

Grades: All grades are 10 percent or less, which is satisfactory.

Intersection Angle: All intersecting streets are perpendicular to one another. Intersections at other than 90 degrees are undesirable.

Visibility: All intersections are designed to afford adequate visibility.

It can be seen that the internal circulation is satisfactory in all aspects.

Appendices

Appendix A - Glossary of Transportation Terms

Appendix B - Explanation and Calculation of Intersection Delay

Appendix C - Existing Intersection Turning Movement Counts, Plots, and Estimation of Daily Traffic Volumes

APPENDIX A

Glossary of Transportation Terms

GLOSSARY OF TRANSPORTATION TERMS

COMMON ABBREVIATIONS

AC:	Acres
ADT:	Average Daily Traffic
CalTrans:	California Department of Transportation
DU:	Dwelling Unit
ICU:	Intersection Capacity Utilization
LOS:	Level of Service
TSF:	Thousand Square Feet
V/C:	Volume/Capacity
VMT:	Vehicle Miles Traveled

TERMS

AVERAGE DAILY TRAFFIC: The total volume during a year divided by the number of days in a year. Usually only weekdays are included.

BANDWIDTH: The number of seconds of green time available for through traffic in a signal progression.

BOTTLENECK: A constriction along a travelway which limits the amount of traffic which can proceed downstream from its location.

CAPACITY: The maximum number of vehicles which can be reasonably expected to pass over a given section of a lane or a roadway in a given time period.

CHANNELIZATION: The separation or regulation of conflicting traffic movements into definite paths of travel by the use of pavement markings, raised islands, or other suitable means to facilitate the safe and orderly movements of both vehicles and pedestrians.

CLEARANCE INTERVAL: Same as yellow time.

CORDON: An imaginary line around an area across which vehicles, persons, or other items are counted (in and out).

CYCLE LENGTH: The time period in seconds required for one complete signal cycle.

CUL-DE-SAC STREET: A local street open at one end only, and with special provisions for turning around.

DAILY CAPACITY: The daily volume of traffic which will result in a volume during the peak hour equal to the capacity of the roadway.

DAILY TRAFFIC: Same as average daily traffic.

DELAY: The time consumed while traffic is impeded in its movement by some element over which it has no control, usually expressed in seconds per vehicle.

DEMAND RESPONSIVE SIGNAL: Same as traffic-actuated signal.

DENSITY: The number of vehicles occupying in a unit length of the through traffic lanes of a roadway at any given instant. Usually expressed in vehicles per mile.

DETECTOR: A device that responds to a physical stimulus and transmits a resulting impulse to the signal controller.

DESIGN SPEED: A speed selected for purposes of design. Features of a highway, such as curvature, superelevation, and sight distance (upon which the safe operation of vehicles is dependent) are correlated to design speed.

DIRECTIONAL SPLIT: The percent of traffic in the peak direction at any point in time.

DIVERSION: The rerouting of peak hour traffic to avoid congestion.

FIXED TIME SIGNAL: Same as pretimed signal.

FORCED FLOW: Opposite of free flow.

FREE FLOW: Volumes are well below capacity. Vehicles can maneuver freely and travel is unimpeded by other traffic.

GAP: Time or distance between successive vehicles in a traffic stream, rear bumper to front bumper.

HEADWAY: Time or distance spacing between successive vehicles in a traffic stream, front bumper to front bumper.

INTERCONNECTED SIGNAL SYSTEM: A number of intersections which are connected to achieve signal progression.

LEVEL OF SERVICE: A qualitative measure of a number of factors, which include speed and travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience, and operating costs.

LOOP DETECTOR: A vehicle detector consisting of a loop of wire embedded in the roadway, energized by alternating current and producing an output circuit closure when passed over by a vehicle.

MINIMUM ACCEPTABLE GAP: Smallest time headway between successive vehicles in a traffic stream into which another vehicle is willing and able to cross or merge.

MULTI-MODAL: More than one mode; such as automobile, bus transit, rail rapid transit, and bicycle transportation modes.

OFFSET: The time interval in seconds between the beginning of green at one intersection and the beginning of green at an adjacent intersection.

PLATOON: A closely grouped component of traffic that is composed of several vehicles moving, or standing ready to move, with clear spaces ahead and behind.

ORIGIN-DESTINATION SURVEY: A survey to determine the point of origin and the point of destination for a given vehicle trip.

PEAK HOUR: The 60 consecutive minutes with the highest number of vehicles.

PRETIMED SIGNAL: A type of traffic signal which directs traffic to stop and go on a predetermined time schedule without regard to traffic conditions.

PROGRESSION: A term used to describe the progressive movement of traffic through several signalized intersections.

SCREEN-LINE: An imaginary line or physical feature across which all trips are counted, normally to verify the validity of mathematical traffic models.

SIGNAL CYCLE: The time period in seconds required for one complete sequence of signal indications.

SIGNAL PHASE: The part of the signal cycle allocated to one or more traffic movements.

STARTING DELAY: The delay experienced in initiating the movement of queued traffic from a stop to an average running speed through a signalized intersection.

TRAFFIC-ACTUATED SIGNAL: A type of traffic signal which directs traffic to stop and go in accordance with the demands of traffic, as registered by the actuation of detectors.

TRIP: The movement of a person or vehicle from one location (origin) to another (destination). For example, from home to store to home is two trips, not one.

TRIP-END: One end of a trip at either the origin or destination; i.e. each trip has two trip-ends. A trip-end occurs when a person, object, or message is transferred to or from a vehicle.

TRIP GENERATION RATE: The quality of trips produced and/or attracted attracted by a specific land use stated in terms of units such as per dwelling, per acre, and per 1,000 square feet.

TRUCK: A vehicle having dual tires on one or more axles, or having more than two axles.

UNBALANCED FLOW: Heavier traffic flow in one direction than the other.

VEHICLE MILES OF TRAVEL: A measure of the amount of usage of a section of highway, obtained by multiplying the average daily traffic by length in miles.

APPENDIX B

Explanation and Calculation of Intersection Delay

EXPLANATION AND CALCULATION OF INTERSECTION LEVEL OF SERVICE (LOS) USING DELAY METHOD

The levels of service at the signalized intersections are calculated using the delay method in Chapter 9 of the 1994 Highway Capacity Manual (HCM). This method views an intersection as consisting of several lane groups. A lane group is a set of lanes serving a movement. If there are two northbound left turn lanes, then the lane group serving the northbound left turn movement has two lanes. Similarly, there may be three lanes in the lane group serving the northbound through movement, one lane in the lane group serving the northbound right turn movement, and so forth. It is also possible for one lane to serve two lane groups. A shared lane might result in there being 1.5 lanes in the northbound left turn lane group and 2.5 lanes in the northbound through lane group.

For each lane group, there is a capacity. That capacity is calculated by multiplying the number of lanes in the lane group times a theoretical maximum lane capacity per lane times 12 adjustment factors.

Each of the 12 adjustment factors has a value of approximately 1.00. A value less than 1.00 is generally assigned when a less than desirable condition occurs.

The 12 adjustment factors are as follows:

1. Peak hour factor (to account for peaking within the peak hour)
2. Lane utilization factor (to account for not all lanes loading equally)
3. Lane width
4. Percent of heavy trucks
5. Approach grade
6. Parking
7. Bus stops at intersections
8. Area type (CBD or other)
9. Right turns
10. Left turns

11. Pedestrian activity

12. Signal progression

The maximum theoretical lane capacity and the 12 adjustment factors for it are all unknowns for which approximate estimates have been recommended in the 1994 Highway Capacity Manual. For the most part, the recommended values are not based on statistical analysis but rather on educated estimates. However, it is possible to use the delay method and get reasonable results as will be discussed below.

Once the lane group volume is known and the lane group capacity is known, a volume to capacity ratio can be calculated for the lane group.

With a volume to capacity ratio calculated, average delay per vehicle in a lane group can be estimated. The average delay per vehicle in a lane group is calculated using a complex formula provided by the 1994 Highway Capacity Manual, which can be simplified and described as follows:

Delay per vehicle in a lane group is a function of the following:

1. Cycle length
2. Amount of red time faced by a lane group
3. Amount of yellow time for that lane group
4. The volume to capacity ratio of the lane group

The average delay per vehicle for each lane group is calculated, and eventually an overall average delay for all vehicles entering the intersection is calculated. This average delay per vehicle is then used to judge Level of Service. The Level of Services are defined in terms of delay as follows:

Level of Service	Average Stopped Delay Per Vehicle (Seconds)
A	0 to 5.00
B	5.01 to 15.00
C	15.01 to 25.00
D	25.01 to 40.00
E	40.01 to 60.00
F	60.01 and up

Level of Service is further described in the table that follows this discussion.

Experience has shown that when a maximum lane capacity of 1800 vehicles per hour is used (as recommended by HCM), little or no yellow time penalty is used, and none of the 12 penalty factors are applied, calculated delay is realistic. The delay calculation for instance assumes that yellow time is totally unused. Yet experience shows that most of the yellow time is used.

An idiosyncrasy of the delay method is that it is possible to add traffic to an intersection and reduce the average delay per vehicle. If the average delay is 30 seconds per vehicle for all vehicles traveling through an intersection, and traffic is added to a movement which has an average delay of 15 seconds per vehicle, then the overall average delay is reduced.

The delay calculation for a lane group is based on a concept that the delay is a function of the amount of unused capacity available. As the volume approaches capacity and there is no more unused capacity available, then the delay rapidly increases. Delay is not proportional to volume, but rather increases rapidly as the unused capacity approaches zero.

Because delay is not linearly related to volumes, the delay does not reflect how close an intersection is to overloading. If an intersection is operating at LOS C and has an average delay of 18 seconds per vehicle, you know very little as to what percent the traffic can increase before LOS E is reached,

Delay Calculation Software

The traffic analysis includes calculation of Intersection Delay and Level of Service using Kunzman Associates software.

The features of Kunzman Associates Delay Calculation software are as follows:

1. The Delay Calculation follows the 1994 Highway Capacity Manual procedures precisely.

2. The Delay Calculation table shows all input assumptions [lines (1) to (17)], all table look up values [lines (18) to (27)], and every calculation step [lines (28) to (44)].

3. Every number can be verified by the user. All formulas and calculation procedures are presented in the Delay Calculation table, including the Notes.

4. All calculated values are expressed to the nearest tenth so that the reader can verify for instance that the sum of the signal phases precisely equals the cycle length.

5. Signal phasing time is shown in lines (34) and (36).

6. Average delay per vehicle by movement is shown in line (39).

7. Percent of vehicles that have to stop by movement is shown in line (40).

8. Average vehicle queue length by movement is shown in line (41).

9. Rather than letting the pedestrian crossing times drive the signal cycle length, the user specifies the signal cycle length and the Delay Calculation table at the top indicates what cycle length is needed to satisfy pedestrians if they are present. Pedestrians are usually not present.

As it turns out, the cycle length required to satisfy pedestrian walk times depends on which leg the pedestrian crosses. All four legs can result in different minimum cycle lengths needed to satisfy the pedestrian crossing times.

As an example, assume the amount of time needed to cross the west leg or east leg of an intersection is 30 seconds. With left turn phasing and the traffic volumes present, assume the northbound through green goes on while the northbound left turns are still being served. After the northbound left turns are served, then the southbound through traffic is given a green indication.

Assume for a 100 second cycle, the northbound through green time is 35 seconds and the southbound through green time is 25 seconds. Because pedestrians crossing on the east leg can be given 35 seconds of green time while the northbound through is running, no additional time is needed to serve pedestrians crossing on the east leg.

Because pedestrians crossing on the west leg can only be given 25 seconds to cross while the southbound through has a green indication, the signal cycle length needs to be extended whenever there is a pedestrian on the west leg. In this example a 100 second cycle will serve the east leg pedestrian but not the west leg pedestrian.

If a pedestrian is on the west leg, and if the intersection is operating below capacity, then five seconds of green time can be borrowed from other phases and given to the southbound through phase, and a 100 second cycle still maintained. However, if the intersection is near capacity, then green time cannot be borrowed from other green phases, and the cycle length has to be extended to still operate at an acceptable Level of Service.

If the software user so desires, the methodology can be used to determine the maximum cycle length needed at all intersections along one street, then that cycle length can be specified at all intersections and the effect on delay determined.

The Delay Calculation refers to Notes at various locations. The Notes are contained on a separate page at the end of the delay calculations.

Unsignalized Intersections

Delay can also be calculated for two way stop and all way stop intersections.

Two way stop delay calculations are based on gap acceptance methodology. Essentially are there enough gaps in the main street (the one without a stop control) traffic volume to allow the side street volumes to cross or turn onto the main street. Also for left turns on the main street, are there enough gaps for the left turns. LOS is determined for all movements except the main street through and right turn movements. LOS is determined by a table look up method where many different threshold values are presented depending on lanes, subject volume and opposing volume.

All way stop delay calculations are based on a volume compared to a service rate methodology. Essentially the service rates are much lower than for a signal and are adjusted to account for lanes crossed, and opposing and crossing volumes among others. LOS is determined by a table look up method where many different threshold values are presented depending on lanes, subject volume and opposing volume.

The 1997 Highway Capacity Manual was used for signalized and unsignalized intersections.

LEVEL OF SERVICE DESCRIPTION
FOR DELAY METHOD (1997 METHODOLOGY)

Level of Service	Description	Stopped Delay Per Vehicle (Seconds)
A	Level of Service A occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.	0 to 10.0
B	Level of Service B generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.	10.1 to 20.0
C	Level of Service generally results when there is fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.	20.1 to 35.0
D	Level of Service D generally results in noticeable congestion. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume to capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	35.1 to 55.0
E	Level of Service E is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high volume to capacity ratios. Individual cycle failures are frequent occurrences.	55.1 to 80.0
F	Level of Service F is considered to be unacceptable to most drivers. This condition often occurs with over-saturation, i.e., when arrival flow rates exceed the capacity of the intersection. It may also occur at high volume to capacity ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.	80.1 +

Source: HIGHWAY CAPACITY MANUAL, Special Report 209, Transportation Research Board, National Research Council, Washington, D.C., 1997, Pages 9-6 to 9-7.

CALCULATION OF PEAK HOUR FACTORS

Intersection	Movement												
	NT	NR	NL	ST	SR	SL	ET	ER	EL	WT	WR	WL	TOTAL
Stanfield Cutoff (NS) and North Shore (EW)													
Morning Peak Hour													
Peak Hour Volume	0	53	47	0	0	0	19	59	0	45	0	311	534
Peak 15 Minutes	0	15	15	0	0	0	8	21	0	14	0	109	182
Peak Hour Factor	1.00	0.88	0.78	1.00	1.00	1.00	0.59	0.70	1.00	0.80	1.00	0.71	0.73
Adjusted Peak Hour Factor	1.00	0.88	0.78	1.00	1.00	1.00	0.59	0.70	1.00	0.80	1.00	0.71	0.73
Evening Peak Hour													
Peak Hour Volume	0	134	51	0	0	0	61	67	0	37	0	154	504
Peak 15 Minutes	0	37	14	0	0	0	16	18	0	10	0	39	134
Peak Hour Factor	1.00	0.91	0.91	1.00	1.00	1.00	0.95	0.93	1.00	0.93	1.00	0.99	0.94
Adjusted Peak Hour Factor	1.00	0.91	0.91	1.00	1.00	1.00	0.95	0.93	1.00	0.93	1.00	0.99	0.94
Stanfield Cutoff (NS) and Big Bear Boulevard (EW)													
Morning Peak Hour													
Peak Hour Volume	24	24	27	23	245	12	278	15	93	658	44	25	1468
Peak 15 Minutes	8	11	5	9	85	5	85	3	33	199	6	6	455
Peak Hour Factor	0.75	0.55	1.35	0.64	0.72	0.60	0.82	1.25	0.70	0.83	1.83	1.04	0.81
Adjusted Peak Hour Factor	0.75	0.55	1.00	0.64	0.72	0.60	0.82	1.00	0.70	0.83	1.00	1.00	0.81
Evening Peak Hour													
Peak Hour Volume	18	46	39	22	178	21	906	26	153	455	13	34	1911
Peak 15 Minutes	4	14	10	5	42	5	239	7	39	123	4	8	500
Peak Hour Factor	1.12	0.82	0.98	1.10	1.06	1.05	0.95	0.93	0.98	0.92	0.81	1.06	0.96
Adjusted Peak Hour Factor	1.00	0.82	0.98	1.00	1.00	1.00	0.95	0.93	0.98	0.92	0.81	1.00	0.96

Peak Hour Factor is the hourly flow rate in vehicles per hour divided by the peak 15 minute flow rate in vehicles per hour. The time periods used are based on the total intersection entering volumes. A Peak Hour Factor of 1.00 is used when a movement's Peak Hour Factor is greater than 1.00. This sometimes occurs on low volume movements.

INTERSECTION DELAY CALCULATION USING 1997 HIGHWAY CAPACITY MANUAL PROCEDURE

Intersection: 2. Stanfield Cutoff (NS) and Big Bear Blvd. (EW)
Time Period: AM Peak Hour Lanes: Existing

Traffic Condition: 2001 Average Month Without Project
Cycle Length: 100 Seconds (Maximum Cycle Length Needed to Satisfy Pedestrians When Present: 94 Seconds)

Descriptor	NT	NR	NL	ST	SR	SL	ET	ER	EL	WT	WR	WL	Total
INPUT DATA													
(1) Volume per Hour, V	24	24	27	23	245	12	278	15	93	658	44	25	1468
(2) Number of Lanes, N	0.50	0.50	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	10.00
(3) Right Turns (FREE=Free Right Turn Lane; AROW=Right Turn Arrow) [See Note 5]													
(4) Lost Time (Yellow, All Red, Etc) in Seconds, Y (Typically 2 to 4 Seconds) [See Note 9]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	
(5) Peak Hour Factor, PHF (1.00 for Peak Hour; 0.90 or 0.95 for Peak 15 Minutes)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
(6) Lane Width (8; 9; 10; 11; 12 [Factor = 1.00]; 13; 14; 15; or 16 for 15+)	12	12	12	12	12	12	12	12	12	12	12	12	
(7) Percent Heavy Vehicles (0; 2; 4; 6; 8; 10; 15; 20; 25; or 30; Typically 4 or 6)	0	0	0	0	0	0	0	0	0	0	0	0	
(8) Grade (-6; -4; -2; 0; +2; +4; or +6)	0	0	0	0	0	0	0	0	0	0	0	0	
(9) Parking Maneuvers per Hour (-1 = No Parking [Factor = 1.00]; 0; 10; 20; 30; or 40)	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	
(10) Buses Stopping per Hour (0; 10; 20; 30; or 40)	0	0	0	0	0	0	0	0	0	0	0	0	
(11) CBD/Other (0=CBD; 1=Other)	1	1	1	1	1	1	1	1	1	1	1	1	
(12) Right Turn Lane Type (0=Standard [Factor=1.00]; 1=Unprotected; 2=Protected w/ Shared Lane)	0	0	0	0	0	0	0	0	0	0	0	0	
(13) Pedestrians per Hour Conflicting with Right Turns (0; 50; 100; 200; 300; 400; or 500)	0	0	0	0	0	0	0	0	0	0	0	0	
(14) Left Turn Lane Type (0=Standard [Factor=1.00]; 1=Unprotected; 2=Protected w/Separate Arrow)	0	0	0	0	0	0	0	0	0	0	0	0	
(15) Saturated Flow Rate per Hour of Green Time (HCM Recommends 1900)	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	
(16) Signal Progression (1=PreTimed/Factor=1.0; 2=Actuated/Factor=0.85; 3=Actuated & Progressed)	1	1	1	1	1	1	1	1	1	1	1	1	
(17) Minimum Green Time in Seconds (Usually 7 to 10 seconds)	7	7	7	7	7	7	7	7	7	7	7	7	
FACTORS FROM TABLES													
(18) Lane Utilization Factor [Table 9-4]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(19) Lane Width Factor [Table 9-5]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(20) Heavy Vehicles Factor [Table 9-6]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(21) Grade Factor [Table 9-7]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(22) Parking Maneuvers Factor [Table 9-8]	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(23) Busses Stopping Fcator [Table 9-9]	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(24) CBD/Other Factor [Table 9-10]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(25) Right Turn Lane Factor [Table 9-11]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(26) Left Turn Lane factor [Table 9-12]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(27) Progression Adjustment Factor [Table 9-13]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(27a) Progression k Value [Table 9-14]	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	
CALCULATED VALUES AND PERFORMANCE MEASURES													
(28) Adjusted Flow Rate (in Peak 15 Minutes) in Vehicles per Hour, v = [(1)*(18)/(5)]	25	25	28	282	0	13	293	16	98	693	46	26	
(29) Adjusted Saturation Flow Rate in Vehicles per Hour of Green, s = [See Note 1]	950	950	1800	1900	0	1800	1900	1900	1800	1900	1900	1800	
(30) Flow Ratio, v/s = [(28)/(29)].	0.03	0.03	0.02	0.15	0.00	0.01	0.15	0.01	0.05	0.36	0.02	0.01	
(31) Minimum Green Plus Lost Time as Proportion of Cycle [See Note 7]	0.11	0.11	0.11	0.19	0.00	0.11	0.19	0.11	0.11	0.40	0.11	0.11	
(32) Critical Lane Group = [(31)'s That Are Critical]. Total is ICU. [See Note 10]	0.00	0.00	0.11	0.19	0.00	0.00	0.00	0.00	0.11	0.40	0.00	0.00	.813
Critical Lane Group = XXXX			XXXX	XXXX					XXXX	XXXX			
(33) Green Time Allocated as Proportion of Cycle, g/C=[See Note 2]. Sum of Critical Moves = 1.00	0.22	0.22	0.13	0.22	0.00	0.13	0.52	0.52	0.13	0.52	0.52	0.13	
(34) Green Time Allocated in Seconds, [(33) * Cycle Length]	22.3	22.3	13.0	22.3	0.0	13.0	51.7	51.7	13.1	51.7	51.7	13.0	
(35) Minimum Ped Time Needed to Cross Street [3 Seconds per Lane Crossed ÷ 7 Seconds]	21	0	0	21	0	0	15	0	0	15	0	0	
(36) Signal Phases Available to Movement. 1 = Phase 1; 13 = Phases 1 and 3. [See Note 6]	68	68	56	8	8	5	24	24	12	4	4	1	
(37) Capacity in Vehicles per Hour (includes Yellow Penalty adjustment), c=[((33)-(4)/C)*(29)]	174	174	162	347	0	162	907	907	163	905	905	162	
(38) Volume to Capacity Ratio, v/c = X = [(28)/(37)]	0.15	0.15	0.18	0.81	0.00	0.08	0.32	0.02	0.60	0.76	0.05	0.16	
(39) Average Delay per Vehicle in Seconds, d [See Note 3]	34.1	34.1	42.5	64.4	0.0	39.8	15.5	11.8	64.7	29.0	12.2	42.1	35.20
(40) Percent of Vehicles That Have to Stop [1.00 -(33)]	78	78	87	78	0	87	48	48	87	48	48	87	
(41) Average Vehicle Queue Length at Beginning of Green, [(28)/(2) * Cycle Length/3600 * (40)]	1.1	1.1	0.7	6.1	0.0	0.3	3.9	0.2	2.4	9.3	0.6	0.6	5.24
(42) Do All Vehicles Clear? [YES if (38) < 0.95] [See Note 8]	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
(43) Level of Service (LOS) Based on (39) [See Note 4]	C-	C-	D	E	A+	D+	B	B+	E	C	B+	D	D+
(44) Leg Average Delay per Vehicle in Seconds - Level of Service, LOS	37.1 Sec; LOS = D+			63.4 Sec; LOS = E			27.2 Sec; LOS = C			28.4 Sec; LOS = C			D+

Signal Timing, Secs: Phase 1 = 13.0; Phase 2 = 0.1; Phase 3 = 0.0; Phase 4 = 51.7; Phase 5 = 13.0; Phase 6 = 0.0; Phase 7 = 0.0; Phase 8 = 22.3. If time = 0.0, Phase is skipped.
Signal Offsets, Secs: Phase 1 = 0.0; Phase 2 = 13.0; Phase 3 = 13.1; Phase 4 = 13.1; Phase 5 = 64.7; Phase 6 = 77.7; Phase 7 = 77.7; Phase 8 = 77.7.
See Notes on last page. NT = Northbound Through, NR = Northbound Right, NL = Northbound Left, ST = Southbound Through, ... , WL = Westbound Left

INTERSECTION DELAY CALCULATION USING 1997 HIGHWAY CAPACITY MANUAL PROCEDURE

Intersection: 2. Stanfield Cutoff (NS) and Big Bear Blvd. (EW)
Time Period: PM Peak Hour Lanes: Existing

Traffic Condition: 2001 Average Month Without Project
Cycle Length: 100 Seconds (Maximum Cycle Length Needed to Satisfy Pedestrians When Present: 128 Seconds)

Descriptor	NT	NR	NL	ST	SR	SL	ET	ER	EL	WT	WR	WL	Total
INPUT DATA													
(1) Volume per Hour, V	18	46	39	22	178	21	906	26	153	455	13	34	1911
(2) Number of Lanes, N	0.50	0.50	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	10.00
(3) Right Turns (FREE=Free Right Turn Lane; AROW=Right Turn Arrow) [See Note 5]													
(4) Lost Time (Yellow, All Red, Etc) in Seconds, Y (Typically 2 to 4 Seconds) [See Note 9]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	
(5) Peak Hour Factor, PHF (1.00 for Peak Hour; 0.90 or 0.95 for Peak 15 Minutes)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
(6) Lane Width (8; 9; 10; 11; 12 [Factor = 1.00]; 13; 14; 15; or 16 for 15+)	12	12	12	12	12	12	12	12	12	12	12	12	
(7) Percent Heavy Vehicles (0; 2; 4; 6; 8; 10; 15; 20; 25; or 30; Typically 4 or 6)	0	0	0	0	0	0	0	0	0	0	0	0	
(8) Grade (-6; -4; -2; 0; +2; +4; or +6)	0	0	0	0	0	0	0	0	0	0	0	0	
(9) Parking Maneuvers per Hour (-1 = No Parking [Factor = 1.00]; 0; 10; 20; 30; or 40)	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	
(10) Buses Stopping per Hour (0; 10; 20; 30; or 40)	0	0	0	0	0	0	0	0	0	0	0	0	
(11) CBD/Other (0=CBD; 1=Other)	1	1	1	1	1	1	1	1	1	1	1	1	
(12) Right Turn Lane Type (0=Standard [Factor=1.00]; 1=Unprotected; 2=Protected w/ Shared Lane)	0	0	0	0	0	0	0	0	0	0	0	0	
(13) Pedestrians per Hour Conflicting with Right Turns (0; 50; 100; 200; 300; 400; or 500)	0	0	0	0	0	0	0	0	0	0	0	0	
(14) Left Turn Lane Type (0=Standard [Factor=1.00]; 1=Unprotected; 2=Protected w/Separate Arrow)	0	0	0	0	0	0	0	0	0	0	0	0	
(15) Saturated Flow Rate per Hour of Green Time (HCM Recommends 1900)	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	
(16) Signal Progression (1=PreTimed/Factor=1.0; 2=Actuated/Factor=0.85; 3=Actuated & Progressed)	1	1	1	1	1	1	1	1	1	1	1	1	
(17) Minimum Green Time in Seconds (Usually 7 to 10 seconds)	7	7	7	7	7	7	7	7	7	7	7	7	
FACTORS FROM TABLES													
(18) Lane Utilization Factor [Table 9-4]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(19) Lane Width Factor [Table 9-5]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(20) Heavy Vehicles Factor [Table 9-6]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(21) Grade Factor [Table 9-7]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(22) Parking Maneuvers Factor [Table 9-8]	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(23) Busses Stopping Fcator [Table 9-9]	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(24) CBD/Other Factor [Table 9-10]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(25) Right Turn Lane Factor [Table 9-11]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(26) Left Turn Lane factor [Table 9-12]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(27) Progression Adjustment Factor [Table 9-13]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(27a) Progression k Value [Table 9-14]	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	
CALCULATED VALUES AND PERFORMANCE MEASURES													
(28) Adjusted Flow Rate (in Peak 15 Minutes) in Vehicles per Hour, v = [(1)*(18)/(5)]	19	48	41	211	0	22	954	27	161	479	14	36	
(29) Adjusted Saturation Flow Rate in Vehicles per Hour of Green, s = [See Note 1]	950	950	1800	1900	0	1800	1900	1900	1800	1900	1900	1800	
(30) Flow Ratio, v/s = [(28)/(29)].	0.02	0.05	0.02	0.11	0.00	0.01	0.50	0.01	0.09	0.25	0.01	0.02	
(31) Minimum Green Plus Lost Time as Proportion of Cycle [See Note 7]	0.11	0.11	0.11	0.15	0.00	0.11	0.54	0.11	0.13	0.29	0.11	0.11	
(32) Critical Lane Group = [(31)'s That Are Critical]. Total is ICU. [See Note 10]	0.00	0.00	0.11	0.15	0.00	0.00	0.54	0.00	0.00	0.00	0.00	0.11	.912
Critical Lane Group = XXXX			XXXX	XXXX			XXXX					XXXX	
(33) Green Time Allocated as Proportion of Cycle, g/C=[See Note 2]. Sum of Critical Moves = 1.00	0.17	0.17	0.10	0.16	0.00	0.10	0.63	0.63	0.14	0.59	0.59	0.10	
(34) Green Time Allocated in Seconds, [(33) * Cycle Length]	16.6	16.6	10.4	16.3	0.0	10.1	63.1	63.1	14.0	59.4	59.4	10.3	
(35) Minimum Ped Time Needed to Cross Street [3 Seconds per Lane Crossed ÷ 7 Seconds]	21	0	0	21	0	0	15	0	0	15	0	0	
(36) Signal Phases Available to Movement. 1 = Phase 1; 13 = Phases 1 and 3. [See Note 6]	68	68	56	8	8	5	24	24	12	4	4	1	
(37) Capacity in Vehicles per Hour (includes Yellow Penalty adjustment), c=[((33)-(4)/C)*(29)]	120	120	115	233	0	109	1123	1123	180	1052	1052	113	
(38) Volume to Capacity Ratio, v/c = X = [(28)/(37)]	0.16	0.41	0.36	0.90	0.00	0.20	0.85	0.02	0.89	0.46	0.01	0.32	
(39) Average Delay per Vehicle in Seconds, d [See Note 3]	40.3	53.0	55.4	93.8	0.0	48.0	27.1	7.0	102.8	13.6	8.4	53.2	38.56
(40) Percent of Vehicles That Have to Stop [1.00 -(33)]	83	83	90	84	0	90	37	37	86	41	41	90	
(41) Average Vehicle Queue Length at Beginning of Green, [(28)/(2) * Cycle Length/3600 * (40)]	0.9	2.2	1.0	4.9	0.0	0.6	9.8	0.3	3.8	5.4	0.2	0.9	6.40
(42) Do All Vehicles Clear? [YES if (38) < 0.95] [See Note 8]	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
(43) Level of Service (LOS) Based on (39) [See Note 4]	D+	D-	E+	F	A+	D	C	A-	F-	B	A-	D-	D+
(44) Leg Average Delay per Vehicle in Seconds - Level of Service, LOS	51.7 Sec; LOS = D-			89.4 Sec; LOS = F			37.3 Sec; LOS = D+			16.2 Sec; LOS = B			D+

Signal Timing, Secs: Phase 1 = 10.3; Phase 2 = 3.7; Phase 3 = 0.0; Phase 4 = 59.4; Phase 5 = 10.1; Phase 6 = 0.3; Phase 7 = 0.0; Phase 8 = 16.3. If time = 0.0, Phase is skipped.
Signal Offsets, Secs: Phase 1 = 0.0; Phase 2 = 10.3; Phase 3 = 14.0; Phase 4 = 14.0; Phase 5 = 73.4; Phase 6 = 83.4; Phase 7 = 83.7; Phase 8 = 83.7.
See Notes on last page. NT = Northbound Through, NR = Northbound Right, NL = Northbound Left, ST = Southbound Through, ... , WL = Westbound Left

INTERSECTION DELAY CALCULATION USING 1997 HIGHWAY CAPACITY MANUAL PROCEDURE

Intersection: 2. Stanfield Cutoff (NS) and Big Bear Blvd. (EW)
Time Period: AM Peak Hour Lanes: Existing

Traffic Condition: 2001 Average Month With Project
Cycle Length: 100 Seconds (Maximum Cycle Length Needed to Satisfy Pedestrians When Present: 90 Seconds)

Descriptor	NT	NR	NL	ST	SR	SL	ET	ER	EL	WT	WR	WL	Total
INPUT DATA													
(1) Volume per Hour, V	24	24	27	23	261	35	278	15	98	658	52	25	1520
(2) Number of Lanes, N	0.50	0.50	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	10.00
(3) Right Turns (FREE=Free Right Turn Lane; AROW=Right Turn Arrow) [See Note 5]													
(4) Lost Time (Yellow, All Red, Etc) in Seconds, Y (Typically 2 to 4 Seconds) [See Note 9]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	
(5) Peak Hour Factor, PHF (1.00 for Peak Hour; 0.90 or 0.95 for Peak 15 Minutes)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
(6) Lane Width (8; 9; 10; 11; 12 [Factor = 1.00]; 13; 14; 15; or 16 for 15+)	12	12	12	12	12	12	12	12	12	12	12	12	
(7) Percent Heavy Vehicles (0; 2; 4; 6; 8; 10; 15; 20; 25; or 30; Typically 4 or 6)	0	0	0	0	0	0	0	0	0	0	0	0	
(8) Grade (-6; -4; -2; 0; +2; +4; or +6)	0	0	0	0	0	0	0	0	0	0	0	0	
(9) Parking Maneuvers per Hour (-1 = No Parking [Factor = 1.00]; 0; 10; 20; 30; or 40)	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	
(10) Buses Stopping per Hour (0; 10; 20; 30; or 40)	0	0	0	0	0	0	0	0	0	0	0	0	
(11) CBD/Other (0=CBD; 1=Other)	1	1	1	1	1	1	1	1	1	1	1	1	
(12) Right Turn Lane Type (0=Standard [Factor=1.00]; 1=Unprotected; 2=Protected w/ Shared Lane)	0	0	0	0	0	0	0	0	0	0	0	0	
(13) Pedestrians per Hour Conflicting with Right Turns (0; 50; 100; 200; 300; 400; or 500)	0	0	0	0	0	0	0	0	0	0	0	0	
(14) Left Turn Lane Type (0=Standard [Factor=1.00]; 1=Unprotected; 2=Protected w/Separate Arrow)	0	0	0	0	0	0	0	0	0	0	0	0	
(15) Saturated Flow Rate per Hour of Green Time (HCM Recommends 1900)	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	
(16) Signal Progression (1=PreTimed/Factor=1.0; 2=Actuated/Factor=0.85; 3=Actuated & Progressed)	1	1	1	1	1	1	1	1	1	1	1	1	
(17) Minimum Green Time in Seconds (Usually 7 to 10 seconds)	7	7	7	7	7	7	7	7	7	7	7	7	
FACTORS FROM TABLES													
(18) Lane Utilization Factor [Table 9-4]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(19) Lane Width Factor [Table 9-5]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(20) Heavy Vehicles Factor [Table 9-6]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(21) Grade Factor [Table 9-7]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(22) Parking Maneuvers Factor [Table 9-8]	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(23) Busses Stopping Fcator [Table 9-9]	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(24) CBD/Other Factor [Table 9-10]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(25) Right Turn Lane Factor [Table 9-11]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(26) Left Turn Lane factor [Table 9-12]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(27) Progression Adjustment Factor [Table 9-13]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(27a) Progression k Value [Table 9-14]	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	
CALCULATED VALUES AND PERFORMANCE MEASURES													
(28) Adjusted Flow Rate (in Peak 15 Minutes) in Vehicles per Hour, v = [(1)*(18)/(5)]	25	25	28	299	0	37	293	16	103	693	55	26	
(29) Adjusted Saturation Flow Rate in Vehicles per Hour of Green, s = [See Note 1]	950	950	1800	1900	0	1800	1900	1900	1800	1900	1900	1800	
(30) Flow Ratio, v/s = [(28)/(29)].	0.03	0.03	0.02	0.16	0.00	0.02	0.15	0.01	0.06	0.36	0.03	0.01	
(31) Minimum Green Plus Lost Time as Proportion of Cycle [See Note 7]	0.11	0.11	0.11	0.20	0.00	0.11	0.19	0.11	0.11	0.40	0.11	0.11	
(32) Critical Lane Group = [(31)'s That Are Critical]. Total is ICU. [See Note 10]	0.00	0.00	0.11	0.20	0.00	0.00	0.00	0.00	0.11	0.40	0.00	0.00	.821
Critical Lane Group = XXXX			XXXX	XXXX					XXXX	XXXX			
(33) Green Time Allocated as Proportion of Cycle, g/C=[See Note 2]. Sum of Critical Moves = 1.00	0.23	0.23	0.13	0.23	0.00	0.13	0.51	0.51	0.13	0.51	0.51	0.13	
(34) Green Time Allocated in Seconds, [(33) * Cycle Length]	23.1	23.1	12.9	23.1	0.0	12.9	51.1	51.1	13.0	51.0	51.0	12.9	
(35) Minimum Ped Time Needed to Cross Street [3 Seconds per Lane Crossed + 7 Seconds]	21	0	0	21	0	0	15	0	0	15	0	0	
(36) Signal Phases Available to Movement. 1 = Phase 1; 13 = Phases 1 and 3. [See Note 6]	8	8	5	78	78	57	24	24	12	4	4	1	
(37) Capacity in Vehicles per Hour (includes Yellow Penalty adjustment), c=[((33)-(4)/C)*(29)]	182	182	160	363	0	160	895	895	161	893	893	160	
(38) Volume to Capacity Ratio, v/c = X = [(28)/(37)]	0.14	0.14	0.18	0.82	0.00	0.23	0.33	0.02	0.64	0.78	0.06	0.16	
(39) Average Delay per Vehicle in Seconds, d [See Note 3]	33.1	33.1	42.7	64.2	0.0	44.5	15.9	12.1	68.7	30.1	12.6	42.3	36.46
(40) Percent of Vehicles That Have to Stop [1.00 -(33)]	77	77	87	77	0	87	49	49	87	49	49	87	
(41) Average Vehicle Queue Length at Beginning of Green, [(28)/(2) * Cycle Length/3600 * (40)]	1.1	1.1	0.7	6.4	0.0	0.9	4.0	0.2	2.5	9.4	0.7	0.6	5.17
(42) Do All Vehicles Clear? [YES if (38) < 0.95] [See Note 8]	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
(43) Level of Service (LOS) Based on (39) [See Note 4]	C-	C-	D	E	A+	D	B	B+	E	C-	B+	D	D+
(44) Leg Average Delay per Vehicle in Seconds - Level of Service, LOS	36.6 Sec; LOS = D+			62.0 Sec; LOS = E+			29.0 Sec; LOS = C			29.3 Sec; LOS = C			D+

Signal Timing, Secs: Phase 1 = 12.9; Phase 2 = 0.1; Phase 3 = 0.0; Phase 4 = 51.0; Phase 5 = 12.9; Phase 6 = 0.0; Phase 7 = 0.0; Phase 8 = 23.1. If time = 0.0, Phase is skipped.
Signal Offsets, Secs: Phase 1 = 0.0; Phase 2 = 12.9; Phase 3 = 13.0; Phase 4 = 13.0; Phase 5 = 64.0; Phase 6 = 76.9; Phase 7 = 76.9; Phase 8 = 76.9.
See Notes on last page. NT = Northbound Through, NR = Northbound Right, NL = Northbound Left, ST = Southbound Through, ... , WL = Westbound Left

INTERSECTION DELAY CALCULATION USING 1997 HIGHWAY CAPACITY MANUAL PROCEDURE

Intersection: 2. Stanfield Cutoff (NS) and Big Bear Blvd. (EW) — Traffic Condition: 2001 Average Month With Project
Time Period: PM Peak Hour — Lanes: Existing — Cycle Length: 100 Seconds — (Maximum Cycle Length Needed to Satisfy Pedestrians When Present: 127 Seconds)

Descriptor	NT	NR	NL	ST	SR	SL	ET	ER	EL	WT	WR	WL	Total
INPUT DATA													
(1) Volume per Hour, V	18	46	39	22	188	36	906	26	171	455	40	34	1981
(2) Number of Lanes, N	0.50	0.50	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	10.00
(3) Right Turns (FREE=Free Right Turn Lane; AROW=Right Turn Arrow) [See Note 5]													
(4) Lost Time (Yellow, All Red, Etc) in Seconds, Y (Typically 2 to 4 Seconds) [See Note 9]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	
(5) Peak Hour Factor, PHF (1.00 for Peak Hour; 0.90 or 0.95 for Peak 15 Minutes)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
(6) Lane Width (8; 9; 10; 11; 12 [Factor = 1.00]; 13; 14; 15; or 16 for 15+)	12	12	12	12	12	12	12	12	12	12	12	12	
(7) Percent Heavy Vehicles (0; 2; 4; 6; 8; 10; 15; 20; 25; or 30; Typically 4 or 6)	0	0	0	0	0	0	0	0	0	0	0	0	
(8) Grade (-6; -4; -2; 0; +2; +4; or +6)	0	0	0	0	0	0	0	0	0	0	0	0	
(9) Parking Maneuvers per Hour (-1 = No Parking [Factor = 1.00]; 0; 10; 20; 30; or 40)	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	
(10) Buses Stopping per Hour (0; 10; 20; 30; or 40)	0	0	0	0	0	0	0	0	0	0	0	0	
(11) CBD/Other (0=CBD; 1=Other)	1	1	1	1	1	1	1	1	1	1	1	1	
(12) Right Turn Lane Type (0=Standard [Factor=1.00]; 1=Unprotected; 2=Protected w/ Shared Lane)	0	0	0	0	0	0	0	0	0	0	0	0	
(13) Pedestrians per Hour Conflicting with Right Turns (0; 50; 100; 200; 300; 400; or 500)	0	0	0	0	0	0	0	0	0	0	0	0	
(14) Left Turn Lane Type (0=Standard [Factor=1.00]; 1=Unprotected; 2=Protected w/Separate Arrow)	0	0	0	0	0	0	0	0	0	0	0	0	
(15) Saturated Flow Rate per Hour of Green Time (HCM Recommends 1900)	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	
(16) Signal Progression (1=PreTimed/Factor=1.0; 2=Actuated/Factor=0.85; 3=Actuated & Progressed)	1	1	1	1	1	1	1	1	1	1	1	1	
(17) Minimum Green Time in Seconds (Usually 7 to 10 seconds)	7	7	7	7	7	7	7	7	7	7	7	7	
FACTORS FROM TABLES													
(18) Lane Utilization Factor [Table 9-4]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(19) Lane Width Factor [Table 9-5]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(20) Heavy Vehicles Factor [Table 9-6]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(21) Grade Factor [Table 9-7]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(22) Parking Maneuvers Factor [Table 9-8]	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(23) Busses Stopping Fcator [Table 9-9]	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(24) CBD/Other Factor [Table 9-10]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(25) Right Turn Lane Factor [Table 9-11]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(26) Left Turn Lane factor [Table 9-12]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(27) Progression Adjustment Factor [Table 9-13]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(27a) Progression k Value [Table 9-14]	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	
CALCULATED VALUES AND PERFORMANCE MEASURES													
(28) Adjusted Flow Rate (in Peak 15 Minutes) in Vehicles per Hour, v = [(1)*(18)/(5)]	19	48	41	221	0	38	954	27	180	479	42	36	
(29) Adjusted Saturation Flow Rate in Vehicles per Hour of Green, s = [See Note 1]	950	950	1800	1900	0	1800	1900	1900	1800	1900	1900	1800	
(30) Flow Ratio, v/s = [(28)/(29)].	0.02	0.05	0.02	0.12	0.00	0.02	0.50	0.01	0.10	0.25	0.02	0.02	
(31) Minimum Green Plus Lost Time as Proportion of Cycle [See Note 7]	0.11	0.11	0.11	0.16	0.00	0.11	0.54	0.11	0.14	0.29	0.11	0.11	
(32) Critical Lane Group = [(31)'s That Are Critical]. Total is ICU. [See Note 10]	0.00	0.00	0.11	0.16	0.00	0.00	0.54	0.00	0.00	0.00	0.00	0.11	.918
Critical Lane Group = XXXX			XXXX	XXXX			XXXX					XXXX	
(33) Green Time Allocated as Proportion of Cycle, g/C=[See Note 2]. Sum of Critical Moves = 1.00	0.16	0.16	0.10	0.16	0.00	0.10	0.63	0.63	0.15	0.58	0.58	0.10	
(34) Green Time Allocated in Seconds, [(33) * Cycle Length]	16.5	16.5	10.4	16.4	0.0	10.3	62.9	62.9	15.2	58.0	58.0	10.3	
(35) Minimum Ped Time Needed to Cross Street [3 Seconds per Lane Crossed + 7 Seconds]	21	0	0	21	0	0	15	0	0	15	0	0	
(36) Signal Phases Available to Movement. 1 = Phase 1; 13 = Phases 1 and 3. [See Note 6]	68	68	56	8	8	5	24	24	12	4	4	1	
(37) Capacity in Vehicles per Hour (includes Yellow Penalty adjustment), c=[((33)-(4)/C)*(29)]	119	119	115	236	0	114	1119	1119	202	1026	1026	113	
(38) Volume to Capacity Ratio, v/c = X = [(28)/(37)]	0.16	0.41	0.36	0.94	0.00	0.33	0.85	0.02	0.89	0.47	0.04	0.32	
(39) Average Delay per Vehicle in Seconds, d [See Note 3]	40.5	53.5	55.2	100.5	0.0	53.9	27.5	7.1	97.4	14.6	9.2	53.0	39.86
(40) Percent of Vehicles That Have to Stop [1.00 -(33)]	84	84	90	84	0	90	37	37	85	42	42	90	
(41) Average Vehicle Queue Length at Beginning of Green, [(28)/(2) * Cycle Length/3600 * (40)]	0.9	2.2	1.0	5.1	0.0	0.9	9.8	0.3	4.2	5.6	0.5	0.9	6.33
(42) Do All Vehicles Clear? [YES if (38) < 0.95] [See Note 8]	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
(43) Level of Service (LOS) Based on (39) [See Note 4]	D+	D-	E+	F-	A+	D-	C	A-	F-	B	A-	D-	D+
(44) Leg Average Delay per Vehicle in Seconds - Level of Service, LOS	51.9 Sec; LOS = D-			93.7 Sec; LOS = F-			37.9 Sec; LOS = D+			16.6 Sec; LOS = B			D+

Signal Timing, Secs: Phase 1 = 10.3; Phase 2 = 4.9; Phase 3 = 0.0; Phase 4 = 58.0; Phase 5 = 10.3; Phase 6 = 0.0; Phase 7 = 0.0; Phase 8 = 16.4. If time = 0.0, Phase is skipped.
Signal Offsets, Secs: Phase 1 = 0.0; Phase 2 = 10.3; Phase 3 = 15.2; Phase 4 = 15.2; Phase 5 = 73.2; Phase 6 = 83.5; Phase 7 = 83.6; Phase 8 = 83.6.
See Notes on last page. NT = Northbound Through, NR = Northbound Right, NL = Northbound Left, ST = Southbound Through, ... , WL = Westbound Left

INTERSECTION DELAY CALCULATION USING 1997 HIGHWAY CAPACITY MANUAL PROCEDURE

Intersection: 2. Stanfield Cutoff (NS) and Big Bear Blvd. (EW)
Time Period: AM Peak Hour Lanes: Restriped

Traffic Condition: 2001 Average Month Without Project
Cycle Length: 100 Seconds (Maximum Cycle Length Needed to Satisfy Pedestrians When Present: 86 Seconds)

Descriptor	NT	NR	NL	ST	SR	SL	ET	ER	EL	WT	WR	WL	Total
INPUT DATA													
(1) Volume per Hour, V	24	24	27	23	245	12	278	15	93	658	44	25	1468
(2) Number of Lanes, N	0.50	0.50	1.00	1.00	0.00	1.00	2.00	0.00	1.00	2.00	0.00	1.00	10.00
(3) Right Turns (FREE=Free Right Turn Lane; AROW=Right Turn Arrow) [See Note 5]													
(4) Lost Time (Yellow, All Red, Etc) in Seconds, Y (Typically 2 to 4 Seconds) [See Note 9]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	
(5) Peak Hour Factor, PHF (1.00 for Peak Hour; 0.90 or 0.95 for Peak 15 Minutes)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
(6) Lane Width (8; 9; 10; 11; 12 [Factor = 1.00]; 13; 14; 15; or 16 for 15+)	12	12	12	12	12	12	12	12	12	12	12	12	
(7) Percent Heavy Vehicles (0; 2; 4; 6; 8; 10; 15; 20; 25; or 30; Typically 4 or 6)	0	0	0	0	0	0	0	0	0	0	0	0	
(8) Grade (-6; -4; -2; 0; +2; +4; or +6)	0	0	0	0	0	0	0	0	0	0	0	0	
(9) Parking Maneuvers per Hour (-1 = No Parking [Factor = 1.00]; 0; 10; 20; 30; or 40)	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	
(10) Buses Stopping per Hour (0; 10; 20; 30; or 40)	0	0	0	0	0	0	0	0	0	0	0	0	
(11) CBD/Other (0=CBD; 1=Other)	1	1	1	1	1	1	1	1	1	1	1	1	
(12) Right Turn Lane Type (0=Standard [Factor=1.00]; 1=Unprotected; 2=Protected w/ Shared Lane)	0	0	0	0	0	0	0	0	0	0	0	0	
(13) Pedestrians per Hour Conflicting with Right Turns (0; 50; 100; 200; 300; 400; or 500)	0	0	0	0	0	0	0	0	0	0	0	0	
(14) Left Turn Lane Type (0=Standard [Factor=1.00]; 1=Unprotected; 2=Protected w/Separate Arrow)	0	0	0	0	0	0	0	0	0	0	0	0	
(15) Saturated Flow Rate per Hour of Green Time (HCM Recommends 1900)	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	
(16) Signal Progression (1=PreTimed/Factor=1.0; 2=Actuated/Factor=0.85; 3=Actuated & Progressed)	1	1	1	1	1	1	1	1	1	1	1	1	
(17) Minimum Green Time in Seconds (Usually 7 to 10 seconds)	7	7	7	7	7	7	7	7	7	7	7	7	
FACTORS FROM TABLES													
(18) Lane Utilization Factor [Table 9-4]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(19) Lane Width Factor [Table 9-5]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(20) Heavy Vehicles Factor [Table 9-6]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(21) Grade Factor [Table 9-7]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(22) Parking Maneuvers Factor [Table 9-8]	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	
(23) Busses Stopping Fcator [Table 9-9]	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	
(24) CBD/Other Factor [Table 9-10]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(25) Right Turn Lane Factor [Table 9-11]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(26) Left Turn Lane factor [Table 9-12]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(27) Progression Adjustment Factor [Table 9-13]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(27a) Progression k Value [Table 9-14]	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	
CALCULATED VALUES AND PERFORMANCE MEASURES													
(28) Adjusted Flow Rate (in Peak 15 Minutes) in Vehicles per Hour, v = [(1)*(18)/(5)]	25	25	28	282	0	13	308	0	98	739	0	26	
(29) Adjusted Saturation Flow Rate in Vehicles per Hour of Green, s = [See Note 1]	950	950	1800	1900	0	1800	3800	0	1800	3800	0	1800	
(30) Flow Ratio, v/s = [(28)/(29)].	0.03	0.03	0.02	0.15	0.00	0.01	0.08	0.00	0.05	0.19	0.00	0.01	
(31) Minimum Green Plus Lost Time as Proportion of Cycle [See Note 7]	0.11	0.11	0.11	0.19	0.00	0.11	0.12	0.00	0.11	0.23	0.00	0.11	
(32) Critical Lane Group = [(31)'s That Are Critical]. Total is ICU. [See Note 10]	0.00	0.00	0.11	0.19	0.00	0.00	0.00	0.00	0.11	0.23	0.00	0.00	.642
Critical Lane Group = XXXX			XXXX	XXXX					XXXX	XXXX			
(33) Green Time Allocated as Proportion of Cycle, g/C=[See Note 2]. Sum of Critical Moves = 1.00	0.24	0.24	0.14	0.24	0.00	0.14	0.47	0.00	0.15	0.47	0.00	0.14	
(34) Green Time Allocated in Seconds, [(33) * Cycle Length]	24.4	24.4	14.2	24.3	0.0	14.2	47.2	0.0	14.5	46.9	0.0	14.2	
(35) Minimum Ped Time Needed to Cross Street [3 Seconds per Lane Crossed ÷ 7 Seconds]	21	0	0	21	0	0	15	0	0	15	0	0	
(36) Signal Phases Available to Movement. 1 = Phase 1; 13 = Phases 1 and 3. [See Note 6]	68	68	56	8	8	5	24	24	12	4	4	1	
(37) Capacity in Vehicles per Hour (includes Yellow Penalty adjustment), c=[((33)-(4)/C)*(29)]	193	193	184	386	0	184	1643	0	189	1631	0	184	
(38) Volume to Capacity Ratio, v/c = X = [(28)/(37)]	0.13	0.13	0.15	0.73	0.00	0.07	0.19	0.00	0.52	0.45	0.00	0.14	
(39) Average Delay per Vehicle in Seconds, d [See Note 3]	31.8	31.8	40.5	52.7	0.0	38.3	15.7	0.0	54.9	19.4	0.0	40.2	28.27
(40) Percent of Vehicles That Have to Stop [1.00 -(33)]	76	76	86	76	0	86	53	0	85	53	0	86	
(41) Average Vehicle Queue Length at Beginning of Green, [(28)/(2) * Cycle Length/3600 * (40)]	1.1	1.1	0.7	5.9	0.0	0.3	2.3	0.0	2.3	5.4	0.0	0.6	3.17
(42) Do All Vehicles Clear? [YES if (38) < 0.95] [See Note 8]	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
(43) Level of Service (LOS) Based on (39) [See Note 4]	C-	C-	D+	D-	A+	D+	B	A+	D-	B-	A+	D+	C
(44) Leg Average Delay per Vehicle in Seconds - Level of Service, LOS	34.9 Sec; LOS = C-			52.0 Sec; LOS = D-			25.1 Sec; LOS = C			20.1 Sec; LOS = C+			C

Signal Timing, Secs: Phase 1 = 14.2; Phase 2 = 0.3; Phase 3 = 0.0; Phase 4 = 46.9; Phase 5 = 14.2; Phase 6 = 0.0; Phase 7 = 0.0; Phase 8 = 24.3. If time = 0.0, Phase is skipped.
Signal Offsets, Secs: Phase 1 = 0.0; Phase 2 = 14.2; Phase 3 = 14.5; Phase 4 = 14.5; Phase 5 = 61.4; Phase 6 = 75.6; Phase 7 = 75.7; Phase 8 = 75.7.
See Notes on last page. NT = Northbound Through, NR = Northbound Right, NL = Northbound Left, ST = Southbound Through, ... , WL = Westbound Left

INTERSECTION DELAY CALCULATION USING 1997 HIGHWAY CAPACITY MANUAL PROCEDURE

Intersection: 2. Stanfield Cutoff (NS) and Big Bear Blvd. (EW)
Time Period: PM Peak Hour Lanes: Restriped

Traffic Condition: 2001 Average Month Without Project
Cycle Length: 100 Seconds (Maximum Cycle Length Needed to Satisfy Pedestrians When Present: 110 Seconds)

Descriptor	NT	NR	NL	ST	SR	SL	ET	ER	EL	WT	WR	WL	Total
INPUT DATA													
(1) Volume per Hour, V	18	46	39	22	178	21	906	26	153	455	13	34	1911
(2) Number of Lanes, N	0.50	0.50	1.00	1.00	0.00	1.00	2.00	0.00	1.00	2.00	0.00	1.00	10.00
(3) Right Turns (FREE=Free Right Turn Lane; AROW=Right Turn Arrow) [See Note 5]													
(4) Lost Time (Yellow, All Red, Etc) in Seconds, Y (Typically 2 to 4 Seconds) [See Note 9]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	
(5) Peak Hour Factor, PHF (1.00 for Peak Hour; 0.90 or 0.95 for Peak 15 Minutes)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
(6) Lane Width (8; 9; 10; 11; 12 [Factor = 1.00]; 13; 14; 15; or 16 for 15+)	12	12	12	12	12	12	12	12	12	12	12	12	
(7) Percent Heavy Vehicles (0; 2; 4; 6; 8; 10; 15; 20; 25; or 30; Typically 4 or 6)	0	0	0	0	0	0	0	0	0	0	0	0	
(8) Grade (-6; -4; -2; 0; +2; +4; or +6)	0	0	0	0	0	0	0	0	0	0	0	0	
(9) Parking Maneuvers per Hour (-1 = No Parking [Factor = 1.00]; 0; 10; 20; 30; or 40)	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	
(10) Buses Stopping per Hour (0; 10; 20; 30; or 40)	0	0	0	0	0	0	0	0	0	0	0	0	
(11) CBD/Other (0=CBD; 1=Other)	1	1	1	1	1	1	1	1	1	1	1	1	
(12) Right Turn Lane Type (0=Standard [Factor=1.00]; 1=Unprotected; 2=Protected w/ Shared Lane)	0	0	0	0	0	0	0	0	0	0	0	0	
(13) Pedestrians per Hour Conflicting with Right Turns (0; 50; 100; 200; 300; 400; or 500)	0	0	0	0	0	0	0	0	0	0	0	0	
(14) Left Turn Lane Type (0=Standard [Factor=1.00]; 1=Unprotected; 2=Protected w/Separate Arrow)	0	0	0	0	0	0	0	0	0	0	0	0	
(15) Saturated Flow Rate per Hour of Green Time (HCM Recommends 1900)	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	
(16) Signal Progression (1=PreTimed/Factor=1.0; 2=Actuated/Factor=0.85; 3=Actuated & Progressed)	1	1	1	1	1	1	1	1	1	1	1	1	
(17) Minimum Green Time in Seconds (Usually 7 to 10 seconds)	7	7	7	7	7	7	7	7	7	7	7	7	
FACTORS FROM TABLES													
(18) Lane Utilization Factor [Table 9-4]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(19) Lane Width Factor [Table 9-5]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(20) Heavy Vehicles Factor [Table 9-6]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(21) Grade Factor [Table 9-7]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(22) Parking Maneuvers Factor [Table 9-8]	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	
(23) Busses Stopping Fcator [Table 9-9]	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	
(24) CBD/Other Factor [Table 9-10]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(25) Right Turn Lane Factor [Table 9-11]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(26) Left Turn Lane factor [Table 9-12]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(27) Progression Adjustment Factor [Table 9-13]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(27a) Progression k Value [Table 9-14]	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	
CALCULATED VALUES AND PERFORMANCE MEASURES													
(28) Adjusted Flow Rate (in Peak 15 Minutes) in Vehicles per Hour, v = [(1)*(18)/(5)]	19	48	41	211	0	22	981	0	161	493	0	36	
(29) Adjusted Saturation Flow Rate in Vehicles per Hour of Green, s = [See Note 1]	950	950	1800	1900	0	1800	3800	0	1800	3800	0	1800	
(30) Flow Ratio, v/s = [(28)/(29)].	0.02	0.05	0.02	0.11	0.00	0.01	0.26	0.00	0.09	0.13	0.00	0.02	
(31) Minimum Green Plus Lost Time as Proportion of Cycle [See Note 7]	0.11	0.11	0.11	0.15	0.00	0.11	0.30	0.00	0.13	0.17	0.00	0.11	
(32) Critical Lane Group = [(31)'s That Are Critical]. Total is ICU. [See Note 10]	0.00	0.00	0.11	0.15	0.00	0.00	0.30	0.00	0.00	0.00	0.00	0.11	.668
Critical Lane Group = XXXX			XXXX	XXXX			XXXX					XXXX	
(33) Green Time Allocated as Proportion of Cycle, g/C=[See Note 2]. Sum of Critical Moves = 1.00	0.19	0.19	0.14	0.19	0.00	0.14	0.53	0.00	0.19	0.48	0.00	0.14	
(34) Green Time Allocated in Seconds, [(33) * Cycle Length]	19.3	19.3	14.3	19.0	0.0	14.0	52.5	0.0	18.6	48.1	0.0	14.2	
(35) Minimum Ped Time Needed to Cross Street [3 Seconds per Lane Crossed + 7 Seconds]	21	0	0	21	0	0	15	0	0	15	0	0	
(36) Signal Phases Available to Movement. 1 = Phase 1; 13 = Phases 1 and 3. [See Note 6]	68	68	56	8	8	5	24	24	12	4	4	1	
(37) Capacity in Vehicles per Hour (includes Yellow Penalty adjustment), c=[((33)-(4)/C)*(29)]	146	146	185	285	0	179	1844	0	264	1674	0	183	
(38) Volume to Capacity Ratio, v/c = X = [(28)/(37)]	0.13	0.33	0.22	0.74	0.00	0.12	0.53	0.00	0.61	0.29	0.00	0.20	
(39) Average Delay per Vehicle in Seconds, d [See Note 3]	36.4	44.5	42.4	62.1	0.0	39.9	17.4	0.0	53.3	16.4	0.0	41.7	26.75
(40) Percent of Vehicles That Have to Stop [1.00 -(33)]	81	81	86	81	0	86	47	0	81	52	0	86	
(41) Average Vehicle Queue Length at Beginning of Green, [(28)/(2) * Cycle Length/3600 * (40)]	0.8	2.2	1.0	4.7	0.0	0.5	6.5	0.0	3.6	3.6	0.0	0.9	4.36
(42) Do All Vehicles Clear? [YES if (38) < 0.95] [See Note 8]	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
(43) Level of Service (LOS) Based on (39) [See Note 4]	D+	D	D	E+	A+	D+	B-	A+	D-	B	A+	D	C
(44) Leg Average Delay per Vehicle in Seconds - Level of Service, LOS	42.3 Sec; LOS = D			60.0 Sec; LOS = E+			22.5 Sec; LOS = C+			18.1 Sec; LOS = B-			C

Signal Timing, Secs: Phase 1 = 14.2; Phase 2 = 4.5; Phase 3 = 0.0; Phase 4 = 48.1; Phase 5 = 14.0; Phase 6 = 0.3; Phase 7 = 0.0; Phase 8 = 19.0. If time = 0.0, Phase is skipped.
Signal Offsets, Secs: Phase 1 =. 0.0; Phase 2 = 14.2; Phase 3 = 18.6; Phase 4 = 18.6; Phase 5 = 66.7; Phase 6 = 80.7; Phase 7 = 81.0; Phase 8 = 81.0.
See Notes on last page. NT = Northbound Through, NR = Northbound Right, NL = Northbound Left, ST = Southbound Through, ... , WL = Westbound Left

INTERSECTION DELAY CALCULATION USING 1997 HIGHWAY CAPACITY MANUAL PROCEDURE

Intersection: 2. Stanfield Cutoff (NS) and Big Bear Blvd. (EW)
Time Period: AM Peak Hour Lanes: Restriped

Traffic Condition: 2001 Average Month With Project
Cycle Length: 100 Seconds (Maximum Cycle Length Needed to Satisfy Pedestrians When Present: 82 Seconds)

Descriptor	NT	NR	NL	ST	SR	SL	ET	ER	EL	WT	WR	WL	Total
INPUT DATA													
(1) Volume per Hour, V	24	24	27	23	261	35	278	15	98	658	52	25	1520
(2) Number of Lanes, N	0.50	0.50	1.00	1.00	0.00	1.00	2.00	0.00	1.00	2.00	0.00	1.00	10.00
(3) Right Turns (FREE=Free Right Turn Lane; AROW=Right Turn Arrow) [See Note 5]													
(4) Lost Time (Yellow, All Red, Etc) in Seconds, Y (Typically 2 to 4 Seconds) [See Note 9]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	
(5) Peak Hour Factor, PHF (1.00 for Peak Hour; 0.90 or 0.95 for Peak 15 Minutes)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
(6) Lane Width (8; 9; 10; 11; 12 [Factor = 1.00]; 13; 14; 15; or 16 for 15+)	12	12	12	12	12	12	12	12	12	12	12	12	
(7) Percent Heavy Vehicles (0; 2; 4; 6; 8; 10; 15; 20; 25; or 30; Typically 4 or 6)	0	0	0	0	0	0	0	0	0	0	0	0	
(8) Grade (-6; -4; -2; 0; +2; +4; or +6)	0	0	0	0	0	0	0	0	0	0	0	0	
(9) Parking Maneuvers per Hour (-1 = No Parking [Factor = 1.00]; 0; 10; 20; 30; or 40)	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	
(10) Buses Stopping per Hour (0; 10; 20; 30; or 40)	0	0	0	0	0	0	0	0	0	0	0	0	
(11) CBD/Other (0=CBD; 1=Other)	1	1	1	1	1	1	1	1	1	1	1	1	
(12) Right Turn Lane Type (0=Standard [Factor=1.00]; 1=Unprotected; 2=Protected w/ Shared Lane)	0	0	0	0	0	0	0	0	0	0	0	0	
(13) Pedestrians per Hour Conflicting with Right Turns (0; 50; 100; 200; 300; 400; or 500)	0	0	0	0	0	0	0	0	0	0	0	0	
(14) Left Turn Lane Type (0=Standard [Factor=1.00]; 1=Unprotected; 2=Protected w/Separate Arrow)	0	0	0	0	0	0	0	0	0	0	0	0	
(15) Saturated Flow Rate per Hour of Green Time (HCM Recommends 1900)	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	
(16) Signal Progression (1=PreTimed/Factor=1.0; 2=Actuated/Factor=0.85; 3=Actuated & Progressed)	1	1	1	1	1	1	1	1	1	1	1	1	
(17) Minimum Green Time in Seconds (Usually 7 to 10 seconds)	7	7	7	7	7	7	7	7	7	7	7	7	
FACTORS FROM TABLES													
(18) Lane Utilization Factor [Table 9-4]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(19) Lane Width Factor [Table 9-5]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(20) Heavy Vehicles Factor [Table 9-6]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(21) Grade Factor [Table 9-7]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(22) Parking Maneuvers Factor [Table 9-8]	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	
(23) Busses Stopping Fcator [Table 9-9]	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	
(24) CBD/Other Factor [Table 9-10]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(25) Right Turn Lane Factor [Table 9-11]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(26) Left Turn Lane factor [Table 9-12]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(27) Progression Adjustment Factor [Table 9-13]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(27a) Progression k Value [Table 9-14]	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	
CALCULATED VALUES AND PERFORMANCE MEASURES													
(28) Adjusted Flow Rate (in Peak 15 Minutes) in Vehicles per Hour, v = [(1)*(18)/(5)]	25	25	28	299	0	37	308	0	103	747	0	26	
(29) Adjusted Saturation Flow Rate in Vehicles per Hour of Green, s = [See Note 1]	950	950	1800	1900	0	1800	3800	0	1800	3800	0	1800	
(30) Flow Ratio, v/s = [(28)/(29)].	0.03	0.03	0.02	0.16	0.00	0.02	0.08	0.00	0.06	0.20	0.00	0.01	
(31) Minimum Green Plus Lost Time as Proportion of Cycle [See Note 7]	0.11	0.11	0.11	0.20	0.00	0.11	0.12	0.00	0.11	0.24	0.00	0.11	
(32) Critical Lane Group = [(31)'s That Are Critical]. Total is ICU. [See Note 10]	0.00	0.00	0.11	0.20	0.00	0.00	0.00	0.00	0.11	0.24	0.00	0.00	.654
Critical Lane Group = XXXX			XXXX	XXXX					XXXX	XXXX			
(33) Green Time Allocated as Proportion of Cycle, g/C=[See Note 2]. Sum of Critical Moves = 1.00	0.25	0.25	0.14	0.25	0.00	0.14	0.46	0.00	0.14	0.46	0.00	0.14	
(34) Green Time Allocated in Seconds, [(33) * Cycle Length]	25.3	25.3	14.1	25.3	0.0	14.2	46.4	0.0	14.5	46.1	0.0	14.1	
(35) Minimum Ped Time Needed to Cross Street [3 Seconds per Lane Crossed + 7 Seconds]	21	0	0	21	0	0	15	0	0	15	0	0	
(36) Signal Phases Available to Movement. 1 = Phase 1; 13 = Phases 1 and 3. [See Note 6]	8	8	5	78	78	57	24	24	12	4	4	1	
(37) Capacity in Vehicles per Hour (includes Yellow Penalty adjustment), c=[((33)-(4)/C)*(29)]	202	202	182	405	0	183	1611	0	188	1599	0	182	
(38) Volume to Capacity Ratio, v/c = X = [(28)/(37)]	0.12	0.12	0.16	0.74	0.00	0.20	0.19	0.00	0.55	0.47	0.00	0.14	
(39) Average Delay per Vehicle in Seconds, d [See Note 3]	30.8	30.8	40.6	51.9	0.0	41.9	16.2	0.0	57.1	20.1	0.0	40.3	29.23
(40) Percent of Vehicles That Have to Stop [1.00 -(33)]	75	75	86	75	0	86	54	0	86	54	0	86	
(41) Average Vehicle Queue Length at Beginning of Green, [(28)/(2) * Cycle Length/3600 * (40)]	1.0	1.0	0.7	6.2	0.0	0.9	2.3	0.0	2.5	5.6	0.0	0.6	3.17
(42) Do All Vehicles Clear? [YES if (38) < 0.95] [See Note 8]	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
(43) Level of Service (LOS) Based on (39) [See Note 4]	C-	C-	D+	D-	A+	D	B	A+	E+	C+	A+	D+	C
(44) Leg Average Delay per Vehicle in Seconds - Level of Service, LOS	34.4 Sec; LOS = C-			50.8 Sec; LOS = D-			26.4 Sec; LOS = C			20.8 Sec; LOS = C+			C

Signal Timing, Secs: Phase 1 = 14.1; Phase 2 = 0.3; Phase 3 = 0.0; Phase 4 = 46.1; Phase 5 = 14.1; Phase 6 = 0.0; Phase 7 = 0.0; Phase 8 = 25.3. If time = 0.0, Phase is skipped.
Signal Offsets, Secs: Phase 1 = 0.0; Phase 2 = 14.1; Phase 3 = 14.5; Phase 4 = 14.5; Phase 5 = 60.5; Phase 6 = 74.7; Phase 7 = 74.7; Phase 8 = 74.7.
See Notes on last page. NT = Northbound Through, NR = Northbound Right, NL = Northbound Left, ST = Southbound Through, ... , WL = Westbound Left

INTERSECTION DELAY CALCULATION USING 1997 HIGHWAY CAPACITY MANUAL PROCEDURE

Intersection: 2. Stanfield Cutoff (NS) and Big Bear Blvd. (EW)
Time Period: PM Peak Hour Lanes: Restriped

Traffic Condition: 2001 Average Month With Project
Cycle Length: 100 Seconds (Maximum Cycle Length Needed to Satisfy Pedestrians When Present: 106 Seconds)

Descriptor	NT	NR	NL	ST	SR	SL	ET	ER	EL	WT	WR	WL	Total
INPUT DATA													
(1) Volume per Hour, V	18	46	39	22	188	36	906	26	171	455	40	34	1981
(2) Number of Lanes, N	0.50	0.50	1.00	1.00	0.00	1.00	2.00	0.00	1.00	2.00	0.00	1.00	10.00
(3) Right Turns (FREE=Free Right Turn Lane; AROW=Right Turn Arrow) [See Note 5]													
(4) Lost Time (Yellow, All Red, Etc) in Seconds, Y (Typically 2 to 4 Seconds) [See Note 9]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	
(5) Peak Hour Factor, PHF (1.00 for Peak Hour; 0.90 or 0.95 for Peak 15 Minutes)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
(6) Lane Width (8; 9; 10; 11; 12 [Factor = 1.00]; 13; 14; 15; or 16 for 15+)	12	12	12	12	12	12	12	12	12	12	12	12	
(7) Percent Heavy Vehicles (0; 2; 4; 6; 8; 10; 15; 20; 25; or 30; Typically 4 or 6)	0	0	0	0	0	0	0	0	0	0	0	0	
(8) Grade (-6; -4; -2; 0; +2; +4; or +6)	0	0	0	0	0	0	0	0	0	0	0	0	
(9) Parking Maneuvers per Hour (-1 = No Parking [Factor = 1.00]; 0; 10; 20; 30; or 40)	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	
(10) Buses Stopping per Hour (0; 10; 20; 30; or 40)	0	0	0	0	0	0	0	0	0	0	0	0	
(11) CBD/Other (0=CBD; 1=Other)	1	1	1	1	1	1	1	1	1	1	1	1	
(12) Right Turn Lane Type (0=Standard [Factor=1.00]; 1=Unprotected; 2=Protected w/ Shared Lane)	0	0	0	0	0	0	0	0	0	0	0	0	
(13) Pedestrians per Hour Conflicting with Right Turns (0; 50; 100; 200; 300; 400; or 500)	0	0	0	0	0	0	0	0	0	0	0	0	
(14) Left Turn Lane Type (0=Standard [Factor=1.00]; 1=Unprotected; 2=Protected w/Separate Arrow)	0	0	0	0	0	0	0	0	0	0	0	0	
(15) Saturated Flow Rate per Hour of Green Time (HCM Recommends 1900)	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	
(16) Signal Progression (1=PreTimed/Factor=1.0; 2=Actuated/Factor=0.85; 3=Actuated & Progressed)	1	1	1	1	1	1	1	1	1	1	1	1	
(17) Minimum Green Time in Seconds (Usually 7 to 10 seconds)	7	7	7	7	7	7	7	7	7	7	7	7	
FACTORS FROM TABLES													
(18) Lane Utilization Factor [Table 9-4]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(19) Lane Width Factor [Table 9-5]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(20) Heavy Vehicles Factor [Table 9-6]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(21) Grade Factor [Table 9-7]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(22) Parking Maneuvers Factor [Table 9-8]	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	
(23) Busses Stopping Fcator [Table 9-9]	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	
(24) CBD/Other Factor [Table 9-10]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(25) Right Turn Lane Factor [Table 9-11]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(26) Left Turn Lane factor [Table 9-12]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(27) Progression Adjustment Factor [Table 9-13]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(27a) Progression k Value [Table 9-14]	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	
CALCULATED VALUES AND PERFORMANCE MEASURES													
(28) Adjusted Flow Rate (in Peak 15 Minutes) in Vehicles per Hour, v = [(1)*(18)/(5)]	19	48	41	221	0	38	981	0	180	521	0	36	
(29) Adjusted Saturation Flow Rate in Vehicles per Hour of Green, s = [See Note 1]	950	950	1800	1900	0	1800	3800	0	1800	3800	0	1800	
(30) Flow Ratio, v/s = [(28)/(29)].	0.02	0.05	0.02	0.12	0.00	0.02	0.26	0.00	0.10	0.14	0.00	0.02	
(31) Minimum Green Plus Lost Time as Proportion of Cycle [See Note 7]	0.11	0.11	0.11	0.16	0.00	0.11	0.30	0.00	0.14	0.18	0.00	0.11	
(32) Critical Lane Group = [(31)'s That Are Critical]. Total is ICU. [See Note 10]	0.00	0.00	0.11	0.16	0.00	0.00	0.30	0.00	0.00	0.00	0.00	0.11	.674
Critical Lane Group = XXXX			XXXX	XXXX			XXXX					XXXX	
(33) Green Time Allocated as Proportion of Cycle, g/C=[See Note 2]. Sum of Critical Moves = 1.00	0.20	0.20	0.14	0.20	0.00	0.14	0.52	0.00	0.20	0.46	0.00	0.14	
(34) Green Time Allocated in Seconds, [(33) * Cycle Length]	19.7	19.7	14.2	19.7	0.0	14.2	52.0	0.0	20.1	46.0	0.0	14.1	
(35) Minimum Ped Time Needed to Cross Street [3 Seconds per Lane Crossed + 7 Seconds]	21	0	0	21	0	0	15	0	0	15	0	0	
(36) Signal Phases Available to Movement. 1 = Phase 1; 13 = Phases 1 and 3. [See Note 6]	68	68	56	8	8	5	24	24	12	4	4	1	
(37) Capacity in Vehicles per Hour (includes Yellow Penalty adjustment), c=[((33)-(4)/C)*(29)]	149	149	184	297	0	183	1824	0	290	1596	0	182	
(38) Volume to Capacity Ratio, v/c = X = [(28)/(37)]	0.13	0.32	0.22	0.74	0.00	0.21	0.54	0.00	0.62	0.33	0.00	0.20	
(39) Average Delay per Vehicle in Seconds, d [See Note 3]	35.9	43.6	42.5	61.5	0.0	42.1	17.9	0.0	51.5	18.0	0.0	41.8	27.53
(40) Percent of Vehicles That Have to Stop [1.00 -(33)]	80	80	86	80	0	86	48	0	80	54	0	86	
(41) Average Vehicle Queue Length at Beginning of Green, [(28)/(2) * Cycle Length/3600 * (40)]	0.8	2.2	1.0	4.9	0.0	0.9	6.5	0.0	4.0	3.9	0.0	0.9	4.40
(42) Do All Vehicles Clear? [YES if (38) < 0.95] [See Note 8]	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
(43) Level of Service (LOS) Based on (39) [See Note 4]	D+	D	D	E+	A+	D	B-	A+	D-	B-	A+	D	C
(44) Leg Average Delay per Vehicle in Seconds - Level of Service, LOS	41.8 Sec; LOS = D			58.6 Sec; LOS = E+			23.1 Sec; LOS = C+			19.6 Sec; LOS = B-			C

Signal Timing, Secs: Phase 1 = 14.1; Phase 2 = 6.0; Phase 3 = 0.0; Phase 4 = 46.0; Phase 5 = 14.2; Phase 6 = 0.1; Phase 7 = 0.0; Phase 8 = 19.7. If time = 0.0, Phase is skipped.
Signal Offsets, Secs: Phase 1 = 0.0; Phase 2 = 14.1; Phase 3 = 20.1; Phase 4 = 20.1; Phase 5 = 66.1; Phase 6 = 80.3; Phase 7 = 80.3; Phase 8 = 80.3.
See Notes on last page. NT = Northbound Through, NR = Northbound Right, NL = Northbound Left, ST = Southbound Through, ... , WL = Westbound Left

INTERSECTION DELAY CALCULATION USING 1997 HIGHWAY CAPACITY MANUAL PROCEDURE

Intersection: 2. Stanfield Cutoff (NS) and Big Bear Blvd. (EW)
Time Period: AM Peak Hour Lanes: Existing

Traffic Condition: 2001 Peak Month Without Project
Cycle Length: 100 Seconds (Maximum Cycle Length Needed to Satisfy Pedestrians When Present: 91 Seconds)

Descriptor	NT	NR	NL	ST	SR	SL	ET	ER	EL	WT	WR	WL	Total
INPUT DATA													
(1) Volume per Hour, V	30	30	34	29	306	15	348	19	116	823	55	31	1836
(2) Number of Lanes, N	0.50	0.50	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	10.00
(3) Right Turns (FREE=Free Right Turn Lane; AROW=Right Turn Arrow) [See Note 5]													
(4) Lost Time (Yellow, All Red, Etc) in Seconds, Y (Typically 2 to 4 Seconds) [See Note 9]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	
(5) Peak Hour Factor, PHF (1.00 for Peak Hour; 0.90 or 0.95 for Peak 15 Minutes)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
(6) Lane Width (8; 9; 10; 11; 12 [Factor = 1.00]; 13; 14; 15; or 16 for 15+)	12	12	12	12	12	12	12	12	12	12	12	12	
(7) Percent Heavy Vehicles (0; 2; 4; 6; 8; 10; 15; 20; 25; or 30; Typically 4 or 6)	0	0	0	0	0	0	0	0	0	0	0	0	
(8) Grade (-6; -4; -2; 0; +2; +4; or +6)	0	0	0	0	0	0	0	0	0	0	0	0	
(9) Parking Maneuvers per Hour (-1 = No Parking [Factor = 1.00]; 0; 10; 20; 30; or 40)	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	
(10) Buses Stopping per Hour (0; 10; 20; 30; or 40)	0	0	0	0	0	0	0	0	0	0	0	0	
(11) CBD/Other (0=CBD; 1=Other)	1	1	1	1	1	1	1	1	1	1	1	1	
(12) Right Turn Lane Type (0=Standard [Factor=1.00]; 1=Unprotected; 2=Protected w/ Shared Lane)	0	0	0	0	0	0	0	0	0	0	0	0	
(13) Pedestrians per Hour Conflicting with Right Turns (0; 50; 100; 200; 300; 400; or 500)	0	0	0	0	0	0	0	0	0	0	0	0	
(14) Left Turn Lane Type (0=Standard [Factor=1.00]; 1=Unprotected; 2=Protected w/Separate Arrow)	0	0	0	0	0	0	0	0	0	0	0	0	
(15) Saturated Flow Rate per Hour of Green Time (HCM Recommends 1900)	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	
(16) Signal Progression (1=PreTimed/Factor=1.0; 2=Actuated/Factor=0.85; 3=Actuated & Progressed)	1	1	1	1	1	1	1	1	1	1	1	1	
(17) Minimum Green Time in Seconds (Usually 7 to 10 seconds)	7	7	7	7	7	7	7	7	7	7	7	7	
FACTORS FROM TABLES													
(18) Lane Utilization Factor [Table 9-4]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(19) Lane Width Factor [Table 9-5]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(20) Heavy Vehicles Factor [Table 9-6]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(21) Grade Factor [Table 9-7]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(22) Parking Maneuvers Factor [Table 9-8]	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(23) Busses Stopping Fcator [Table 9-9]	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(24) CBD/Other Factor [Table 9-10]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(25) Right Turn Lane Factor [Table 9-11]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(26) Left Turn Lane factor [Table 9-12]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(27) Progression Adjustment Factor [Table 9-13]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
(27a) Progression k Value [Table 9-14]	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	
CALCULATED VALUES AND PERFORMANCE MEASURES													
(28) Adjusted Flow Rate (in Peak 15 Minutes) in Vehicles per Hour, v = [(1)*(18)/(5)]	32	32	36	353	0	16	366	20	122	866	58	33	
(29) Adjusted Saturation Flow Rate in Vehicles per Hour of Green, s = [See Note 1]	950	950	1800	1900	0	1800	1900	1900	1800	1900	1900	1800	
(30) Flow Ratio, v/s = [(28)/(29)].	0.03	0.03	0.02	0.19	0.00	0.01	0.19	0.01	0.07	0.46	0.03	0.02	
(31) Minimum Green Plus Lost Time as Proportion of Cycle [See Note 7]	0.11	0.11	0.11	0.23	0.00	0.11	0.23	0.11	0.11	0.50	0.11	0.11	
(32) Critical Lane Group = [(31)'s That Are Critical]. Total is ICU. [See Note 10]	0.00	0.00	0.11	0.23	0.00	0.00	0.00	0.00	0.11	0.50	0.00	0.00	.941
Critical Lane Group = XXXX			XXXX	XXXX					XXXX	XXXX			
(33) Green Time Allocated as Proportion of Cycle, g/C=[See Note 2]. Sum of Critical Moves = 1.00	0.23	0.23	0.11	0.23	0.00	0.11	0.55	0.55	0.11	0.54	0.54	0.11	
(34) Green Time Allocated in Seconds, [(33) * Cycle Length]	23.0	23.0	11.2	23.0	0.0	11.2	54.5	54.5	11.3	54.5	54.5	11.2	
(35) Minimum Ped Time Needed to Cross Street [3 Seconds per Lane Crossed ÷ 7 Seconds]	21	0	0	21	0	0	15	0	0	15	0	0	
(36) Signal Phases Available to Movement. 1 = Phase 1; 13 = Phases 1 and 3. [See Note 6]	68	68	56	8	8	5	24	24	12	4	4	1	
(37) Capacity in Vehicles per Hour (includes Yellow Penalty adjustment), c=[((33)-(4)/C)*(29)]	181	181	130	361	0	130	960	960	131	959	959	130	
(38) Volume to Capacity Ratio, v/c = X = [(28)/(37)]	0.17	0.17	0.28	0.98	0.00	0.12	0.38	0.02	0.93	0.90	0.06	0.25	
(39) Average Delay per Vehicle in Seconds, d [See Note 3]	34.3	34.3	49.0	92.6	0.0	43.0	14.9	10.5	125.9	40.1	10.9	47.9	49.29
(40) Percent of Vehicles That Have to Stop [1.00 -(33)]	77	77	89	77	0	89	45	45	89	46	46	89	
(41) Average Vehicle Queue Length at Beginning of Green, [(28)/(2) * Cycle Length/3600 * (40)]	1.4	1.4	0.9	7.5	0.0	0.4	4.6	0.3	3.0	11.0	0.7	0.8	6.20
(42) Do All Vehicles Clear? [YES if (38) < 0.95] [See Note 8]	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	YES	YES	NO
(43) Level of Service (LOS) Based on (39) [See Note 4]	C-	C-	D-	F	A+	D	B	B+	F-	D+	B+	D	D-
(44) Leg Average Delay per Vehicle in Seconds - Level of Service, LOS	39.6 Sec; LOS = D+			90.5 Sec; LOS = F			41.4 Sec; LOS = D+			38.6 Sec; LOS = D+			D-

Signal Timing, Secs: Phase 1 = 11.2; Phase 2 = 0.1; Phase 3 = 0.0; Phase 4 = 54.5; Phase 5 = 11.2; Phase 6 = 0.0; Phase 7 = 0.0; Phase 8 = 23.0. If time = 0.0, Phase is skipped.
Signal Offsets, Secs: Phase 1 = 0.0; Phase 2 = 11.2; Phase 3 = 11.3; Phase 4 = 11.3; Phase 5 = 65.8; Phase 6 = 77.0; Phase 7 = 77.0; Phase 8 = 77.0.
See Notes on last page. NT = Northbound Through, NR = Northbound Right, NL = Northbound Left, ST = Southbound Through, ... , WL = Westbound Left